

# YEAR OF THE COAST



May/June 1980

New Jersey  
**OUTDOORS**



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Department of Environmental Protection



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# New Jersey OUTDOORS

<b>New Jersey's Atlantic Oceanfront, Barrier Islands, and Back Bay Regions</b>	<b>2</b>
<i>By David N. Kinsey</i>	
<b>Fishing in Great Bay</b>	<b>6</b>
<i>By Paul Olsen</i>	
<b>New Jersey's Bay Shellfisheries</b>	<b>8</b>
<i>By Bill Figley, Tom McCloy and Staff of the Nacote Creek Research Laboratory</i>	
<b>Staying in Shape with the Jersey Shore Lifeguards</b>	<b>10</b>
<i>By Thomas J. Koellhoffer</i>	
<b>Beach Watching</b>	<b>12</b>
<i>By Susan D. Halsey</i>	
<b>Wildlife in New Jersey/ The Woodchuck</b>	<b>14</b>
<i>By Thomas A. Altavilla</i>	
<b>It's Tomfoolery!</b>	<b>17</b>
<i>By Robert Eriksen</i>	
<b>Expect the Unexpected</b>	<b>18</b>
<i>By Tony Patterson</i>	
<b>Fawntastic "Doe"</b>	<b>20</b>
<i>By Alden Stahr</i>	
<b>Take a Walk Along the Coast</b>	<b>22</b>
<i>By D. W. Bennett</i>	
<b>DEPARTMENTS</b>	
<b>Environmental News</b>	<b>16A</b>
<b>MINI FEATURES</b>	
<b>Lake Assunpink Fishing</b>	<b>16</b>
<b>Endangered Species of New Jersey</b>	<b>21</b>
<b>Earth and Space Photography Contest</b>	<b>21</b>
<b>The Third Battle of Monmouth</b>	<b>29</b>
<b>Stone School Museum</b>	<b>29</b>

**A GUIDE TO NEW JERSEY'S BEACHES**  
(A Center Spread Snapout)

# from the editor

## YEAR OF THE COAST

As announced in the March/April issue, this issue (May/June) has been designated as the *Year of the Coast* issue. On New Year's eve, in keeping with President Carter's 1979 environmental message establishing 1980 as the *Year of the Coast*, Governor Byrne signed a proclamation announcing New Jersey's participation in this event.

The Barnegat Light front cover by David Campione sets the mood and the *Table of Contents* reveals the ingredients that make up the issue—coastal problems facing New Jersey, beach walking, fishing, our bay shellfisheries, beach geology, our Jersey Shore lifeguards, and

more.

And the extra added attraction in this issue is a center spread snapout four-page supplement titled, *A Guide to New Jersey's Beaches*, which covers just about everything you wanted to know about our coastal resource. Several charts provided by the Division of Tourism list the shore resorts, places to fish, and the facilities available. Included in this supplement is a coastal calendar listing events, places, dates, and contacts. In short, what we have is a *what, when, where and how* to enjoy our Jersey shore this year.

### IN THIS ISSUE:

In our lead article, Acting Director of Coastal Resources, David H. Kinsey discusses the issues confronting our coastal resources in *New Jersey's Atlantic Oceanfront, Barrier Islands, and Back Bay Regions*.

Water Resources Biologist Paul Olsen, a new author, tells us *when, where and how* to fish the least polluted bay in New Jersey in the article, *Fishing in Great Bay*.

*New Jersey's Bay Shellfisheries* discusses New Jersey's shellfish resources including the impacts of commercial and recreational shellfishing, pollution, diseases affecting the resource, and the shellfish species found in our area. The article was prepared by marine biologists Bill Figley, Tom McCloy and the staff of the Nacote Creek Research Laboratory. Reprints of this article are available by writing to:

Division of Fish, Game and  
Wildlife  
Nacote Creek Research  
Laboratory  
Route 9  
Absecon, N.J. 08201

Did you ever wonder why the lifeguards at the seashore look so trim and fit? And why you in comparison looked so pale and flabby? Read *Staying in Shape With the Jersey Shore Lifeguards* by Thomas J. Koellhoffer.

Susan D. Halsey, a DEP specialist in coastal geology, writes about

*Beach Watching*, which is all about coastal environments, especially beaches, dunes, wave action, and alterations. New to our pages, Ms. Halsey is a graduate of University of Massachusetts (BA), Duke (MA) and University of Delaware (Ph.D.).

"The New Jersey coast is unabashedly walkable, ready to reward anyone willing to get up early in the morning, get out of the car, and wander off the usual track..." So says author D.W. Bennett, Executive Director of the American Littoral Society, in his article, *Take a Walk Along the Coast*.

