

NJPL

New Jersey

July/August 1987
\$1.95

Outdoors

STATE DEPOSITORY
PUBLIC LIBRARY



Jersey Shore Issue
4 Extra Pages & Snap Out Poster

New Jersey Outdoors

- 2 Bluefish: King of the Surf • *Pete McLain*
- 8 Claws • *Larry Sarnier*
- 12 New Jersey Shore: Keeping It Clean • *Rachelle Garbarine*
- 17 David Hart: Father of New Jersey Marine Fisheries Management • *Pete McLain*
- 19 A Jersey Shore Treasure: Island Beach State Park • *Mary Ann Evans*
- 23 Good News Bad News: Recreational Fishing in the Hudson River • *Bill Andrews*
- 28 Wading Birds • *Richard Riker*
- 30 Stranded: Former Navy Diver Aids Marine Mammals • *Cathie Cush*
- 34 MSX and the Oysters of Delaware Bay: The Parasite (Part 2) • *Susan Ford and Jean Jones*
- 37 Marine Enforcement • *Larry Sarnier*

DEPARTMENTS

- 7 Calendar of Events
- 18 Letters to the Editor

MINI/FEATURES

- Jersey Shore Poster—Center Spread Snapout
Front cover enlarged to poster size.
- 40 Wildlife in New Jersey—Snow Geese

Front Cover

The Jersey Shore: An attraction for generations; a resource for generations to come. Photo by Peter Michael Zanetti

Back Cover

1986 July 4th Bicentennial fireworks spectacular over the Statue of Liberty, viewed from the Jersey City shoreline of Liberty State Park. Photo by George Goodwin

(Note: Costs of publishing the magazine not covered by subscriptions are met from general revenues available to the Department of Environmental Protection.)

The views and opinions of authors do not necessarily represent the opinion or policies of the Department of Environmental Protection or the State of New Jersey.

New Jersey Outdoors (USPS 380-520) is published bi-monthly (six times a year) by the N.J. Department of Environmental Protection. Second-class postage is paid at Trenton, N.J. and additional mailing offices. Subscriptions are \$6.50 for one year, \$11.95 for two years, and \$15.95 for three years payable by check or money order to New Jersey Outdoors Mailing Office, CN 402, Trenton, N.J. 08625. Single copies, if available, cost \$1.95. POSTMASTER: Send address changes to *New Jersey Outdoors* mailing office. Send old and new addresses and the zip code numbers. The Post Office will not forward copies unless forwarding postage is provided by the subscriber. Allow eight weeks for new subscriptions and change of address to take effect. *New Jersey Outdoors* welcomes photographs and articles, but will not be responsible for loss or damage. Permission granted to reprint with credit to *New Jersey Outdoors*. Telephone: Circulation (609) 530-5772; Editor's Office, (609) 292-2477 or 633-2102. Toll free number, 1-800-345-8112 for subscription information.

State of New Jersey

Thomas H. Kean
Governor

Department of Environmental Protection

Richard T. Dewling
Commissioner

Communications and Public Education

Regina Desvernine, Director

Howard J. Wolf, Deputy Director
CN 402, Trenton, NJ 08625
Telephone: (609) 633-2103

New Jersey Outdoors Magazine Staff

Steve Perrone
Editor

Circulation
Jackie Fisher
Margaret Scott
Art Director
John Mocerl

Graphic Design
Paul J. Kraml
Production Coordinator
Joyce M. Albanezi
Student Assistant
Karl Sperling

Natural Resources Group Liaison

Helen C. Fenske
Assistant Commissioner

Editorial Advisory Board

Jacqueline Berke
Charles Coffin
John T. Cunningham
Patricia Haughey
Gene Hill
Robert Lick
Scott McGonigle
Jim Naylor
Karen Reeds
Richard J. Sullivan

NEW JERSEY OUTDOORS CREDO

This publication is dedicated to the wise management and conservation of our natural resources and to the fostering of greater appreciation of the outdoors. The purpose of this publication is to promote proper use and appreciation of our natural, cultural, and recreational resources, and to provide information that will help protect and improve the environment of New Jersey.

Guest Editorial

By JOHN WEINGART

The New Jersey shore is beautiful in the summer. Year-round residents and seasonal and daily visitors peacefully coexist with the water and sand. Life seems to slow down and the problems of the world appear confined to jellyfish, sunburns and vacations that are too short.

But during a storm the shore is a different place. The ocean declares war on the beachfront communities, threatening life and property. The tranquility of a sunny summer day is remembered as a cover for a reconnaissance mission by the storm. Most people wisely flee for their lives, while the houses and roads that must stay behind are buffeted by the winds and waves.


The summer of 1987 is an appropriate time in which to reflect on the power of hurricanes and other coastal storms. This year is the 25th anniversary of the last storm to inflict major damage along most of the Jersey shore, and it also marks the 43rd anniversary of the 1944 hurricane. These storms killed people and caused tremendous financial losses to individuals and to government at all levels. The 1962 storm completely destroyed close to 2,000 private homes and severely damaged water and sewer pipes and beaches, jetties and seawalls, as well as causing twelve people to lose their lives and thousands of people to be evacuated by helicopter. The storm cut two channels across Long Beach Island, dividing it into thirds and stranding residents at the northern tip.

Nevertheless, the Jersey shore is now much more intensely developed than it has ever been. Governor Richard Hughes, who took office just before the April 1962 storm, issued a warning that is worth remembering 25 years later. Chairing a conference of Atlantic Coast governors and Federal officials on long-range shore protection after the storm, Governor Hughes concluded his remarks by saying, "I think it is

certain that we will recover from the latest disaster and we will make a good recovery. But unless we consider future activity only in terms of lasting protection of future disasters, we stand to suffer again and again loss of life and property.

"We must learn that nature has provided its own means of accommodating high waters, high tides, and other accommodations of natural forces which periodically destroy what man has created. We have learned once again through this sobering experience in March that nature will exact a heavy toll from those who insist upon encroaching on areas which are intended as natural shock absorbers for nature's tremendous destructive forces. If we would develop such areas with a sense of caution and respect for the oddities of nature, we would then have substantially lessened the risk of the kind of destruction that we have just experienced."

As we enjoy the shore this summer, it is important to learn from the past storms so that we can be better prepared for those that will come in the future. The Department of Environmental Protection and the Cape May County Planning Board are co-sponsoring a program on the 1962 storm subtitled "Remembrances of Things To Come." This program will be held on Friday, September 18, in the Cape May City Convention Hall. This program is open free of charge to the public. For further information, write to the Division of Coastal Resources, CN 401, Trenton, NJ 08625.


While at the shore this summer, be sure to learn the evacuation route from your area. Also, use a rainy day to visit your local historical society or museum to learn more about the way storms have affected the shore in the past. Try to talk with people who have lived through major coastal storms. And finally, think about the ways in which the shore should be used and developed in the future and make your views known to decision makers at all levels of government. 

In this Issue



This special Jersey Shore Issue of New Jersey Outdoors focuses in on the Atlantic Ocean, Delaware Bay and Hudson River shoreline of New Jersey. Specific areas that are referenced are highlighted. The article page numbers listed in the table of contents appear on the location map. A quick glance shows points of interest along the entire coast.

For most residents, that stretch from Sandy Hook to Cape May is known simply as—*THE SHORE*. For some it means one specific thing. For others it can mean something entirely different. Solitude ... honky tonk ... surf and sand ... fishing and crabbing ... dunes and waves ... breezes ... bathing suits and sunburn ... driftwood and seaweed...

This summer the state is launching a major campaign to keep coastal beaches and water clean and free of litter. The public education program is being conducted by DEP in cooperation with the State Division of Travel and Tourism, local municipalities, businesses and community groups. Use the pull-out poster (centerfold) to spread the message: **NEW JERSEY SHORE ... KEEP IT PERFECT!** 

BLUEFISH

King of the Surf

BY PETE MCLAIN



The gigantic schools of monster bluefish, many up to 20 pounds, ravaging the mullet and other small bait fish in the surf, more than earn bluefish the title, "King of the Surf." There is no other sport fish on the Atlantic coast that hits the surf with such dynamic force and intensity as the blues, which arrive along the Jersey beaches in mid-May and stay until early December.

Surf fishing is frequently regarded as one of the least productive forms of angling. When it's good, it's really good. But when it's poor, it's slim pickings. However, when the bluefish are just offshore in the ocean, the surf fisherman is almost sitting on a time bomb waiting for someone to announce "the blues are in." That simple statement starts the saltwater sportsmen heading for Jersey beaches from Sandy Hook to Cape May Point with their long rods and high expectations of experiencing some of the best surf fishing to be found in the United States.

The schools of bluefish along the Jersey coast tend to follow an annual behavior pattern and feeding habit which keeps the anglers guessing. The first bluefish arrive in Jersey, on their northward migration, from mid-May to early June. These are the lean fish called "racers," which may go from three to six pounds, but are skinny until they settle down to feed. The "summer bluefish," generally great schools of two to five pound blues, live just offshore most of the summer and make forays to the surf during the early morning and late evening hours, and also after dark. Some days they will "blitz" the beach all day long but they generally avoid the bright summer sun in favor of the dusk and dawn.

The fall bluefish are the surf fishermen's delight. When the mullet migration hits the Jersey coast around the second week of September, the migrating schools of big slammer bluefish are right on their trail. From late September until mid-December, there is day after day of catching bluefish up to 20 pounds in the surf that cause some anglers to lay back on the beach exhausted from doing battle with these fall blues. Last fall, 1986, was the greatest year for fall surf bluefishing in the memory of the oldest veteran Jersey surf fishermen.

Now this is not to say that you drive down to Island Beach State Park any day of the week from late May to December, throw a line in the water and catch bluefish. It doesn't work that way. The bluefish move in schools and they feed when they are ready. You might set with

your rod in a sand spike for 10 hours and never have a strike, then for an hour the surf will be alive with blues. There may be a week or two that goes by when the tackle shops report, "a slow pick." There will be other days, especially in the fall, when you will see acres of surfacing bluefish with thousands of gulls and terns working over them, about four long casts off the beach. But this is all part of surf fishing for blues.

However, bluefish provide the best surf fishing in New Jersey, and also in the coastal states from Maine to the Carolinas. Years ago the striped bass was the most sought after surf fish, but the present low populations and restrictive legislation, has focused angler's attention on the bluefish, which are getting larger and more numerous every year. Back in the 1960's if you caught a six pound bluefish it was a bragging size fish, in the 1970's the average blue was pulling the scales down to 10 pounds, and by the mid-1980's, it was not unusual to hook a 15 to 18 pounder. I suspect this fall there will be a number of bluefish top the 20 pound mark.

Surf fishing is somewhat of a specialized angling where the proper equipment is re-

quired to accommodate the size of the fish, and the moods of the ocean's surf. You don't need a \$25,000. 4-wheel drive beach buggy, a battery of long rods, expensive reels, and a tackle box which is too heavy to lift off the ground. However, there are basic rods, reels, lures and apparel, which allows you to enter the surf fishing fraternity and fraternize with the most experienced old salts.

Perhaps the most confusing aspect of getting into surf fishing for the neophyte is the surf rod. First and foremost, there is no "all purpose" surf rod and reel combination. There are some types of rods and reel combinations which are designed for "most" surf fishing, but I don't know of a single rod which will do everything properly. This is true of hunting arms, golf clubs and most other outdoor recreational equipment. So the wise angler spends a little time and effort researching what the best rods and reel combination are for the type of surf fishing he expects to do and where.

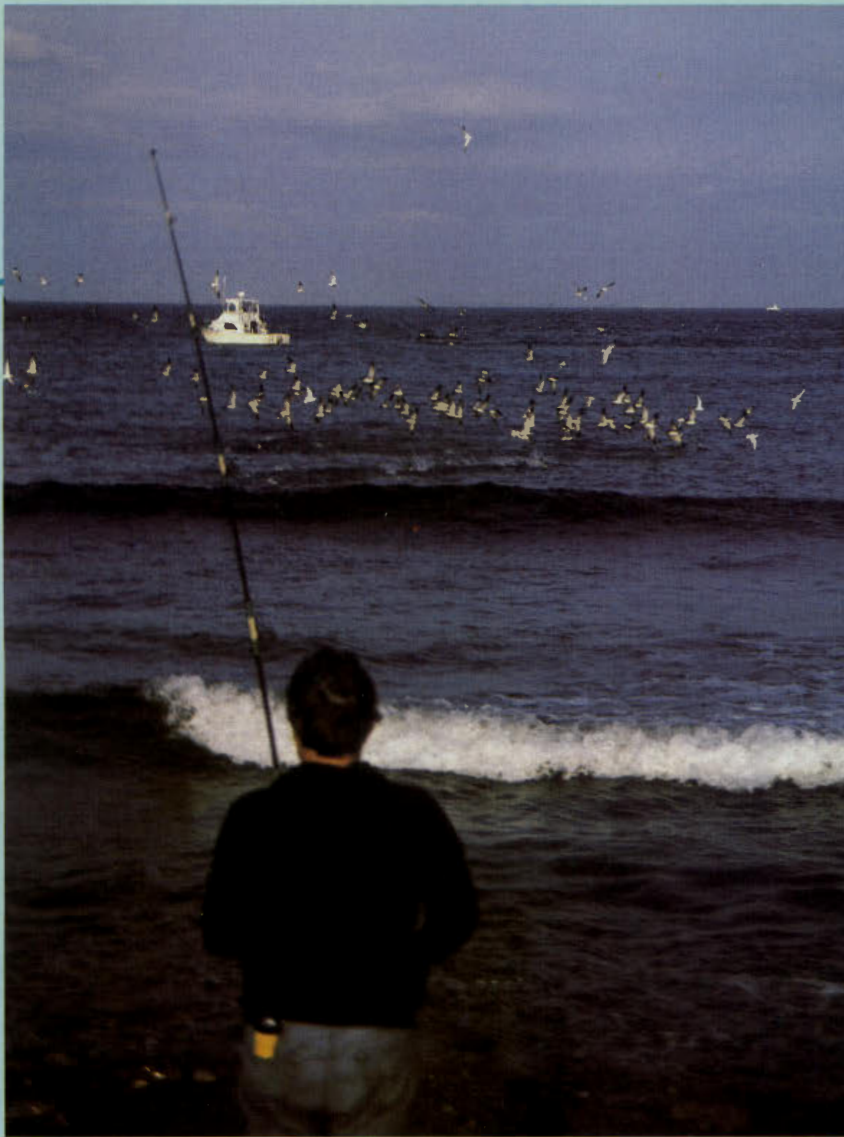
I would recommend that the prospective surf angler make several visits to coastal tackle shops, which have a reputation for carrying a complete line of surf fishing tackle.

Pete McLain is a regular contributor to New Jersey Outdoors. He is known to many as the former (retired) Assistant Director of the New Jersey Division of Fish, Game and Wildlife. Pete authored two articles for this issue of NEW JERSEY OUTDOORS. See also *David Hart: Father of New Jersey Marine Fisheries Management*.