About 20 draft copies of the guide titled, *A Coast Walkbook*, mentioned in the article will be available for review by New Jerseyans familiar with our coastal resources. Gery Bennett said the first 20 requests received will be sent a review copy. Write to:

American Littoral Society  
Highlands, N.J. 07732

As usual, we have our Wildlife in New Jersey article titled, *The Woodchuck* by Thomas Altavilla. This article is introduced by the Carol Decker illustration on the inside back cover.

In *Expect the Unexpected*, Tony Patterson, Division of Tourism, takes us on a recreational tour of the Garden State. From the Skylands in the north down to Cape May at the Southern tip, he lists the many gas-saving vacation trips available in our state. Write in for new vacation

brochure.

Division of Tourism  
Box 400 (NJO)  
Trenton, N.J. 08625

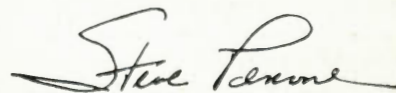
Do you know what drives normal, healthy Americans with good jobs and families to arise at 3 a.m. and flounder around the Spring woods making strange noises with a little wooden box? That's the question author Robert Eriksen asks in *It's Tomfoolery*. And I'm not telling.

And a new author, Alden Stahr, tells us how a very old mother gave up everything, including her fur coat, for her children. Read *Fawntastic "Doe"* and find out.

A mini feature—fishing on *Lake Assunpink*. If you enjoy fishing for channel catfish, largemouth bass, chain pickerel, yellow perch and other freshwater species, try Lake Assunpink, located in the Assunpink Wildlife Management Area in Monmouth County.

And if you're interested in fresh water or saltwater fishing in about 55 other Wildlife Management Areas, send a \$3 check or money order for the 120-page Wildlife Management Area Guide, complete with three-color maps of each area, directions, and what's there. Write to:

Wildlife Management Guide  
P.O. Box 1809  
Trenton, N.J. 08625



New Jersey State Library

# New Jersey's Atlantic Oceanfront, Barrier Islands and Back Bay Region

David N. Kinsey

Acting Director of Coastal Resources



FORREST S. CLARK

The 127-mile Atlantic oceanfront of New Jersey, from Sandy Hook to Cape May, is the region known commonly as "the Shore." However, like many parts of New Jersey, it is extremely diverse. The region includes undeveloped islands, with egrets and verdant meadows. It also includes resort cities whose heyday was half a century ago and who now have blocks upon blocks of abandoned housing. The region includes an area with a major canal cut by the U.S. Army Corps of Engineers more than 60 years ago for defense purposes, as well as a treasured historic site, "Lucy the Elephant," in Margate, a national land-

mark and eloquent testament to the ebullient late-19th-century and early-20th-century style of seashore land development. The region includes one operating nuclear generating station, the site of a federally-approved nuclear generating station, and the now abandoned site of the world's first proposed offshore floating nuclear generating station. The barrier islands of the region are narrow and compact, yet strikingly diverse among themselves. Some are family-oriented resorts, while others cater to day trippers and the late teens and young twenties crowd. Atlantic City, in the aftermath of the 1976 constitutional referendum

authorizing casino gambling, is experiencing the new challenges of major development pressures. Sea clammers, commercial fishermen, and recreational fishermen also vie for the living marine resources in this coastal region.

**In brief, although it constitutes only a small part of New Jersey's overall coastal zone, this oceanfront, barrier island, and back bay region presents considerable diversity and challenges, just as New Jersey's entire coastal zone presents a stunning array of difficult and complex issues.**

## PERSPECTIVES

It is within the past 10 years that significant environmental legislation concerning the oceanfront, barrier island, and back bay region has been enacted and implemented. The past three decades are important, however, because of several singularly significant events, especially the March 1962 storm which cut through New Jersey's barrier islands in several locations and wreaked havoc along the entire shoreline. Although numerous laws have been passed in this past decade, it has only been in the latter years that procedural framework that was established has been supplemented by the necessary substantive framework of workable, reasonable policies to provide explicit guidance to users of coastal resources.

## FIFTEEN KEY ISSUES

Numerous issues fill the agenda for coastal management in New Jersey. However, at least 15 discrete issues deserve some special attention in a retrospective and prospective view of the challenges of the oceanfront, barrier island and back bay region. These issues include: beach access, shore protection, high-rise construction, offshore oil and gas production, hotel-casino development, wetlands and natural habitat protection, coastal water quality, fisheries, barrier island development, suburbanizing the coast, the coastal regulatory decision-making process, the coastal policy formulation process, the role of people in coastal decision-making, and the need for broad and widespread public education on coastal management matters.