Author with an 18 pound bluefish landed after a 10 minute battle.

With a permit, four wheel drive vehicles are allowed access to designated areas of the beach at Island Beach State Park.





Talk to the owner and ask for his recommendations and suggestion based on what your individual needs and interests might be. Selling saltwater fishing tackle is his business and he is an expert. Stay away from the bargain basement discount stores where the clerks may be selling fishing rods one day and sneakers the next. Also, talk to anglers on the beach and see what rods and reels they are using. When you lay out the money for a surf rod and reel, be certain you know what you are buying.

Surf rods are generally longer and stiffer than most other types of fishing rods for two reasons. First, you may need to cast up to six ounces of sinker and bait out 200 feet into the surf to get to where the fish are feeding. This takes a stout rod with "backbone" to effectively throw heavy weight and baits. Secondly, there are big fish in the surf. You may tie into a striped bass over 50 pounds, a bluefish over 20, or a channel bass which tops 45 pounds. This being the case, you need a stout rod and a quality reel to get the fish through the wash and onto the beach. However, there will be days when the blues and other surf fish are within 30 feet of the beach. Here you may be casting a 1/2 to 1 ounce lure, and you will be spending a lot of time and energy casting, a lighter rod, something around eight feet is easier to cast.

If I was forced to make a recommendation for selecting surf tackle for Jersey bluefish, it would be two rod and reel outfits. One would be a medium-heavy spinning rod in graphite or fiberglass construction, about 10 foot long, which would handle lures up to five ounces, and carry 12 to 25 pound test monofilament line. This would be the rod for reaching out 200 feet for baitfishing or casting heavy lures.

The other choice would be a medium action 8 foot spinning rod and reel, "jetty stick" type, which is considerably lighter, with a more limber action, and would easily handle lures from 1/2 ounce to three ounces. The line would be 8 to 17 pound monofilament. This rod would probably be your favorite as it's light enough to cast for hours without breaking your back. But the 10 footer would be the backup rod when the fish are just over the bar or demanding a big hunk of bait, which is hard to cast with the lighter rod.

Now the veteran surf hounds will scream that I have forgotten the big 13 foot, or longer, "Hatteras heaviers" with conventional revolving spool reels loaded with 30 pound test line.



There is no question that these monster rods have their place in a surf fisherman's life, but they are not a beginner's rod.

Some excellent advice is to be certain that you match the rod and reel to the fishing line test and lure weights. This can not be over emphasized, if you expect to get the best performance from your tackle. Fortunately, the rod and reel manufacturers make it easy. On the better rods, the manufacturers list the line test and lure weights recommended for that particular rod. Likewise the reel manufacturers list the yards of line of a particular test recommended for a reel. A tremendous amount of research has gone into developing these recommendations, and they should be followed. Generally, you will find that for most surf fishing, 8 to 17 pound test mono line will cast well and handle anything you hook.

However, when it comes to bluefish and other toothy fish, you must use a length of heavier line or leader to prevent the fish from cutting the casting line. Most blue fishermen prefer to add a 10 inch length of 30 to 50 pound monofilament between their line and the lure or bait. This can be done by tying in a barrel swivel at the line and heavier mono-

filament, or simply tying the two together. Some anglers prefer to use a 30 pound length of wire leader. It comes complete with a swivel and snap. Personally, I feel you catch more fish with the heavy monofilament.

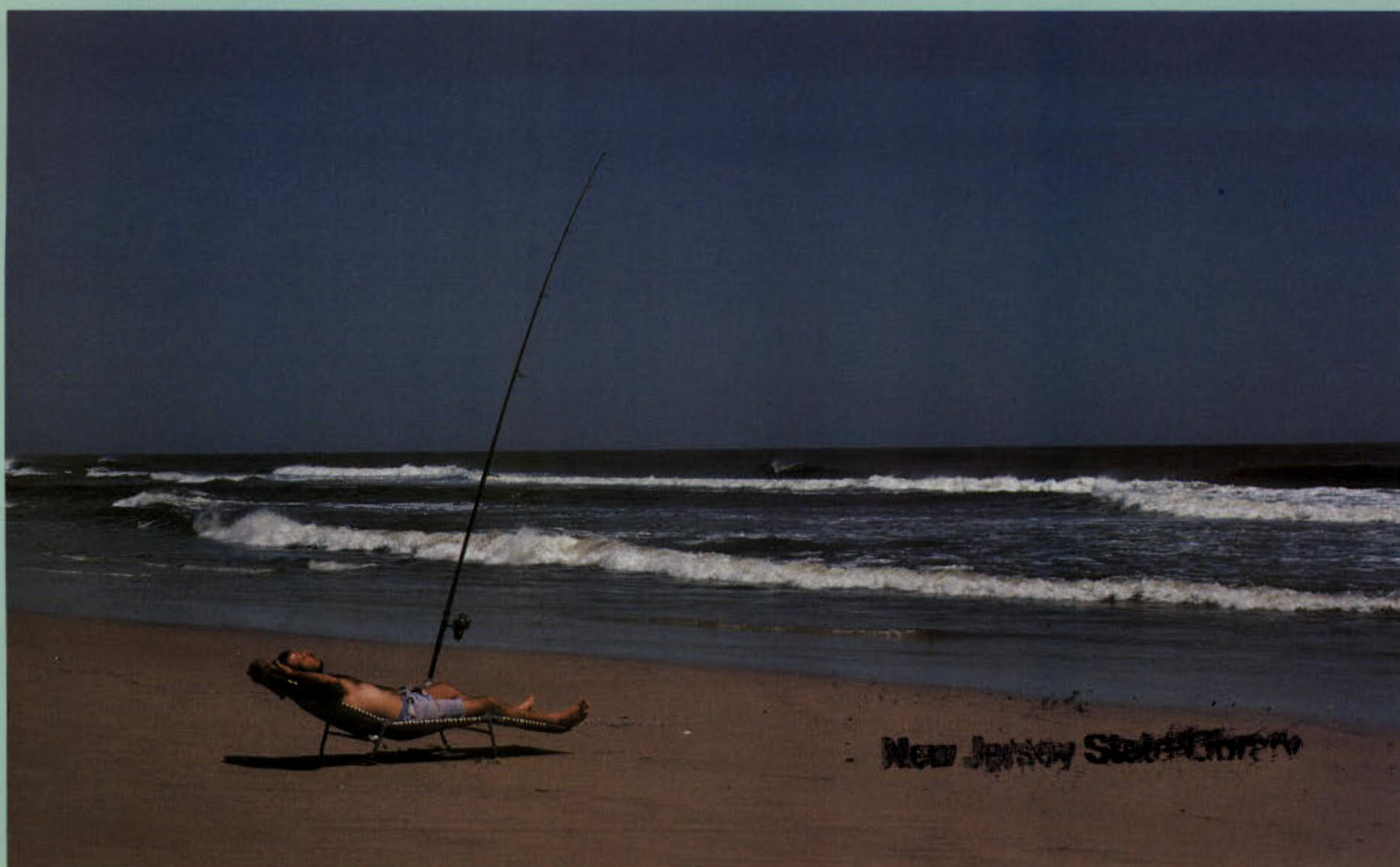
When it comes to selecting lures and baits for bluefish in the surf, the choice is unlimited. There are days when the bluefish are crashing bait against the beach that they can be caught on a teaspoon with a hook tied to it. There are other days, when they might ignore every lure in the tackle shop. However, on most days there are certain lures and baits, which consistently take bluefish, to the exclusions of everything else. There are also certain wind and water conditions which will dictate which lures you can cast.

As the seasons change, the selection of baits and lures shifts. When the bluefish first arrive in late May and June, they are hungry to gain the weight they have lost on their northern migration. A hunk of fresh mackerel or a frozen mullet on a 4/0 hook fished on a bottom rig, is something they find hard to refuse. If there is a bluefish school chasing small bait fish, a 1½ ounce Hopkins metal or a 3/4 ounce bucktail jig may do the trick. A swimming,

Because of the bluefish's voracious feeding habits they can easily be caught from the shore or from a boat.

Although bluefish bite on almost anything, shown are some of typical lures and tackle.

Bluefishing is strenuous to some and relaxing to others.



diving, or popping plug may also drive them crazy. A good trick for the first time bluefisherman is to watch what the local anglers are using for bait or lures.


The summer bluefishing from late June to early September, is a more relaxed affair. Here you can bait up a chunk of mackerel, mullet, blood worm or squid, cast out your bottom rig with a pyramid sinker, to hold bottom, and relax in a lawn chair while getting your summer tan, and wait for the bluefish to bite. Always keep the drag on your reel adjusted so the fish can take the line off the reel, rather than dragging your rod into the surf. Just before dark and early in the morning, you may wish to use your lighter surf rod to toss swimming plugs, metals, and surface poppers for bluefish which are feeding on bait near the beach.

Without a question the best bluefishing occurs in the fall. The mullet, baitfish about two to five inches long, migrate down the surf in tremendous schools, and the bluefish are right after them. Around the second or third week of September the mullet run usually hits Island Beach State Park, one of the prime bluefishing areas in the United States. From late September until early December the bluefish schools come down the surf. The prime time would be October to late November.

You have to witness a school of several thousand bluefish chasing the mullet down the surf line to believe it. The mullet and blues will be breaking water in the feeding frenzy, as the gulls and terns circle and dive into the melee picking up pieces of mullet left by the

feeding blues. The surf fishermen will be standing shoulder to shoulder casting and catching fish as long as they can endure the physical exertion. When the blues hit the beach in the fall the sports writers and tackle shops quickly get the word out. Local surf fishermen are soon joined by the North Jersey anglers, then the beach buggies start to show up from Pennsylvania, Virginia, New York, Massachusetts, Delaware, Maryland and the Carolinas. When the bluefish are in the Jersey surf, the auto traffic and activity along the beach makes it appear that summer has returned.

Where is the best place to fish the Jersey surf for bluefish? The answer is just about anywhere you can reach the ocean's surf from the tip of Sandy Hook to Cape May Point. However, action may vary depending on the season and movement of the fish. The Monmouth County beaches can be red hot, while Island Beach State Park surf may be a slow pick. The next day the fish may be off Island Beach and Long Beach Island. A few days later they may pass Atlantic City and Cape May. These patterns may last for two months during the spectacular fall migration. During the summer and late spring, the fish are not as mobile, and easier to predict.

New Jersey is blessed with some of the best surf fishing on the Atlantic Coast. Most of the beaches are accessible and open to public fishing. The local tackle shops are in business to help you get started in surf fishing, all you have to do is go. Once you are hooked on surf bluefishing, it's too late. 

Catch of the day



CALENDAR OF EVENTS

Summer Programs

WASHINGTON CROSSING STATE PARK
Route 29, Titusville. Sunday Family
Hikes—1:30 PM

Alternate Saturdays Family Nature Pro-
grams Call Nature Center (609) 737-0609
for details and places.

SOMERSET COUNTY PARK COMMISSION
ENVIRONMENTAL EDUCATION PRO-
GRAMS Call (201) 766-2489 for summer
programs

JULY

11 INNERTUBING: LOWER BEACH—
HARRISVILLE, Pine Barrens. Meet
by 10:30 a.m. at Harrisville Dam, Rt.
679, 7 miles north of New Gretna
(Rt. 9) and 11 miles south of
Chatsworth. A 20-minute walk to
embarkation point and a 20-minute
walk after a two-hour cruise-in-a-
tube in lush pineland beauty. Wear-
ing old sneakers is a must, plus life
jackets for children and weak swim-
mers. Water depth averages less
than three feet. Bring innertube and
lunch. For information, call (609)
267-7062.

28 FOLK MUSIC FOR YOUNG FOLK
10:30 A.M. on Tennis court area
w/Berlin Park, White Horse Pike (Rt.
30) and Park Drive in Berlin.

AUGUST

1&2 WETLANDS PRESERVATION,
George Spinner, a retired naturalist
will present a two-day workshop of
lectures and field trips at the Wet-
lands Institute, Stone Harbor. Call
Wetlands Institute, (609) 368-1211
for details.

8 "MARINE ENFORCEMENT OF NJ'S
SHELLFISH AND MARINE FISH RE-
SOURCES," Karl Yunghans of
NJDEP will discuss regulations on
recreational and commercial fish-
ing industries, at 8:15 PM at the
Wetlands Institute, Stone Harbor.

8 FLOAT TRIP: GODFREY BRIDGE-
EVANS BRIDGE. There's nothing
better in "dog days" than 1½ hours
of floating down the Wading River
after a 45-minute warm-up walk to
starting point. This favorite of tub-
ing buffs can be followed optionally
by a FULL MOON HIKE (See next
entry). Bring lunch and usual re-

quirements for tubing. Meet *by 1:30
p.m.* at Evans Bridge, Rt. 563, 11
miles south of Chatsworth, Burling-
ton Co. Bring lunch and an optional
picnic supper.

FULL MOON HIKE: LAKE OSWEGO
(7 MILES) In the Pine Barrens. Meet
at Lake Oswego, 3½ miles east of Rt.
563 on Penn Forest-Jenkins Road
which leads east from 563 at a point
8½ miles south of Chatsworth and
2½ mi. north of Evans Bridge. Easy
hiking with a snack stop midway.
Bring your own snacks and a flash-
light. In this idyllic setting under a
summer moon "even the fish fall in
love." Meet *no later than 7:30* or
miss out! Ideal for singles and non-
singles, too! For information, call
Bert Nixdorf, (609) 267-7052.

SEPTEMBER

7 CHESTER—LONG VALLY ROTARY
Labor CLUB 32nd ANNUAL HORSE
Day SHOW. Featuring Somerset Hills
Handicapped Riders Club. 8 AM to
4 PM at Chubb Park, Route 24 in
Chester. Admission charge. Infor-
mation, 201-852-9066.

Spend a Weekend on the Wild Side of New Jersey

Wildlife workshops for teachers at

New Jersey School of Conservation
Branchville Sept. 11-13, 1987

Sponsored and conducted by New
Jersey Division of Fish, Game and
Wildlife, these workshops give
information and skills to teach
about the environment. Courses
are taught by wildlife biologists.
Graduate credit is offered through
Rutgers University.

Call: 201 **637-4125**

Division of Fish, Game and Wildlife



C · L · A · W · S



PHOTOGRAPHS PROVIDED BY THE DIVISION OF FISH, GAME & WILDLIFE

BY LARRY SARNER

The five-inch female blue crab rested quietly under a bunch of ulva, or sea lettuce. Earlier she had a light meal of some worms she dug up from the mud on which she rested. Her mouth parts would absently scrape diatom film off ulva leaves that the weak currents might waft by her face. Occasionally, she would even take a bite out of the ulva itself. But she was always ready for the big meal that sometimes came her way. Little could she understand how dangerous it was to be overly eager or tempted by the strange yet inviting morsel that was about to be offered her.

The fluid ceiling to her world was only a few feet above her back. Each day it would rise and fall twice. Earlier she had moved from deeper water, where she wintered over in a rather inactive stupor. Now, in her shallow creek in the salt marsh, she had become quite alert as the waters warmed. This was the third season in which she had experienced this warming. It would likely be her last.

Some time ago the last segments on her abdomen (which were normally tightly pressed against her thorax, or chest) started to be forced downward, hinging from the rear, as orange-colored eggs were forced out from inside her and formed a "sponge." Over a million of these eggs had accumulated. They had been fertilized earlier by a male who deposited sperm inside her during their unique crustacean mating ritual. Most of her eggs were well on their way toward developing into minute zoeae larvae, which would later swim free among the estuarine plankton. Before the summer was over they would change into the megalops stage and change form again before settling to the bottom and eventually looking and acting like their parents.

The day was warm. The sky above the crab's ceiling held scattered clouds, of which she was only faintly aware. Their passing caused her world to become alternately lighter and dimmer. But now a new type of shadow settled above her. Its source, unlike a cloud, had hard, smoother edges and extended down into the water. She saw strange, unnatural-looking, boxy cages come down around her. In the center of each was the type of thing she was always waiting for: a fresh fish head, her favorite meal. Several times she started to do her sideways movement toward one of the delectable morsels but got beaten to the punch by some of her more aggressive neighbors. Then these cages closed up, rose quickly to the ceiling, moved up through it and were gone, usually with the neighbor on board. The neighborhood was getting lonely. She became

cautious. However, she also became hungry. The fish smell whetted her appetite. It was driving caution away.

Also, from this shadow above her, lines were lowered with a strange kind of meat attached. This was something not naturally encountered in her marine environment. She had no way of knowing that they were the necks of feathered creatures that some other, almost bare-skinned, hairy beings raised far away in another realm for meat and eggs. All she could feel was the hunger building. The appetite for those alien objects, however strange, became uncontrollable.

She swiftly moved sideways, half swimming, half crawling, and latched onto one of the chicken necks with her powerful, blue-streaked claws, ripping pieces off and feeding them to her very active mouth. So engrossed in this activity was she that she did not notice the ceiling lowering, closing in on her. Actually, she was rising. She didn't even notice a stringy, net-type bag enter down through the ceiling, come under her and then quickly up. By the time she became aware of all this she was wrenched quickly up through her ceiling, out into a strange, dry, airy world. She was lowered unceremoniously onto the other side of the shadow-giver whose bottom had intruded into her world and her life.

After a few moments of panic, of gnashing out with her claws at some soft round claws borne by a strange creature her eyes and brain could barely make out, she found herself pulled away from the net, tossed a few feet through the air and sent crashing down through her wet ceiling again. Doing her typical sideward swim, claws tucked in tight, she quickly angled down to her beloved ulva bed, resting after her brief but traumatic encounter of an unwanted kind.

Epilogue

She would never know, nor did she have the mental equipment to know the significance of her adventure. Her egg mass had saved her. Many of her former neighbors would be boiled within a few hours to feed the strange aliens that sent the tempting probes into her world. A very few of her departed fellows, the ones getting ready to shed their shells, would be kept in floating cages for a short reprieve. Then, once these fellows shed but while the new shells were still soft, the aliens would delight in feeding themselves with this highly prized meal for millions of New Jerseyans and visitors to the Garden State, New Jersey soft-shell blue crabs.

Larry Sarnar is a Marine Education Specialist with the Division of Fish, Game and Wildlife. Larry recently joined DEP after a twenty year science teaching career. Larry authored two articles for this issue of *NEW JERSEY OUTDOORS*. See also *Marine Enforcement*.

This "Sponge" Crab, a fertilized female, is carrying up to two million eggs. The sponge's color—from orange to yellow to dark brown (just before the eggs hatch)—indicates the development of the eggs.



Catch of the day—Boy with basket full of crabs.

The sex and the maturity of Blue Crab can be identified from the underside. Lower: "Jimmy." Upper left: Immature Female "She Crab." Upper right: Mature Female.



A. Zoea

Stage—Microscopic in size, they drift as estuarine plankton.

B. Megalops Stage—After shedding its shell several times, it begins to take on crab-like characteristics.

C. First Crab Stage—Begins to migrate to brackish water from the highly saline waters where it was born.

Some NJ Crabs

Of the two dozen or so crabs that are likely to be found in New Jersey waters, the blue crab is by far the best known. (Relative length is given for the solid shell's longest dimension.)

- Blue crab, *Callinectes sapidus*; 8"; found mostly in bays
- Jonah crab, *Cancer borealis*; 6"; ocean, mostly offshore
- Rock crab, *Cancer irroratus*; 5"; ocean, mostly offshore
- Spider crab, *Libinia emarginata*; 4"; bays and ocean
- Lady crab, *Ovalipes ocellatus*; 3"; most stepped-on crab by ocean bathers
- Ghost crab, *Ocypode quadrata*; 2"; sandy beaches

Mud crabs, *Panopeus* sp.; 1"; mostly bays
Fiddler crabs, *Uca* sp.; 1"; intertidal mud banks and flats

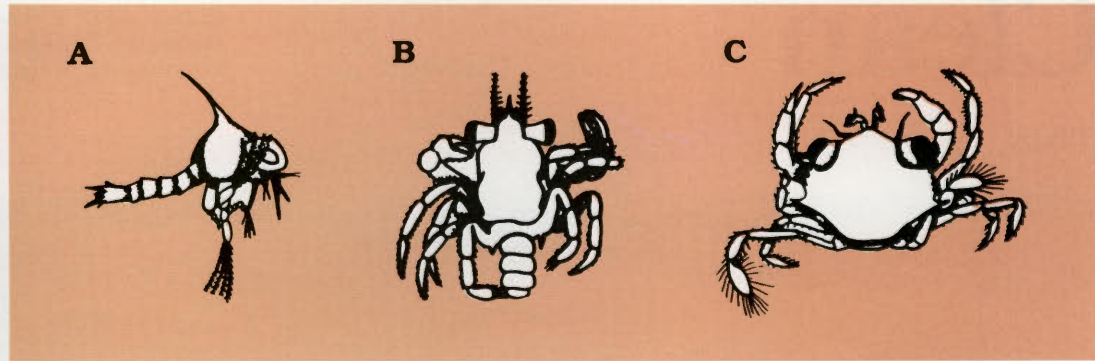
Flat-clawed hermit crabs, *Pagurus pollicaris*; 1 1/4"; mostly ocean, in large shells (moon snail and whelks)

Long-clawed hermit crabs, *Pagurus longicarpus*; 3/8"; mostly bays, in small shells (mud snails and oyster drills)

Mole crabs, *Emerita talpoida*; 1"; shallow ocean

Horseshoe crabs, *Limulus polyphemus*; 14"; not a crab—not even a crustacean

SOURCE: *A Field Guide to the Atlantic Seashore* by Kenneth L. Gosner in the Peterson Field Guide Series; Houghton Mifflin Co., 1978. NJ



SOFT SHELLS MARGARET

Tuckahoe Inn
Route 9 on the Bay
Beesley's Point, NJ 08223

Thanks to Pete Harp, proprietor

- 4 soft-shelled crabs—cleaned and trimmed
- 1/4 cup light beer
- 1/4 cup flour
- 1 tbsp. grainy mustard
- 1 tbsp. oil
- freshly ground pepper
- 1/2 oz. lean ham, diced
- 1 scallion, trimmed and thinly sliced
- 4 lemon wedges

Preheat oven to 375°; lightly oil a baking sheet and set aside.
Pour the beer into a large bowl.

Gradually whisk the flour until a smooth batter results. Stir in the mustard and set the batter aside.
Heat 1 tbsp. of oil in a nonstick skillet over medium-high heat. Sprinkle the crabs with some pepper. Dip the crabs in the batter; shake off excess batter and place in the skillet. Cook the crabs on the first side until they are browned—about 45 seconds—then brown the otherside. Transfer the crabs to the baking sheet.

Bake the crabs for 8 minutes. Remove from oven and scatter the ham and scallions over them, return to oven and bake for 2 more minutes. Serve immediately and garnish with the lemon wedges.

New Jersey Shore

Keeping it Clean

BY RACHELLE D. GARBARINE

History in New Jersey's time-worn and gentle Atlantic coastal region is made up of beachfront towns and twisting roads, of high tides and sand dunes, and of churning, steel-blue waves that slap against the shore. Over time, the ocean has beckoned many people to live, work and play along its edge, stretching 127 miles from Monmouth County to the Cape May peninsula. But, like almost every other environmentally sensitive area in the State, the coastal zone has had to struggle to survive. And survive it did, lasting for most of this century as a natural retreat, far from the harsh urban environment found in the northern half of the State.

In the past decade, however, that tradition has been threatened. As development began to intrude across New Jersey, populations grew and land dwindled, straining many of the State's natural resources. The ocean and its shoreline, it seems, have been hurt the most. The two, environmentalists say, are victims of

This

SCOTT GREENWALD



progress, carelessness and pollution. The most recent and most visible culprit, they add, is plastic debris—from bags to containers and from tampon applicators to six-pack soda-can rings—that wash up on beaches. The unsightly rubble has come to represent both the State's worsening waste disposal problem and the continuing degradation of one of its most important natural resources. To many it's a clear sign that something has to be done.

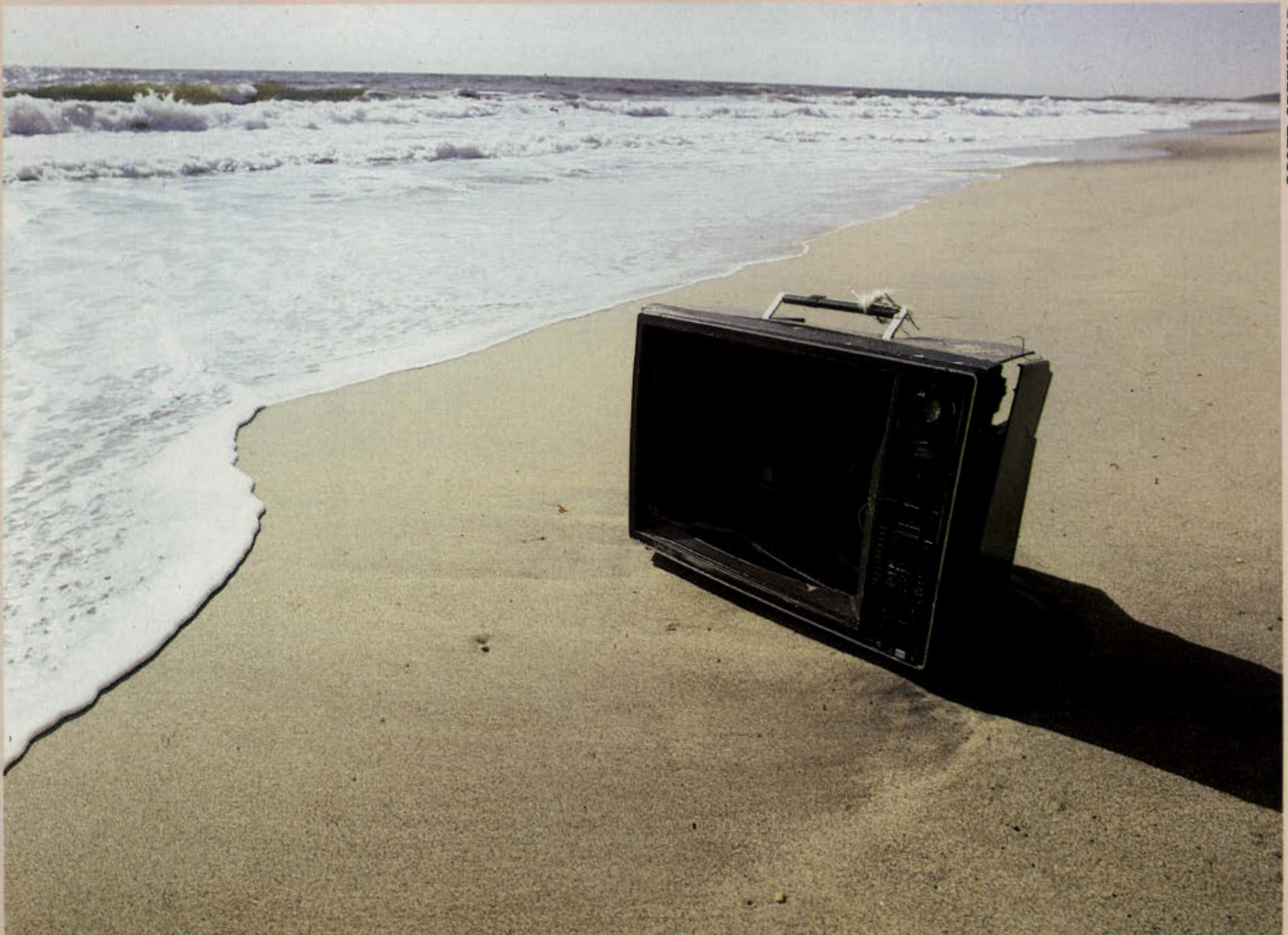
The ocean is at once vast and powerful, yet very fragile, said State Senator Leonard T. Connors, Jr. (R-Ocean), who is calling for an all-out campaign to "clean our waterways and our beaches." And he has authored several bills—including one that would create the New Jersey Shore Protection Authority—to do just that. According to Senator Connors, who is also the mayor of Surf City and a commercial fisherman, it is estimated that on an annual basis ships discharge over 639,000 plastic containers and fishermen lose or dispose of

about 135,000 metric tons of netting into the ocean. "People," he said, his words colored with sadness, "can ruin things so easily."

Senator Connors is not alone in this campaign. It is one that many New Jerseyans, especially those in the southern part of the State, support. To make their views known they have begun to organize anti-litter walks along some of the State's beaches and to rally municipal and State officials—anything they can think of to make all residents aware of the sad condition of the waters off the New Jersey coast. "We are the ocean dumping capital of the world," said Cynthia Zipf, coordinator of Clean Ocean Action, a regional coalition against ocean dumping that comprises 70 organizations from the New York and New Jersey metropolitan area and has its headquarters in Sea Bright.

"Look at Staten Island," said Zipf, with a touch of irony, "the Fresh Kills landfill is fast becoming the highest point on the East

or That



SCOTT GREENWALD

Coast." What all this means, Zipf added, is that more and more people may be looking to the ocean as the solution. "Ocean dumping could be easy and economical and, for the most part, would keep the problem out of sight," she said. "but it's a shell game: new problems would surface because the old ones have not been solved." Fortunately, a shift toward dumping solid waste in the ocean is not under consideration and is illegal under New Jersey law.

One long-standing environmental problem has been litter on the State's beaches. In some environmental circles it has been dubbed the pink tide because of the myriad of tampon applicators—nick-named New Jersey sea shells or sea whistles—that can be found covering the sand or floating in the ocean. However, the litter encompasses other plastics, paper, glass, metals, lumber and trees. A study conducted in 1975 by the National Academy of Sciences revealed that 6.4 million tons of litter found its way into the world's oceans

each year, and a majority of this was dumped from merchant ships. Time has only served to enhance the problem, as recent estimates show that 75 percent of the 6,000 commercial vessels leaving NY Harbor ply along the NJ coast, and 60 percent of those entering the harbor travel the same route. DEP Commissioner Richard T. Dewling has said, "It's like having a moving municipality off shore, with a population of thousands going back and forth dumping garbage overboard."

Litter is an obvious aesthetic problem. Researchers believe that it may also injure marine organisms, damage ships and machinery and, though the link is less clear, constitute a health problem.

In recent years the focus has centered on non-biodegradable plastics. There are several reasons, including the increased production of plastics in the United States (up to 47.9 billion pounds today) and a growing body of

This or That. . .

SCOTT GREENWALD



SCOTT GREENWALD



evidence that such floatables affect the ocean and its inhabitants—from marine mammals to shorebirds.

Robert Schoelkopf, founding director of the Marine Mammal Stranding Center in Brigantine, can attest to the dangers of plastics. Schoelkopf said that the deaths of five out of the 35 animals he finds a year can be traced to plastics. That figure, he added, raises questions about the unknown number of marine mammals that could be dying from plastics off shore. It has been recognized that sea turtles, for example, feed on plastic bags and sheeting, mistaking them for jellyfish, Schoelkopf said.

The National Marine Fishery Service's northeastern headquarters, in Massachusetts, cited New Jersey with the highest incidence of marine mammal deaths related to plastic ingestion. Add to that the Federal research pointing out that worldwide plastics are responsible for the deaths of between 50,000

and 90,000 northern fur seals and an estimated 100,000 other marine animals. It is also believed that between one and two million waterfowl die annually from getting tangled in plastic six-pack rings and other plastic floatables.

As for the risk to people, a group of New Jersey doctors and health professionals have organized under the name of Save Our Shore. They suggested that various illnesses—such as skin rashes and ear and respiratory infections—may be tied to swimming in the State's coastal waters. In response, Dr. Terry Shehata, director of the State Department of Health's Environmental Disease Prevention Service, said there is no scientific data to support such a claim. But the New Jersey Departments of Health and Environmental Protection have agreed that a study will be conducted to answer that question. "The beaches along the shore," Dr. Shehata stressed, "are safe, and

Ocean bathing at Sandy Hook, Gateway National Recreation Area, Monmouth County.



CORNELIUS HOGENEIRK

Rachelle D. Garbarine is a professional writer whose works have appeared in several newspapers.

people can swim in them without fear."

A persistent problem is the hefty amount of money it costs to clean the debris, which government leaders fear may eventually affect the State's \$11.4 billion tourist industry. Yet the results of a recent study conducted by the US Travel Data Center and R.L. Associates, of Princeton, indicated that "the tourism industry at the shore continues to grow." Still, of the 1,000 people interviewed, 25 percent said that "cleaner beaches would bring them to the shore more often."

Although attendance has not dropped at Island Beach State Park, Richard Riker, its superintendent, said an average of \$400 a day is spent clearing litter from the park's one-mile stretch of swimmable beachfront property and that around \$40,000 a year goes to hauling the trash away. "A lot of the litter comes from people who bring it on the beach," said Riker, adding that still more is coming from the water itself.

John Krisko, supervising park ranger at Gateway National Recreation Center in Sandy Hook, concurs, saying that Gateway's annual beach operation and maintenance bill tallies over \$300,000. "We dispatch three tractors and 16 employees to clean our beaches and nearby roadways," Krisko said. "but as soon as the tide comes in, the litter is back."

Where is it coming from? William Librizzi, director of DEP's Division of Policy and Planning, said there is a combination of land and ocean sources: combined sewer overflow, non-point sources such as storm sewers and street runoff, sewage sludge dumping, and solid waste disposal activities from commercial and recreational boats.

Mindful of that, and of the consequences of dumping more floatables into the ocean, New Jersey has begun two initiatives to combat its latest problem. According to Librizzi, DEP is conducting studies to verify the origin of floatables, to trace and ultimately control their path to the beach; and to investigate current methods used to handle marine litter and the regulations that exist to control it, including the Refuse, Clean Water and Ocean Dumping Acts. There is also an international treaty on maritime pollution known as MARPOL, which was drafted in 1973. Its provisions—called annexes—cover five separate pollutants, and the fifth would prohibit the disposal of non-degradable plastics at sea and the dumping of garbage within 25 miles of shore. It would also require ports to have dockside garbage disposal units.

However, it has taken years to bring the first four provisions into effect, and the fate of the final one is no different. To make it effective, a minimum of 15 nations representing 50 percent of the world's shipping tonnage must ap-

prove the annex. So far, only 27 countries, accounting for about 45 percent of the tonnage, have ratified Annex V. The United States, with 4.7 percent of the tonnage, is expected to follow suit.


Meanwhile, New Jersey's floatable study is progressing with its "coastline indexing," said David Rosenblatt, principal environmental specialist at the Division of Water Resources. Last month, Rosenblatt said, the department selected 15 beaches—13 along the coast and two along the Raritan Bay—and with the help of county and local health officials studied the trash that washed ashore. Through a series of beach walks, they hope to be able to determine the quantity and kinds of debris and how it gets to a particular spot along the shore. To that end, floating trackers will be released near suspected trash sources and tracked to their final destination, said Rosenblatt.

At the same time the NJDEP, under the Cooperative Coastal Monitoring Program, will continue to watch the 22 waste water treatment plants to see that they are functioning properly and will monitor the 350 water quality sampling stations along the coastline. Another key element is a DEP plan to work with municipalities to implement storm water management controls.

"It is important that communities take care of what they can on a local level," said Rosenblatt. "As minor as it may seem, keeping the streets free of debris will help to make the ocean cleaner."

New Jersey has also prohibited the sale of non-biodegradable six-pack rings (and similar legislation regarding tampons is now pending), but critics are concerned that the ban is being ignored. Although the State has enacted some of the most stringent environmental laws in the nation, said Cynthia Zipf, of Clean Ocean Action, some of them are not being carried out.

Senator Connors agrees. He has authored legislation calling for fines of up to \$500 for people who "dispose of litter and other substances that pollute the State's bays, coastal waters, lakes and streams." If passed, the New Jersey Marine Police, officials from the Division of Fish, Game and Wildlife and municipal police will be able to enforce the law. For others, like Richard Riker of Island Beach State Park, the answer is to educate the general public. "People," he said, "have to lead the way for change to be effective."

Everyone agrees, however, that although much has been started to combat the litter problem, more still needs to be done. "The ocean has a tremendous ability to heal itself," concluded Zipf. "What it needs now is to be given that opportunity." 



DAVID HART: Father of New Jersey's Marine Fisheries Management

BY PETE MCLAIN

Few men earn the distinction of becoming a legend in their own time, but Captain David Hart of Cape May, New Jersey, is recognized as the Father of Jersey's marine fisheries programs. For over 50 years, Capt'n Dave, as he is affectionately known, has championed the cause of marine fisheries resource conservation and management.

David Hart was born in 1901 in Philadelphia, Pennsylvania. He served in World War I, married Alice Beatty in 1925, and they had two sons, David Jr. and Paul. The Harts moved to Cape May in 1934. Captain Hart purchased a 32-foot party boat, the *Alice H.*, and joined the recreational fleet of 20 open party fishing boats. During the tourist seasons he sailed fishing parties for porgies, sea bass, fluke and weakfish. In 1937 he acquired the 55-foot *Georgia Man*, which carried 70 passengers.

During World War II, in 1941, he converted the *Georgia Man* to an offshore dragger and began commercial fishing for croakers, porgies, trout, fluke and other food fish. His sons went to sea at 17 years of age and frequently served as part of his crew. In 1943, he purchased the 65-foot *Ralph J.* party boat and converted it to a dragger. In 1954, Capt. Dave converted his commercial boats to purse seiners and fished for porgies. In 1954 he rebuilt a 110-foot World War II submarine chaser to a "carry boat" for offloading his boat's heavy catches of porgies and mossbunker. The year 1957 was Captain Dave's last as an independent and active successful commercial fisherman.

Retiring from commercial fishing was the beginning of a career in which he utilized his years of keeping his patience dealing with the public as a party boat captain, his first-hand experience as a commercial fisherman and his drive and personality to represent commercial fishing interests in New Jersey and the nation. His trips to the legislature in Trenton became an almost daily routine, and when there was legislation on a commercial fishing issue, it was Capt. Dave Hart who was up front.

With his background and knowledge of New Jersey marine fisheries, Capt. Hart was appointed to the recently reorganized Fish and Game Council in 1949, representing the commercial fishermen's interests. He served from 1949 to 1956 on the first Council. These were the tumultuous years of striped bass legislation in New Jersey. Capt. Hart, representing the commercial fishermen, squared off against Frank Valgenti, a successful and respected attorney who represented the sport fishermen. For a few years they were political enemies, but

following the striped bass war, they became close friends, spending winters in Florida fly-rodming for largemouth bass from a 12-foot boat.

Capt. Dave returned to the New Jersey Fish and Game Council for a second term from 1963 to 1968 and served as Chairman. Dave Hart is remembered as one of the Council's best Chairmen, who ran meetings by Roberts Rules of Order and a strong hand. He served another term on the Council from 1972 to 1976.

When the Atlantic State Marine Fisheries Commission was formed, he was appointed an Administrative Member from 1949 to 1957 and served as Chairman from 1961 to 1964. He currently serves as the Governor's appointee to the Commission. During the 1960's, Capt. Hart, as Chairman of the Commission, almost singlehandedly lobbied the Commercial Fisheries Act (88-309) through the Congress. This act made possible needed funds for all states enrolled in the commercial fisheries program. From 1976 to 1983 Capt. Hart served as member and Chairman of the Mid-Atlantic Fishery Management Council and continued as a member to 1986. He also served on many subcommittees developing management plans and programs for various fish and shellfish species.

Capt. Dave's experience and ability to communicate both commercial and marine interests resulted in his becoming a moving force in the New Jersey legislature. When legislation relating to the marine resource was at issue, Capt. Dave worked effectively both up front and behind the scenes. Dave Hart was on a first-name basis with four New Jersey Governors and countless legislators, who listened to and respected his counsel.

Capt. Dave was a strong and moving personality in public life, and he was a devoted husband and father. He referred to his late wife, Alice, as the "Duchess," and treated her as such. Captain Dave's personal charm, respect and ready wit endeared him to women from the first hello. It was impossible for anyone not to be charmed by the friendly magnetism and his gentlemanly manner.

Capt. Dave currently lives in Cape May in an apartment overlooking the Atlantic Ocean which he knows, loves and from which he earned his living. Dave Hart has returned much more to the fisheries resource than he took by helping to charter a true course in modern marine fishery management. He is the father of marine fisheries in New Jersey. There will never be another Capt. Dave Hart. It is appropriate that this Marine Issue of New Jersey Outdoors be dedicated to Captain David Hart of Cape May, New Jersey.



Captain David Hart—April 1987.

PHOTOGRAPH SUPPLIED BY AUTHOR

New Jersey Outdoors welcomes letters from readers. Letters for publication should include the writer's name and address and should be mailed to: Editor, New Jersey Outdoors, CN 402, Trenton, N.J. 08625. Letters may be edited for reasons of length or clarity. Please keep the letters coming. We'd like to hear what you think about the magazine. We'll also try to answer questions and if we cannot, we'll ask our readers for help.

Clifford C. Olson
1007 Peck Street
Hightstown, NJ 08520



Dear Editor

WE SURE WILL

Just a line—no complaints, no suggestions.

Just remembered when I first subscribed to New Jersey Outdoors, it was about the size of Readers Digest and about five pages, six?

Wow! We have really spread out. Love those paintings by Carol Decker. Wrote you a couple times and got no answer—hope you told her how much we like them.

Just renewed my subscription. Keep this "little" mag coming!

Sincerely Yours,
William O. Terrill
Warren

As you know by my records, I am a longtime subscriber. This is my 2nd note regardless. The publication, I like the format and the paper, and print quality. What I continue to dislike is the cosmopolitan turn the contents have developed into. I am renewing once more for a three year period in the hope you get back to some of the old time basics which drew me to subscribe initially many years ago. I refer to the diagrams, maps and hints/tips with visuals, applying to fishing, hunting & trapping in addition to camping and hiking.

Thanks for your time & attention.

P. Punzo
Saddlebrook

We try to publish an interesting, informative and balanced magazine everytime we go to press. Because NJO is published by DEP which includes such diverse elements as Fish & Game, Parks and Forestry, Coastal Resources, Waste Management, Environmental Quality, and Water Resources, we attempt to give all these elements a fair shake in each issue.

MASS TRANSIT PROPOSAL

We never had acid rain till we had automotive smog. In the old days when all trains, factories and homes burned coal, acid rain was not a problem. And the coal burned was the cheapest, meaning the dirtiest coal, around.

The proper strategy is to get as many people out of their cars and onto public transit as possible. This must include having any outer development be tied to at least two transit lines by having the developer fund permanent transit connecting van routes. Only then can we end gridlock causing outer congestion as towns struggle for ratables without proper consideration to getting people to these office parks.

Future transit funding must be increased so NJTransit and the private operators can reduce fares and increase service. All transit competes against the auto, which is subsidized 90% on all levels of government. Having chaired both regional and county air quality committees, I can assure you 75% of the problem can be solved with mass transit for more state residents.

Yours truly,
William R. Wright.
Cranford

COMPLAINTS

I want to let you know that my March/April issue arrived so late that the Calendar of Events was out of date for March—except the last two.

The "Story Locator" map is a big improvement—but still does not give enough information for readers to find locations.

You used to give highway numbers, landmarks, dirt roads, trails, parking, etc., so that we could find places.

Yours truly,
Art Williams
A.D. Williams
Saddle Brook

Sorry for any inconvenience. If you have a problem, please call us at 609/530-5772.

WE ALSO THANK YOUR BENEFACTOR

For several years now, I have been receiving "New Jersey Outdoors" as a gift. I have tried in vain to find who my benefactor is.

I have had many enjoyable walks through the pages and fond memories of my childhood.

As though it were today, I still re-

member as a child, returning to the same spot in the woods, every year, to see my "Lady Slipper" bloom once again.

To my benefactor, many thanks for the memories.

Dawn Harrison Dipple
Rt. 1 Box 110
Hereford, Arizona 85615
602-378-2055

MEMORIES

As a 32 year old native of Morris County, now living in Arizona, I can't begin to tell you how much your magazine means to me, especially articles about Morris County, and hearing Wildlife Preserves Inc. I grew up next to W.P.S. and know it well; it's a beautiful piece of land, trees etc. Please keep up the good work. I'm proud to show off your magazine. People ask what's in N.J.? Why do you want to go back?

You give me a lot to show them. I've always been proud of New Jersey. Your magazine makes it easy to show why.

Toni Pasquale
Apache Junction
Arizona

Dear Editor:

I am researching the life and career of Max Schrabisch, a pioneer archaeologist who lived in Paterson, New Jersey in the early 20th century. My goal is to publish a biography of this scholar and excavator, who did so much in furthering our knowledge of prehistoric peoples in New Jersey.

I am seeking information from your readers pertaining to Max Schrabisch, including personal memories, correspondence, etc. In particular, I would like to hear from Robert Jantzen of Colorado, whose letter to the editor was published in the July-August, 1986 issue of *New Jersey Outdoors*.

I thank you for your cooperation in furthering this research project.

Sincerely,
Edward J. Lenik
Sheffield Archeological
Consultants
100 Deerfield Road
Wayne, New Jersey 07470
(201) 835-8530

PHOTOS AND TEXT
BY MARY ANN EVANS

There's a treasure hidden along the southern Jersey coast on a strip of land called Island Beach State Park. This ten-mile undeveloped barrier beach offers surf fishing, bathing, nature trails and rare flora and fauna. Preservation efforts limit access by dividing the area into zones: a natural area, a recreational area and a wildlife sanctuary. The wildlife here is different from that found a few miles north in spirited Seaside Heights. Island Beach is for nature lovers who want to discover the jewel of the Jersey shore.

Early morning light stretches first across the rippling surf and then touches the water's edge, transforming common pebbles into glistening gems. Patterns play across the ever-changing terrain—some natural, others man-made.

The fishing is excellent here. Just cast into the crystal-clear surf and be patient or follow the gulls in a boat and get right into the action of a "blitz."

The vegetation is primitive and indomitable—roots grasping like tenacious fingers into the sand and limbs contorting in the wind and salt spray. In some protected areas the American holly stands colorful and erect. Those familiar with the landscape of Cape Cod will find a similarity here, though on a smaller scale. There is the same effort to control the shifting of the sands by wind and water. Beach grass and snow fencing are the norm.

Shore treasures are plentiful for beachcombers. Youngsters encounter a varied shore experience here—they're not just limited to a towel and some sand. Protection is the note of the park, whether it be lifeguards protecting vacationers from the hidden dangers of the surf or State Park rangers protecting the fragile environment from the vacationers.

To the south of Island Beach, across the Barnegat Inlet, rises the Barnegat lighthouse ("Old Barney"). As if looking from the past to the future, one only has to turn westward and view New Jersey's first nuclear generating plant.

Unfortunately, there are those who are blind to the beauty of this unique protected playground and continue to deface it. Trash and treasure go hand in hand constantly.

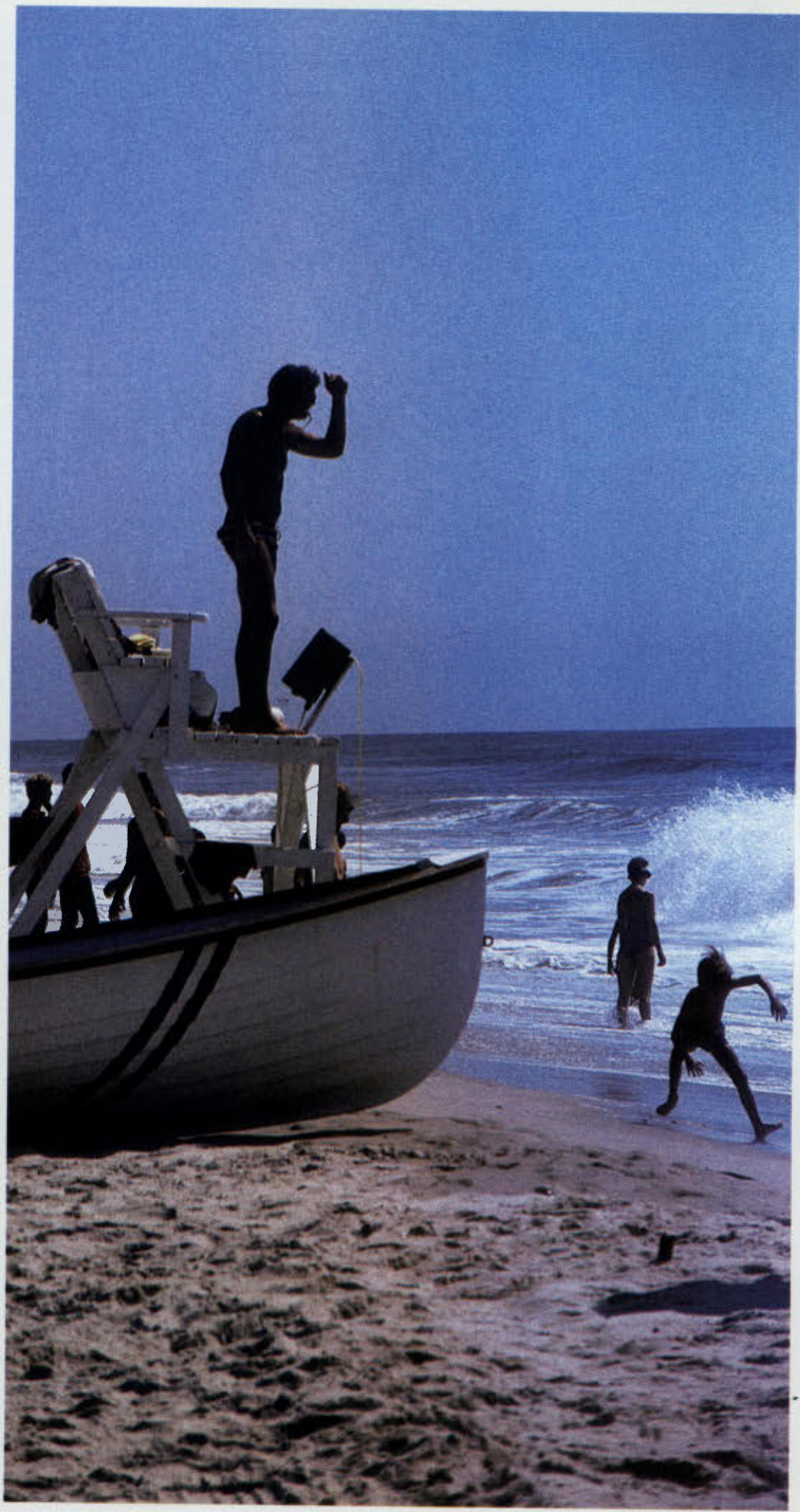
Tales of pirate treasure hidden in the sands along the Jersey shore have and will continue to intrigue many, but one of New Jersey's most obvious natural treasures is the Island Beach State Park.

A Jersey Shore Treasure Island Beach State Park









Mary Ann Evans is a freelance photographer. She recently moved back to New Jersey after 9 years of homesteading in up-state New York where she raised children and sheep. Currently she lives near the Jersey Shore which is a new resource of inspiration for her photography. With a degree in Art Education, Mary Ann has done photography work for book, magazine and card companies.

Good News, Bad News:



PHOTOGRAPHS SUPPLIED BY THE DIVISION OF FISH, GAME & WILDLIFE

Fishing off of Caven Point Pier, Liberty State Park, Jersey City, offers recreational opportunities in the midst of one of the State's most urban areas.

Recreational fishing in the Hudson River

BY BILL ANDREWS

Redevelopment of New Jersey's lower Hudson River waterfront began in the late 1970's with congressional authorization of the New York Harbor Collection and Removal of Drift Project and passage of the Beaches and Harbors Bond Act by the voters of New Jersey. Thus, the Harbor Clean-up Project, as it is commonly called, became a joint State and Federal undertaking designed to satisfy two purposes. First, for the Army Corps of Engineers, the project would improve harbor navigation by reducing floating drift materials at the source (abandoned piers and derelict vessels). Second, for the State of New Jersey, the project would improve the aesthetic appear-

ance of the harbor's shoreline, which had become an eyesore after years of abandonment and neglect following the demise of obsolete shipping and rail service operations. It was thought that the removal of the abandoned debris from the water would spur redevelopment of this important waterfront region.

The Harbor Clean-up Project called for the removal of derelict vessels, deteriorated shore structures and debris along the shoreline seaward of the mean high water line, and it required the owners to repair and maintain any economically useful waterfront structures that remained. Work began at Liberty State Park, and in June 1980 the Division of Fish,

Bill Andrews is a Principal Fisheries Biologist with the Bureau of Marine Fisheries, Division of Fish, Game and Wildlife. Bill has been with DEP for over 13 years and for the last 9 years has been involved in habitat protection.

Set in the middle of the New Jersey/New York Harbor, Caven Point Pier offers a spectacular setting for a day's recreation.

Game and Wildlife was asked to evaluate the effects on fishing that would occur in the Hudson River between Bayonne and Edgewater, New Jersey. A major concern was the poor condition and scarcity of shore-based public access for fishing in this, the nation's most densely populated urban region.

Waterfront recreational use was surveyed in July 1980. Fishing opportunities were limited to approximately 21 deteriorated and abandoned piers that were scheduled for removal or were repaired for commercial use. These piers were utilized extensively by local residents for outdoor recreation, primarily fishing and crabbing.

After considerable deliberation over the shore-based waterfront access problem, the DEP formed an in-house committee of urban planners, recreational specialists, engineers and fishery resource managers to address the issue of providing mitigation for the loss of public waterfront access for fishing on the Hudson River. The committee evaluated numerous alternative waterfront access sites. A fishery resource inventory of many potential fishing pier sites and of the diverse aquatic habitats of the lower Hudson River began in December 1982 and continued on a seasonal

basis for one year.

The fishery inventory was conducted with a variety of commercial and experimental nets. Catches showed the presence of a diverse and productive fish population located within casting distance of many of the existing piers. The most commonly occurring and abundant recreational species collected were the American eel, American shad, Atlantic tomcod, blueback herring, bluefish, striped bass, summer flounder, white catfish, white perch, winter flounder and blue crab.

Although water quality in the lower Hudson River has improved significantly over the past 15 years and levels of contamination in fish tissue have declined, there still remains an advisory against consumption of striped bass, bluefish, white perch, white catfish and American eel. Polychlorinated biphenyls (PCBs), industrial chemicals, were discharged in large volumes into the Hudson River by a transformer-manufacturing plant prior to the ban of these compounds in 1976. Surveys indicate that the Hudson River is the most severely PCB-contaminated drainage basin within the State. The advisory recommends that consumers should eat no more than one meal per week of the listed species caught in



Clean-up operations along the riverfront have already improved the scenic quality of the shoreline.



*Coastal Area Facilities
Regulations required
new developments, such
as this restaurant in
Weehawken, to provide
public fishing access to
the Hudson River.*

the designated regions. Persons of high risk, such as pregnant women, nursing mothers, women of child-bearing age and young children, should further restrict their intake. The other recreational species listed here have been tested and found safe for unrestricted consumption.

The blue crab, which may move throughout a given estuary, has a closure zone in Newark Bay and the Passaic and Hackensack Rivers. Contaminants in the blue crab have been shown to be elevated only within the hepatopancreas (a digestive organ); there is relatively little contamination in the muscle tissue. By removing the internal organs from a crab prior to cooking, the risk of eating contaminants would be reduced.

Contaminants are primarily concentrated in the fatty, lipid-rich tissues such as the belly, skin and lateral line of fish. Consumption of contaminants can be reduced from those fish identified under the advisory by trimming fatty areas during filleting or by using alternative cooking techniques such as broiling on a rack to allow fat to run off.

Local anglers claimed that the Caven Point Pier in Jersey City, just south of Liberty State Park, produced more and larger fish catches than other shore-based sites in the area. The pier was particularly productive during the summer months for bluefish, summer flounder, striped bass and blue crab, in the fall and winter for winter flounder and Atlantic tomcod, and in the spring for striped bass, winter flounder and herrings.

In 1981 the DEP purchased the Caven Point Pier and has recently hired a consultant to prepare a phased development plan for its rehabilitation and restoration as a major public recreational facility under the management and control of the Division of Parks and Forestry. The overall length of the pier is 4,300 feet. The width varies from 40 to 90 feet. Its location provides a spectacular view of the Upper Bay of New York Harbor south to the Verrazano Bridge, north to the Statue of Liberty and east to Governor's Island and the lower Manhattan skyline. Port Liberte, a large residential lagoon development, is under construction at the base of the pier and will provide limited parking and a shuttle service for fisherman.

Realizing that an effective urban fishing access program requires the concerted efforts of many individuals with varied expertise and that access should not be relegated to one location, the DEP is requiring through its Coastal Resource and Development Waterfront Program that major developers adjacent to coastal waters provide fishing access within their project boundaries. To successfully im-




Waterfront Facility Chart

Waterfront Location	Facility Access	Existing	Proposed
Caven Point Pier, Jersey City	pier	X	
Liberty State Park, Jersey City	jetties boat ramp marina	X X	 X X
Liberty Harbor North, Jersey City	marina pier	 X	 X
Dept. of Defense Property, Essex St., Jersey City	bank	X	
Jersey City Park, Jersey City	pier	X	
Port Authority Exchange Place, Jersey City	pier		X
National Bulk Carriers, Inc., Harsimus Cove, Jersey City	pier marina		 X X
New Port Development Co., Jersey City	pier marina		 X X
Port Authority, Hoboken	bank pier marina	X	 X X
Hartz Mountain, Weehawken	pier marina	X	 X X
ARCORP, Weehawken	pier marina	X X	 X X
Roc Harbor, North Bergen	bank pier marina	X	 X X
Richmond's Marina, Edgewater	marina	X	
The Commodore, Edgewater	pier marina		 X X
Von Dohln Marina, Edgewater	marina	X	
North Hudson Marina, Edgewater	marina	X	
Palisades/Hazard's, Edgewater	boat ramp bank	X X	
Palisades/Linwood Park, Englewood	bank	X	
Palisades/Englewood Marina, Englewood	marina bank	X	
Palisades/Alpine Marina, Alpine	marina bank	X X	

One of the most popular fishing and crabbing areas on the Hudson is in Palisades Interstate Park.

plement such an innovative program will require a dedicated commitment from the State and local governments, the developers and fishermen over an extended period.

Above is a list of existing and proposed fishing access sites on New Jersey's lower Hudson River waterfront. It should be noted, however, that some of the proposed facilities are requirements of Coastal Resources and Development Permits, whereas others have been submitted to the DEP as conceptual plans. 

Wading Birds

Visitors to the Jersey shore frequently see a variety of wading birds. These graceful creatures, some of which are also visitors, can be found from Cape May Point to the Hackensack Meadows. They feed on small fishes, crabs, mussels and snails found in the shallow waters.

In their pursuit of food, they search the salt marshes and freshwater wetlands. Many of the species return to New Jersey by the first of May of each year to raise another generation. Once heavily hunted for their plumage, the birds are now protected. The main threat to them now is an ever shrinking habitat in which to feed, nest and raise their young.

Richard Riker



A.

... of the New Jersey Shore

A. Great Egret (*Casmerodius albus*)—once almost extinct, these elegant birds can measure 32" in length (not counting tall plumes) with a 55" wing spread. Preferred foods are fish, small mammals, amphibians and insects.

B.



C.



B. Tri Colored Heron (*Egretta tricolor*)—formerly known as Louisiana Heron, the name was changed by the American Ornithological Union in the early 1980's. The birds measure 26" long with a 36" wing spread.

C. Little Blue Heron (*Egretta caerulea*)—the smallest of the five birds shown, the Little Blue Heron measures 24" in length and has a wing spread of 40". Declining in population from 350 in 1979 to 111 in 1985, with similar declines noted along the entire eastern coast, the Little Blue Heron is one of the most threatened wading birds. It is slow methodical feeder in both fresh and salt water wetlands.

D.



E.



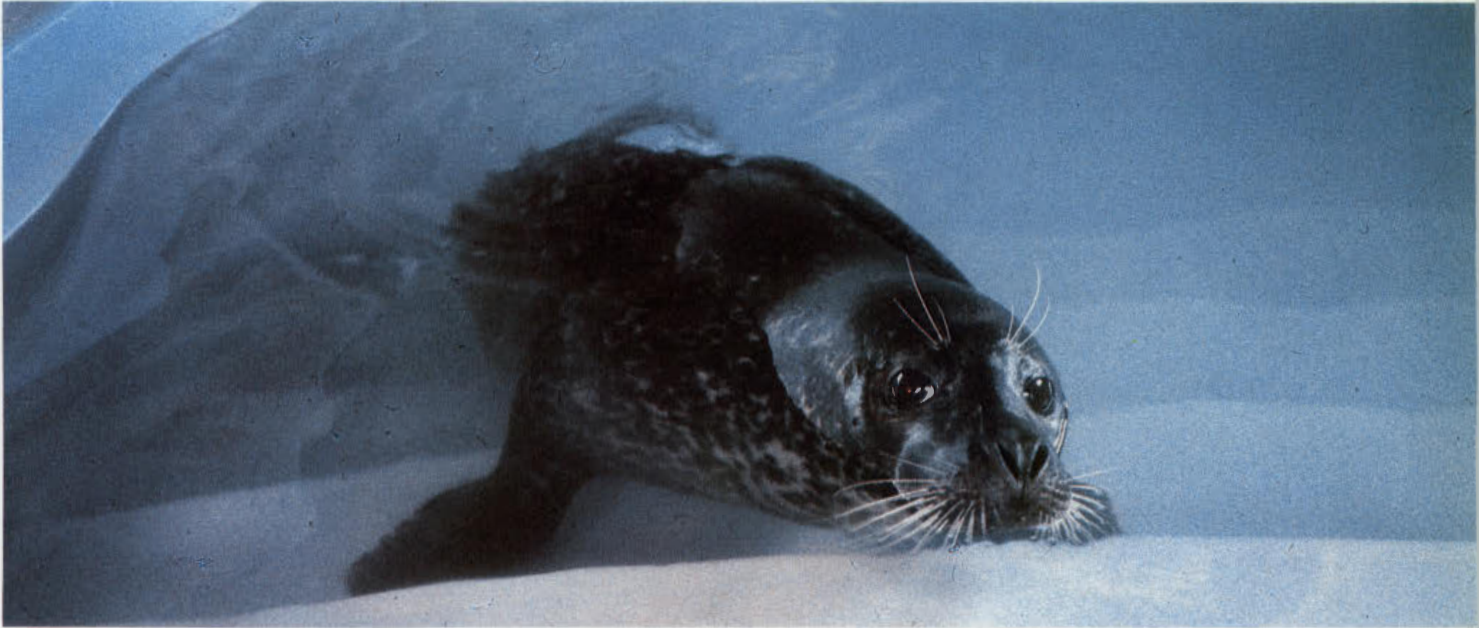
D. Snow Egret (*Egretta thula*)—the most plentiful wading bird in New Jersey, the Snowy Egret moves briskly in the water stirring up the bottom with its feet, stabbing repeatedly to catch prey. It measures 24" in length and has a 41" wing spread.

E. Yellow Crowned Night Heron (*Nycticorax violaceus*)—with heavy bodies and short thick necks, this heron measures 20" in length with a 44" wing spread. It takes 2-5 days for both the male and female to build their nest of sticks, twigs and reeds.

Stranded

former Navy Diver Aids Marine Mammals

PHOTO PROVIDED BY MMSS



RAY FISK

BY CATHIE CUSH

Late last February, Bob Schoelkopf went to Miami with a friend—not an unusual trip for any Jersey shore resident. But Schoelkopf's friend was a loggerhead turtle.

As a special operations technician in the Navy, Schoelkopf used to help SEALs (members of the Navy's elite Sea, Air and Land team). Today he helps seals, whales, dolphins, porpoises and sea turtles. Since 1977, Schoelkopf has headed the Marine Mammal Stranding Center, now based in Brigantine. He also serves as a deputy conservation officer for the State.

The loggerhead, a threatened species, was being taken to its new home in the Miami Seaquarium. In July US Fish and Wildlife agents had seized the emaciated turtle from a Philadelphia man who was trying to sell it, and they brought it to the center to be nursed back to health.

Ironically, Schoelkopf notes, "We treated the same one six years ago. The owner was unintentionally starving it just out of ignorance..." When it arrived in Brigantine last summer, "the animal was so light it couldn't even sink." At the center, the animal thrived and gained weight. Because the turtle was bred in captivity, Schoelkopf felt it would do better in an aquarium rather than in the wild, and so it was taken to Miami.

The winter before, Schoelkopf performed a similar mission of mercy. Several turtles were suffering from cold shock because they stayed north later than usual. They had wandered into back bays from Long Island to Cape Cod and became confused when a land mass stood between them and their instincts to head south. When the water suddenly turned cold, many of the cold-blooded reptiles went into cold shock—the reptilian equivalent of hypothermia. They became dormant, and at least 16 of various species died.

An airlift operation was organized to rescue eight surviving animals, including a rare Kemp's Ridley turtle, a green turtle and a loggerhead. The turtles were flown to the Sunshine State, where they were released off the west coast of Key Largo—closer to their natural wintering grounds.

There were 31 strandings in New Jersey in 1986—about half as many as in the previous year. "It's a fluctuating thing. We still haven't figured out why," Schoelkopf observes. "Last year we saw the largest numbers of large whales." These included three dead fin whales—one as long as 60 feet. One in Deal and one near Gloucester had been hit by boats; another, which washed ashore in Bayhead, had

died near the Hudson River, was towed to sea by New York authorities and then washed back in. The center was called to help dispose of the remains.

1985 saw 66 strandings, the most ever recorded for the State. Several sperm whales, one of the species that were hunted from whaling towns such as Harvey Cedars in days gone by, were spotted off the coast. A newborn fin whale found at Lavalette was a casualty of Hurricane Gloria. "We had to euthanize it," Schoelkopf said quietly. "Seven days later its mother was spotted off the coast looking for it." The mother was estimated to be about 60 feet long and weighed 50 tons.

In October two surf fishermen found a baby pygmy sperm whale beached in North Wildwood. The 60-pound mammal was brought to the center's Brigantine holding tank, where it was given round-the-clock attention by trained volunteers. When the whale was brought in, Schoelkopf said he would rather keep the patient for six months if necessary than send it to another facility that might not give the animal the care it needs. Unfortunately, the baby whale had contracted pneumonia and died within five days.

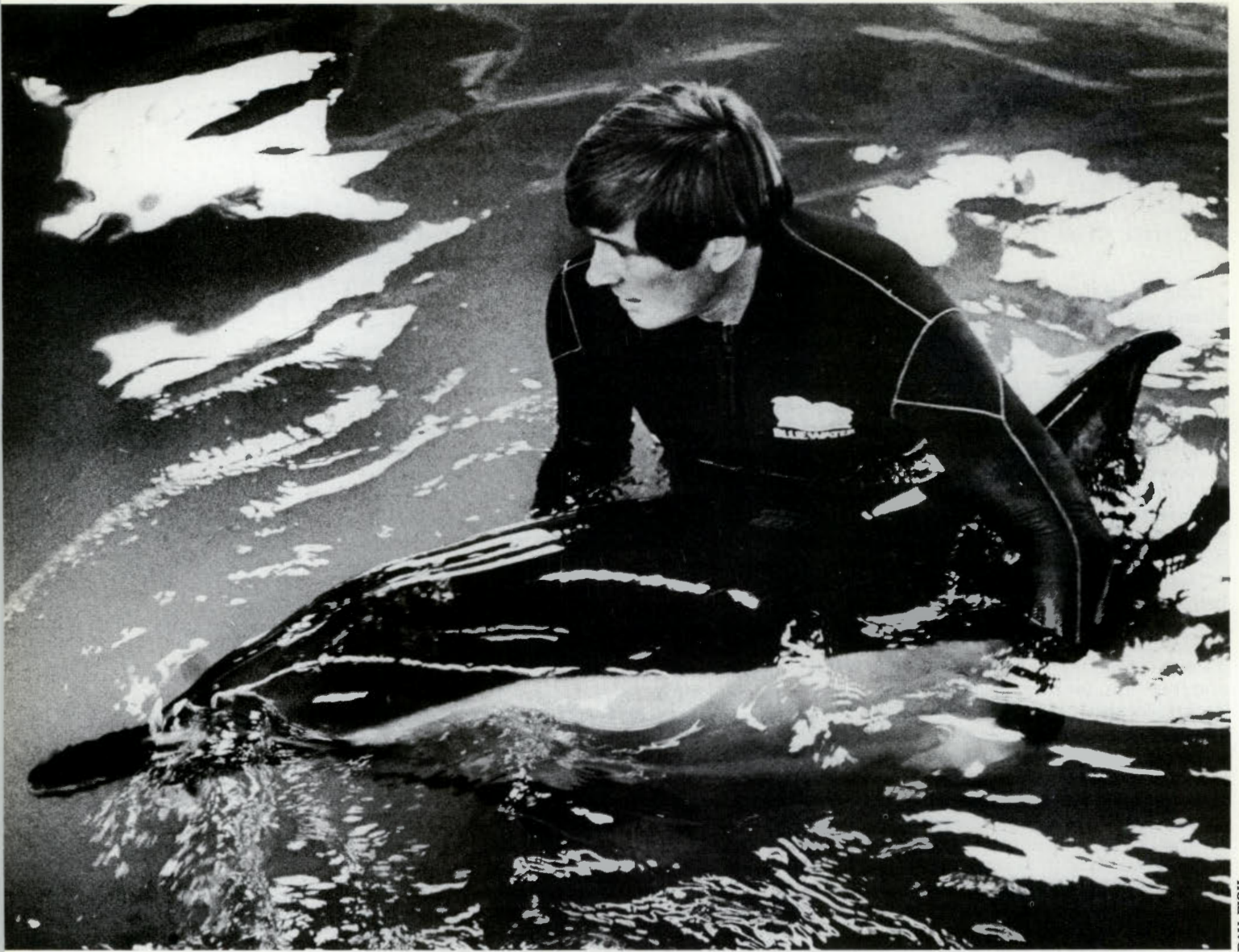
For almost a decade Schoelkopf and his volunteers have responded to reports of marine mammals and endangered sea turtles that have washed up on beaches along the East Coast. Whenever possible, sick or injured animals are taken to Stranding Center headquarters or Schoelkopf's home, where they can be treated and allowed to recuperate. (At his home, a double-sized honeymoon-suite bathtub donated by an Atlantic City casino serves as a holding tank.) If the animal is too large to swim comfortably in the center's pool, other facilities, such as an aquarium, must be found for it. But he will release a seal or dolphin to another facility only if he could be guaranteed that the animal will not be used in a show. A former dolphin trainer (as is his wife and co-founder of the center, Sheila Dean), at Atlantic City's now defunct Steel Pier, Schoelkopf says that too often the animals are mistreated in captivity. Under the best circumstances, the animals can be released into the wild.

When Schoelkopf is called upon to dispose of the body of a dolphin or whale, he'll perform an autopsy, to the extent that his facilities permit, and send organ samples to pathologists at the University of Pennsylvania for study. Rare animals are sent to the Smithsonian. Marine mammals, which are at the top of the food chain, are tested for such heavy metals as mercury in the liver, when funding permits. Schoelkopf says he currently has three years' worth of liver samples ready for analysis but is awaiting funding for the lab-

Cathy Cush is a frequent contributing writer to *NEW JERSEY OUTDOORS*.

Meet Barney, a Harbor Seal. The only Harbor Seal diagnosed as having epilepsy, he is being cared for during his second stranding in New Jersey.

Bob Schoelkopf, Director of the Marine Mammal Stranding Station, offering Barney nourishment.



RAY FISK

PHOTO PROVIDED BY MMSS



oratory work. Few such studies have been done until recently, so there is little knowledge of what normal levels might be for a particular species.

"We've seen some young turtles with levels 300 times higher than we'd expect," he observes, "but at this point we can't say where the source is." Future research may someday be able to pinpoint it.

Schoelkopf has been able to pinpoint one cause of premature death in sea turtles: plastic garbage bags.

"We have the highest number of plastic-related deaths in the United States in New Jersey," he reports. Turtles eat the bags, mistaking them for jellyfish, their favorite food. The result is fatal intestinal blockage. (Plastic pollution is starting to take its toll on fishing vessels as well, he says. Several engines have been fouled by plastic debris that has lodged in an intake valve or elsewhere.) Turtles also become entangled in monofilament lines left on wrecks by fishermen. Schoelkopf has been working with area scuba-diving clubs to teach divers how to extract the turtles and save

them from asphyxiation. Fishermen and other boaters, too, may be able to lend a helping hand.

Even if a turtle appears dead it may not be beyond help, he says. "bring the turtle back to the boat," he instructs. "Turn the turtle over, tilt the head back and push gently on the plastron [the soft bottom part of the shell]." This may resuscitate the turtle.

"Any time a marine mammal [or turtle] is picked up or put in tow, notify the local Coast Guard—otherwise you could get fined and the boat could be seized," he warns. The practice of notifying the Coast Guard also ensures that no one on board will be tempted to take the animal's shell as a souvenir. Schoelkopf also asks anyone who might find an injured or dead turtle that has been tagged to send the tag (or the information on it) to him or to another branch of the Northeast Stranding Network for their records.

Schoelkopf, a native of Reading, Pennsylvania, had his first encounters with sea turtles while undergoing Navy scuba training in Key West, Florida. As part of combat training, divers would be dropped off at a point two miles from shore and would have to swim back. "I used to cheat a little," he confesses, "and swim with the turtles." This practice of swimming with turtles or marine mammals, he now cautions, "is not only dangerous but it's against the law." Approaching such animals constitutes harassment under the Marine Mammal Protection Act and Endangered Species Act. "Not all animals are as playful as they are sometimes portrayed," he continues. "They can be very protective of their young."

"These animals can be quite powerful, even in play," says one who has learned the hard way. "I've been tossed 10 feet out of a pool by a 10-foot pilot whale, and I've had a seal tear my mask off under water." At other times, Schoelkopf says, he has had his nose broken and has been knocked unconscious by captive animals. Seal bites are not uncommon.


Off the mid-Atlantic, winter is seal season and strandings are relatively frequent. "Even one day away from the Stranding Center during seal season worries us," Schoelkopf says. In December 1984 he found himself traveling to Virginia to help free a dolphin that was tangled in monofilament. Volunteer divers, including some from the Cousteau Society, helped Schoelkopf return the animal to the sea. But back at Brigantine, he said, "we had trouble manning the center with volunteers." He also worries that if a seal were brought in while an inexperienced volunteer was on duty, the odds of the handler being bitten would be greater. It's often easy to find volunteers for

the first few days, but as time wears on it's difficult to find people willing to cover the graveyard shift.

At present, however, volunteers are the only way to staff the non-profit operation. In fact, Schoelkopf himself is actually a volunteer—he receives no salary for his work. The Stranding Center budget just doesn't allow it. The current operating budget is about \$30,000, but Schoelkopf says the ideal would be about \$50,000 to cover operating costs, planned expansion and increased animal transport capacity. The center currently receives no State or Federal aid, but a bill passed by the New Jersey State Senate could change part of that by providing a one-time grant of \$30,000. Schoelkopf currently averages about \$25 a week from lectures.

The money could be used to pay for lab analysis of the liver samples, he says, or for upkeep of the center vehicle, "which really takes a beating from being used on the beach." A field person could even be paid a salary, he notes. Some of the money might go toward disposal costs, which average \$60 an hour for small animals, although the center could never afford to finance the disposal of a large whale, which might cost as much as \$12,000.

Despite what might appear to be spotty attendance, volunteers have been generous with their time and funds. In 1983 the city of Brigantine gave the center a 99-year lease on a piece of waterfront property. (Until then, the center had been at Gardiner's Basin in Atlantic City.) The Brigantine Lifeguard Association raised \$22,000 toward a larger holding tank. Bell Telephone Pioneers of America donated construction materials and labor to help turn an old Coast Guard station on the property into a marine life museum, which is open seven days a week during the summer. Yet the vigil over a saddleback dolphin that washed ashore at Stone Harbor in early 1985 was made more difficult because there weren't enough drysuits for all the divers who stayed with the animal in the 38-degree water of the pool.

But, Schoelkopf says from experience, those volunteers who do spend time in the water with dolphins will be touched. "Everybody has a new awareness of the animals, more of a respect for them. They love them," he says. While in the water with a dolphin, this good Samaritan of the sea says, "you have a feeling of some type of communication—almost a telepathic communication. I've spent up to three days in a wetsuit with an animal. It's an education in itself to see the intelligence they show. They accept you and what you're doing. I wouldn't try to compare them to humans, but they have their own intelligence." 

A recovering saddleback dolphin being introduced to a heated pool after he was found on the beach of Stone Harbor.

Harbor Porpoise being released by Martne Mammal Stranding Station staff after a successful rehabilitation.

All sightings of stranded marine mammals should be reported regardless of where they occur. Call the 24-hour Stranding Hotline at (609) 266-0538. For more information contact the Martne Mammal Stranding Center, P.O. Box 773, Brigantine, NJ 08203.

MSX

and the Oysters of the Delaware Bay: The Parasite (Part 2)



BY SUSAN FORD
AND JEAN JONES

When the organism MSX (see J/F '87 issue of *NJ Outdoors*) was first recognized in 1958 as the cause of sudden and massive destruction of Delaware Bay oysters, it was new to science.

No one had seen it before, yet within a few years, it had nearly destroyed the oyster fisheries in Delaware and lower Chesapeake Bays. Scientists in the states affected by MSX (a protozoan parasite now bearing the scientific name *Haplosporidium nelsoni*) started a cooperative effort to respond to the crisis. Scientists at Rutgers, led by Dr. Harold Haskin, director of the Oyster Research Laboratory, were joined by researchers at the Virginia Institute of Marine Science, the University of Maryland and the National Marine Fisheries Service Pathology Laboratory at Oxford, Maryland.

Early research was directed at describing the life cycle of the parasite. These efforts were frustrated, however, by the inability of scientists to transmit MSX in the laboratory. They placed infected and uninfected oysters side-by-side in aquaria. They tried feeding infected

tissue to uninfected oysters, injecting it and finally transplanting it, but nothing worked. The uninfected oysters remained uninfected.

Even in nature, it appeared that direct transmission between oysters did not occur. MSX-free oysters could become heavily infected even though there were no parasitized oysters nearby.

Another puzzling discovery was that spores, a life-cycle stage characteristic of the group in which MSX had been classified, were rarely found. The lack of MSX spores suggested that oysters might be a "dead end" host for the parasite: that it could infect, multiply in and kill oysters but fail to develop a life-cycle stage that was probably necessary for transmission.

Eventually, researchers concluded that there might be a "reservoir" host, an organism other than the oyster that was the natural host for the MSX parasite, and that this second host produced the infective stages acquired by oysters.

There are plenty of potential candidates for "reservoir" host. Hundreds of species inhabit the bay bottom along with oysters, and hundreds more swim or float in the overlying waters. Even animals never present in the bay but living in near-shore ocean waters must be considered possible host species. Many organisms have already been examined but have been found without MSX, and the task of methodically searching through all the potential hosts for a microscopic parasite is monumental.

Despite being still mystified about the life cycle of MSX, scientists at Rutgers and other laboratories have accumulated a great deal of knowledge about the parasite and particularly about its activities in Delaware Bay.

Infective stages, perhaps spores released by a reservoir host, are present each summer between June and early November in waters with salinity levels of 15 ppt or more. Mollusks such as oysters and clams, which feed on microscopic plants, use their gills for gathering food as well as for respiration, and oysters become infected while they are filtering food particles from the water. The parasites establish themselves in the surface tissue of the gills, eventually enter the circulatory system and then move to all parts of the oyster's body.

Infected oysters usually stop feeding and growing, many biochemical reactions are disrupted, blood protein levels fall sharply and tissues often become emaciated. Very susceptible oysters usually die within six to eight weeks after becoming infected.

Like many of the oyster's predators and competitors, the MSX parasite is restricted to high-salinity water. It cannot tolerate salinities less than 10 ppt, and it generally

Trays containing laboratory-reared oysters being tested for resistance to MSX.

Research Associate
Shelta Kanaley
withdrawing blood from
oyster and examining it
for live MSX parasites.

Photomicrograph of a
single MSX parasite in a
histological section
through an oyster. This
parasite measures
about 20 microns in
diameter (1 micron =
1/1,000,000 meter).



PHOTOGRAPHS SUPPLIED BY AUTHORS

does not cause serious problems in waters below about 15 ppt.

MSX causes relatively little destruction on Delaware Bay seed beds because they are located in a low-salinity region. Most seed oysters are free of MSX when dredged in the spring, but they become infected soon after they are placed in areas of higher salinity on leased grounds.

The number of oysters that become infected after they are transplanted varies from year to year. In some years, virtually all become infected; in other years, only a few have MSX. Since the onset of the effects of MSX in 1957, there have been four periods of low MSX activity, each lasting one or two years and interspersed with periods of moderate to heavy activity lasting four to five years.

The fluctuation of disease activity on the leased grounds is not associated with changes in river flow, although drought allows infective stages to spread up the bay, but the variation is probably caused by cycles in the abundance of infective stages in the lower bay. Very cold

winters are often followed by a low-MSX year, possibly because the cold has killed the hypothetical reservoir host.

Depending on the intensity of MSX activity in a particular year, deaths caused by the parasite range from less than 5 percent to more than 50 percent between planting (in May and June) and Christmas, when most oysters have been harvested. On the average, however, MSX-related mortality of oysters during this period is only about 15 percent.

These are relatively low death rates compared with those for the epizootics of the late 1950's, not because the parasite is less abundant or lethal but because the native oysters have become resistant. In 1957 and 1958, when Delaware Bay oysters were first exposed to the MSX parasite, most were extremely susceptible and died immediately. Some were naturally resistant, however, and survived. They reproduced, and it is largely their resistant offspring that repopulated the bay. Resistant offspring may become infected with MSX, but infections do not readily become lethal.

Dr. Harold Haskin,
Director of the Oyster
Research Laboratory.



Susan Ford is a research assistant professor in the Department of Oyster Culture, Shellfish Research Laboratory, Cook College, New Jersey College of Agriculture Experiment Station, Rutgers University, Port Norris, New Jersey 08349. **Jean Jones** is a newspaper reporter and freelance writer who lives in Millville, New Jersey. This New Jersey Agricultural Experiment Station Publication can be identified as No.

H-32504-3-86, supported by State Funds and National Marine Fisheries Service Funds.

Unfortunately, the same salinities that protect oysters in the upper bay from MSX have also prevented continued development of resistance, since susceptible individuals survive and reproduce there. In fact, far more oysters exist in such protected areas than in regions where the parasite is regularly present to "weed out" susceptible oysters.

Each summer when oysters spawn, larvae from both resistant and susceptible parents mix and settle throughout the bay. Overall, the resistance of the native Delaware Bay stock has not increased appreciably since shortly after the massive destruction that occurred from 1957 to 1959.

The development of resistance to MSX in native oysters is an act of nature. Other actions allowing Delaware Bay oysters planters to remain in business despite the continued presence of MSX are the result of cooperative efforts of Rutgers' scientists, State management officials and industry members themselves.*

Many of the methods used to prevent or treat human diseases, such as vaccination or administration of drugs, are not possible or practical for the prevention or cure of MSX. Dealing with MSX is also quite different from spraying a field with pesticides in order to save a crop from destruction. Oysters grow in water that is up to 30 feet deep. Delaware Bay alone covers 720 square miles and holds trillions of gallons of water, which is constantly moved by wind and tides, diluted with river water and exchanged with ocean water. The entire water mass over an oyster ground is completely exchanged many times a day! It is not difficult to imagine the problems that would be encountered in the application of a potential "curative" substance to an oyster ground.

At present, it is more practical to look for alternative solutions that combine scientific knowledge of the parasite and its host with improved fishery practices. One such project is a joint effort of the Rutgers Oyster (now Shellfish) Research Laboratory and the New Jersey Department of Environmental Protection's Bureau of Shellfisheries that is directed toward revitalization of the natural seed beds.

The project combines basic research into the factors affecting reproduction and survival of oysters on the seed beds with application of these findings to more effective use of the natural seed supply. Since 1974, the industry has transplanted between 330,000 and 450,000 bushels of natural seed each year and has provided a livelihood for several hundred people.

Oystermen have altered their practices so that they now harvest oysters after a single season on the growing grounds. Although this

means that they must plant seed that is already relatively large or, alternatively, harvest relatively small oysters, this practice minimizes infections and deaths due to MSX because it shortens exposure time.

Mechanical culling machines were developed by the industry to separate live oysters from shells. They have eliminated the need for large crews to perform this task and have reduced dredging costs for both seed and market oysters.

In 1982, Rutgers, with assistance from local, State and Federal governments, completed a large, modern laboratory for shellfish research at Bivalve. It has greatly increased the capabilities for investigating solutions to the MSX problem.

One aspect of the expanded research program is the development of a highly specific antibody/antigen-based assay that will make diagnosis of MSX in oysters considerably more rapid than it is now. The assay will also make the search for a reservoir host and the potential for its control or tracking much more feasible.

Other research programs are exploring ways to take advantage of the low-salinity control over MSX, such as locating or creating planting grounds in low-salinity regions of the upper bay or of tributary creeks and rivers. Another is to move infected oysters for short periods into low-salinity water, where they will not be harmed but where MSX will be destroyed.

Researchers at the Shellfish Laboratory have developed strains of oysters highly resistant to MSX. Several strains are now being tested commercially. Resistant strains must be produced in a hatchery, and because of the high cost compared with that of natural seed, their commercial success probably will be found in nontraditional fisheries, such as those producing uniformly high-quality, high-priced oysters for restaurants and raw bars where oysters are served on the half-shell.

Although researchers work on new solutions to the MSX problem, the continued efforts of science, industry and resource management working together to preserve, enhance and wisely use the supply of native seed and to protect water quality in oyster-growing areas will go a long way toward maintaining a healthy oyster fishery in New Jersey. **NJ**

* Because of the poor condition of the seed beds, the Division of Fish, Game and Wildlife, with the advice of the Delaware Bay Shellfisheries Council and Rutgers Shellfish Research Laboratory, will not open the natural oyster seed beds, above the southwest line in the Delaware Bay for the taking of seed oysters in 1987.

BY LARRY SARNER

The New Jersey Division of Fish, Game and Wildlife's Marine Conservation Officers are a small band of dedicated people with a purpose. With a few boats they do their best to watch our coasts. Their dedication does not come from the thrill of nabbing an illegal clammer red-handed, but rather from a love of our natural coastal areas and wetlands and their living resources and a desire to keep this a healthy, productive region for generations to come.

True, some exciting cops-and-robbers types of stake-outs, chases and arrests do happen. These often entail quite a bit of discomfort and danger, and like all police work, more often end up with more office- and paperwork than any outdoorsman should be subjected to.

In summer these men often patrol randomly, checking weekend anglers for undersize fluke, stripers and crabs. But the tough and more interesting police-type work (locating suspect operations, catching violators in the act and documenting evidence useful in court) involves commercial fishermen. Most of the people who make their living from the sea and bays are very careful to abide by the regulations. All work hard in often uncomfortable conditions. However, a few seem dedicated to foiling any laws and in getting more than their fair share of the resource.

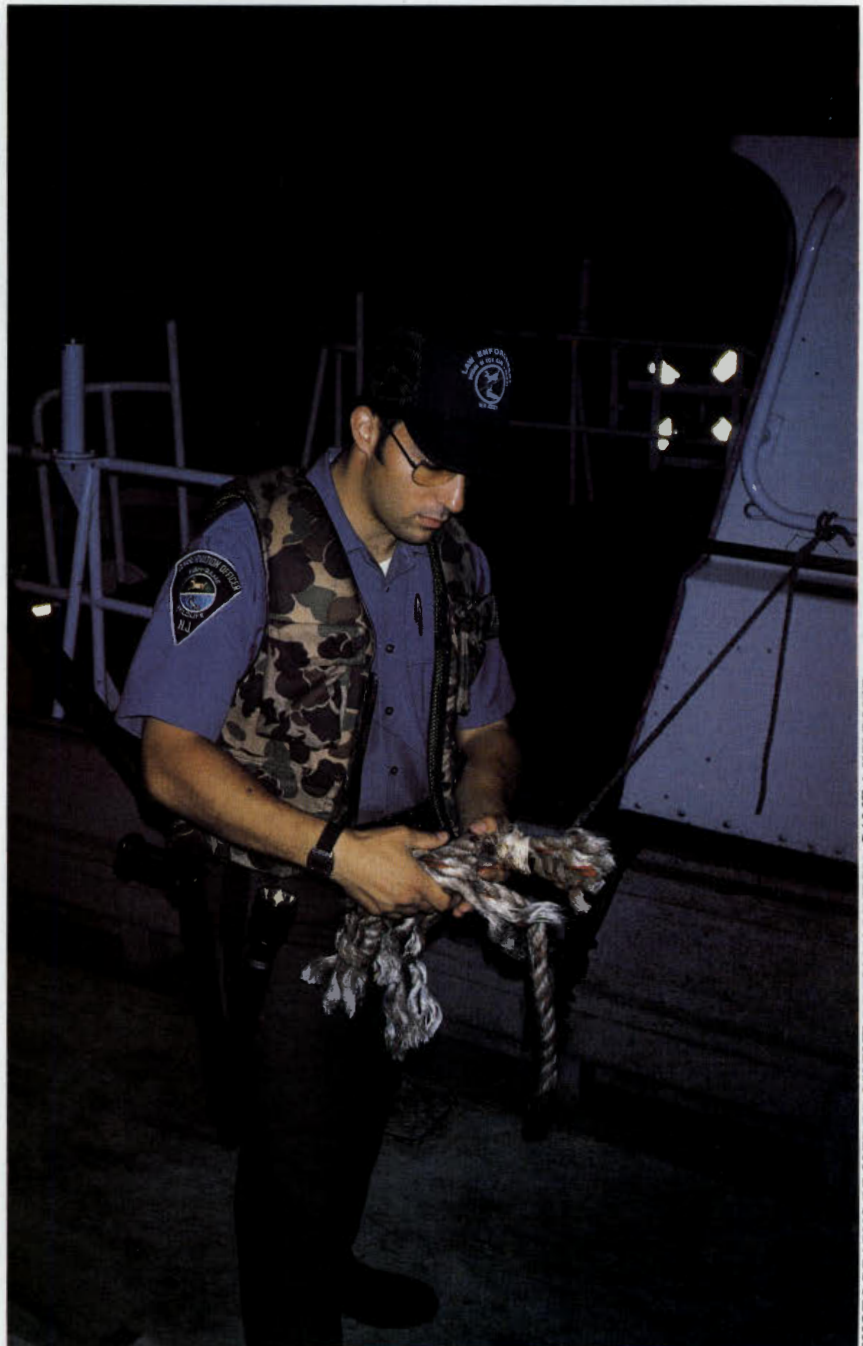
A Case in Point:

Having received information that a particular lobsterman in Belford, Monmouth County, was consistently bringing in many short lobsters, the unit planned an operation designed to put an end to it.

Think of the ups and downs, good and bad, running through the minds of officers as the plan unfolds.

After much planning, three officers set out in a skiff for an apparently pleasant day of fishing in Sandy Hook Bay (good). However, they knew they were there for purposes that were designed to end in an unpleasant confrontation (bad). The suspect lobster boat was sighted returning to port (good). Stacked near its stern were bulky objects concealed by a tarp (bad). The officers pulled anchor. As the lobsterman approached a group of recreational fishing boats, with his attention concentrating on maneuvering, the skiff approached. With a bullhorn they identified themselves and instructed a crewman to get away from the stern of the boat. The big boat gunned its engine. The crewman attempted to kick overboard the bulk under the tarp. The captain stuck his head out of the wheel house and yelled something to his crewman, who finally succeeded in pushing his load overboard.

Marine Enforcement



PHOTOGRAPHS PROVIDED BY THE DIVISION OF FISH, GAME & WILDLIFE

A buoy was dropped by the officers at the site of the dumping and a quick visual check of position was made by alignment with shore points (good). A short chase, stop and boarding revealed two barrels of legal lobster and stories of "We didn't hear you" and "We didn't know who you were." As one of the officers began putting on scuba diving gear, however, the lobster crew's faces dropped in stunned amazement. But a hoped-for easy location of the buoy was not to be. Its line didn't deploy as expected (bad). But with visual checks to locate the spot, an anchor was dropped. So precise was the location, that the anchor snagged the load in question (good). Six bags of lobster parts were recovered. The diver went down and recovered more.

All in all, the lobsterman was given a State fine of \$1,400 for possession of undersized lobster and interference. He received a Federal penalty of \$35,000 since he was fishing with a Federal license.

With a catch worth about \$2,000, several undetected trips might make this type of operation seem like an acceptable risk. All New Jersey gamblers are not at Atlantic City. However, with previous violations, this captain lost his Federal permit for two years and no doubt would have trouble fishing in New Jersey waters for quite some time.

Another Case in Point:

Another operation involved two New Jersey officers on one of two 41-foot Coast Guard boats, a National Marine Fisheries Service agent with a Coast Guard helicopter, and a tractor. All these resources were deployed in the same Sandy Hook-Raritan Bay area, looking for a night-time trawler.

New Jersey regulations state that no trawling (dragging a net) can be done within two miles from shore. Reports were that at least one boat was routinely doing this in the area at night. The electronics onboard modern fishing vessels include various radios, LORAN navigation, sonar fish and depth finders and radar. It is the radar that makes it difficult for any vessel to sneak up on another. But for the charge of trawling to stick, officers need only see a taut haul-line over the side of a fishing vessel.

On this particular night, a Coast Guard helicopter out of Brooklyn was searching the bay. They located a trawler in operation and came down to the boat. With their "Midnight Sun" floodlights turned on they did see the trawl line and radioed to agents on one of the two Coast Guard boats, who closed in and boarded the vessel. In the meantime the fishermen had cut their line, thus setting loose several thousand dollars worth of net and cable, not



to mention 500 pounds of fish caught up in the net. However, they did attach a white buoy to the net, hoping to recover it later.

Officers spent hours pulling buoys in the crowded lobstering area before locating the one they wanted. Since it was a bigger load than the Coast Guard boat could bring on deck, they attached a line and took it to shore, where later a tractor pulled the whole rig out of the water for inspection. Many fish were returned to the water. Many were undersized (the least of the violations at this point). However, a few 10-pound fluke and 15 weakfish were found. Unfortunately most of the fish had perished and could only be dumped unceremoniously back into the bay. The Federal Agents cited this vessel for running at night with lights; the State charged the fisherman with dragging a net in the bay and interference.

These types of operations, along with keeping track of clams, both undersized and from contaminated waters, could keep busy a force many times the size of our Marine Enforcement Unit with its seven Conservation Officers.

A strict regulation of catch limits and size

The night's work pays off. Marine enforcement officers inspecting an illegal catch.



of fish and shellfish will ensure that enough young fish survive to maturity. Thus a continued repopulation will let our descendants benefit from the abundance that our ancestors did. The dedicated enforcement officers are one of the best hopes that this will happen.

Eyes and Ears: You Can Help

The Conservation Officers of the Division of Fish, Game and Wildlife's Marine Enforcement Unit are efficient and effective. But they are few. You can help be their eyes and ears.

If you know of or have good reason to suspect a violation of regulations protecting our marine resources, call (609) 441-3474.

If the situation needs immediate, urgent attention, call the DEP Hotline (609) 292-7172, 24 hours a day.

It is *your* resource they are trying to preserve.

New Jersey lies next to an area of a very valuable natural resource: our marine and wetlands environment. We are also in one of the most densely populated areas on our earth. These two factors make management of this resource necessary if we are to preserve it for future generations. Various agencies take on the enforcement responsibilities needed to oversee the laws and regulations and can cite violators in another agency's area of primary concern. The Marine Enforcement Unit of the New Jersey Division of Fish, Game and Wildlife is at the core of this effort. Although small, the unit is quite effective and enjoys the cooperation of other, larger agencies when necessary.

Below is a summary of these cooperating groups:

- **Marine Enforcement Unit** (Division of Fish, Game and Wildlife; NJ Department of Environmental Protection)

Conservation Officers with five trailerable unmarked boats operate out of one field station and often directly from their homes. Their jurisdiction is primarily from the Delaware River's Commodore Barry Bridge, down around Cape May, up the coast past Sandy Hook, up the Hudson River to the NJ-NY state line. They watch over finfish and shellfish operations, both recreational and commercial, mostly out to 3 miles, and occasionally deal with waterfowl, pollution and drug runners. They also work Federal waters (3 to 200 miles) in conjunction with NMFS & USCG.

- **Marine Police**

This unit within the New Jersey State Police has nearly 100 officers with several dozen boats (marked with the familiar blue and gold

stripes). They operate out of seven stations, covering much the same areas as the FG&W unit plus freshwater, back bays and boating areas. They primarily watch over boating regulations, licensing operation and safety.

- **US Coast Guard**

This approximately 300-person operation operates a few dozen large boats from 16' & 21' utility boats to 210' cutters, plus three helicopters, out of seven New Jersey ports (with help readily available from nearby states). It primarily watches for boaters in distress but is also quite active in enforcement duties involving fisheries out to the end of the 200-mile Federal Fisheries Conservation Management Zone off our coast, drug smuggling and safety violations.

- **US National Marine Fisheries Service**

Three agents in New Jersey are the lead agency for Federal Fisheries Enforcement and are deputized as NJ Marine Conservation Officers.

- **Others**

Additional agencies that watch over marine-related activities but have no enforcement powers and can write violations include the NJ Department of Health (inspect processing and food facilities) and the Bureau of Coastal Enforcement and Field Services (under NJDEP, Division of Coastal Resources).

Between Apprehension and Conviction

As with many types of enforcement, officers are often discouraged with the slow movement of the legal system and small penalties meted out. However, in New Jersey, well over 95 percent of arrests in marine enforcement lead to either a guilty plea or conviction. But of the various courts in the State that hear cases, most deal with marine resource problems only very occasionally and, in turn, do not appreciate the seriousness of the offense. Often only a small fine is levied, perhaps a few hundred dollars.

On the other hand, Federal agents set aside cases to be heard at one time by a circuit judge specializing in marine and fisheries provisions. They are well versed with the value of the resource and, accordingly, deal out stiff penalties, often ranging into the thousands or tens of thousands of dollars.

Items on our Marine Enforcement Unit's wish-and-want list might also include some clerical help, better electronics gear, upgraded boats and, of course, more officers. However, amongst our present force, there probably is less grumbling and more make-do attitude than any comparable number of law officers one might find anywhere. **NJ**

Snow Geese

BY FRED FERRIGNO
AND MIMI DUNNE

The snow goose could be called the Arctic goose, for it spends half of its life in Arctic and mainland Canada. When in New Jersey it is a bird of snow, arriving in October to winter on the Delaware Bay. Though you won't find any snow geese in New Jersey during the summer, the salt marshes and adjacent agricultural fields bear witness to their winter stay.

Biologists recognize two distinct subspecies of the snow goose, greater and lesser. The lesser snow goose is slightly smaller, ranging in weight from 4.5 to 6 lbs., with a mature wingspan of 17 inches. The greater snow goose weighs from 6 to 7½ lbs. and has a wingspan over 18 inches. The lesser snow goose has a blue phase, a different color phase of the same race. While greater snow geese are restricted to the Atlantic Flyway, lesser snow geese are found across the country in all four flyways.

The staging and migration of snow geese in early April along the Delaware Bay is a spectacular sight. From New Jersey, geese depart for the St. Lawrence River in Canada. In May and early June, flocks migrate from the St. Lawrence to the Arctic breeding grounds in Northern Baffin, Bathruth, Bylot, Northern Ellesmere and other islands.

Snow geese will begin nesting as soon as the snow is melted. Their nest is a down-lined scrape in the tundra, with some vegetation added. The clutch ranges from 2 to 9 eggs. The female incubates the eggs while the male stands guard nearby to defend the nest. The timing of nesting is probably the most critical factor in nesting success; if too late owing to late snow melt, broods will not be successful. Summer storms, Arctic fox predation and possibly acid rain may contribute substantially to mortality of young snow geese.

A combination of good habitat and cooperative management resulted in increasing populations of greater snow geese. From the early to mid 1900's, snow geese populations fluctuated at low levels of 10,000 to 50,000 birds. Despite some good years, the populations tended to remain at low levels.

In the 1960's and early 1970's, snow geese began to disperse from their restricted wintering areas. A small flock of 300 birds that win-

tered in the East Pool of the former Brigantine National Wildlife Refuge (NWR) was the first to winter on the Atlantic Coast of New Jersey. On the Delaware Bay, snow geese also began to disperse from Egg Island to other tidal marshes. There are at present four flocks that use the tidal marshes from Reeds Beach, Cape May County, to Bayside, Cumberland County.

The tidal restoration of salt hay impoundments—a management technique—was a major contributor to the expansion of snow geese along Delaware Bay. When salt hay farms are taken out of production and allowed to return to tidal marsh, they quickly revert to lush stands of salt cordgrass. By 1985, 6,900 acres—more than half of the original salt hay farms once extant—were restored to tidal marsh. The snow geese responded.

With an increasing population of snow geese, marsh eat-outs continue on several NWR's and the Delaware Bay. Snow geese will also move inland considerable distances to deplete farm crops. The removal of vegetation is detrimental to other birds and to invertebrates. Sharp-tailed sparrows, willets, marsh hawks, black ducks, mallards and other salt-marsh nesters are affected by snow geese eat-outs.

The US Fish and Wildlife Service, the Atlantic Flyway Council and the Canadian Wildlife Service proposed a limited hunting season in 1975-76 to counter depredation of agricultural crops and tidal marsh, and to provide recreational hunting opportunities. Snow geese are hunted by decoying them to a variety of sets. During the last ten years they have become very wary as an adaptation to hunting pressure. Only the most carefully arranged full-body decoys, shells and winds socks will attract snow geese these days. Annual harvests, once as high as 40,000, are now one third of that.

Populations of snow geese are accurately monitored by photographic means. Birds that stage on Delaware Bay can be counted, as can St. Lawrence and Arctic nesting geese. All of these surveys provide information for the cooperative goose management plan, designed to ensure that this beautiful white bird will remain a winter inhabitant of the Jersey coast.

Fred Ferrigno is Principal Wildlife Biologist with the Bureau of Wildlife Management in the Division of Fish, Game and Wildlife. He has 35 years of experience in the research and management of wetlands and habitat species. Mr. Ferrigno has a Masters Degree from Rutgers University in Ecology & Agricultural Research.

Mimi Dunne has been with the Division of Fish, Game and Wildlife for five years and is currently a Senior Wildlife Biologist and Education Specialist. Ms. Dunne is a graduate of Rutgers University and a frequent contributor to NEW JERSEY OUTDOORS.

ORIGINAL ACRYLIC PAINTING BY CAROL DECKER



© 87
Carol Decker 9