## BEACH ACCESS

**Reasonable public access to New Jersey's oceanfront and bayfront beaches is a perennial issue, one that has received increasing administrative, legislative, judicial, and public attention over the years. In brief, New Jersey's 48 oceanfront beaches hold the key to the public access issue. Almost all these municipalities charge fees for use of public beaches, ranging from 50 cents per day to \$50. for a season. In addition to their controlling the right to actually step on a beach, some municipalities have de facto beach access problems because of the lack of changing facilities, parking facilities, or access paths.**

In 1976, the Commissioner of the Department of Environmental Protection led a week-long Beach Walk along the oceanfront beaches to dramatize the Department's concern for this issue and to learn the facts on the problem, by meeting with local officials and citizens. One of the results of the Beach Walk was the innovative bus shuttle service, instituted by the Department of Environmental Protection in 1977, between Toms River and Island Beach State Park in order to increase public access to the park without expanding the parking lot on the undeveloped barrier island oceanfront park. The experiment met with great success and has been repeated each summer.

However, the problems of beach access do remain; many people want to use the oceanfront beaches, but do not attempt to do so because of difficulties in finding access to a beach. Informal surveys of visitors to Island Beach State Park recognize the necessity of making an early start in order to obtain access to the beach on peak summer weekend mornings, before the park closes due to its limited parking capacity. The same perception of limited access probably exists for other beach areas, as evidenced by the extreme popularity of the biggest free oceanfront beach, at the Gateway National Recreation Areas—Sandy Hook Unit, which is the closest large sandy beach to the northern New Jersey metropolitan area. Since much of the Monmouth County beaches have the appearance of limited access, beach goers are deprived of their rights to this form of public outdoor recreation.

In addition, some areas of so-called "private" beaches do remain, particularly in northern Ocean County at Bay Head, Mantoloking, and Normandy Beach, in addition to certain areas in Monmouth County. These enclaves of privilege do constitute part of the diversity of the New Jersey shoreline, but will become increasingly conspicuous as the push toward a more egalitarian society continues.

In the short term, the state is assisting certain county projects designed to increase public access to beaches. In particular, Monmouth County, with the assistance of State Green Acres funding, is designing and developing the Seven Presidents County Park on the oceanfront at Long Branch. In the future, additional public agency efforts will be required to fulfill the promise of regional beach access, particularly by the acquisition of access paths, easements, and rights-of-way from public streets and planned public parking areas to the oceanfront beaches. Improved public transportation from population centers to beach areas will also be an important part of the beach access solution.

## SHORE PROTECTION

**The effects of winter storms of 1978 on New Jersey's oceanfront shoreline**

**demonstrated sharply the vulnerability of the shoreline to the natural forces of wind and water. The cumulative effect of the 1978 storms was in many places greater than that of the single severe storm of March 1962. While no new inlets were created in 1978, there were some areas of washover and of severe erosion; particularly at Sea Isle City. Dunes created and stabilized with vegetation and fences since 1962 did stave off more severe erosion, as they were designed to do. However, dunes and nonstructural protection measures in addition to structural shore protection served largely only to delay the long-term destruction of property that will inevitably take place.**

In November, 1977, the citizens of New Jersey passed a \$20 million bond issue for shore protection purposes, recognizing the importance of the shoreline to the resort economy of the entire State. The Department of Environmental Protection is preparing a five-year master plan to use these scarce capital funds wisely, so that such past errors as faulty location of jetties, which have then exacerbated shoreline erosion problems downdrift, will not be repeated. Indeed, some existing jetties may even be removed, in order to return the shoreline dynamics to their original status.

The Department of Environmental Protection has adopted shore protection policies that emphasize nonstructural approaches such as groins and jetties to shoreline management, while recognizing that structural approaches are sometimes appropriate and indeed necessary, particularly to protect heavily built-up urban areas. The challenge for the next decade is to use the scarce shore protection bond issue funds wisely, while at the same time acting to reduce the future pressures for further shore protection funding by changing the patterns of land development and setting the stage for *not* rebuilding at the same locations after the next major storm that creates inlets or washes over extensive areas of the barrier islands. History will repeat itself, the barrier islands will be breached. It is only a question of time.

## HIGH-RISE HOUSING

The desecration of the New Jersey shoreline by high-rise towers provided a major impetus for the passage of strong coastal management legislation in New Jersey in the early 1970s. The abandoned carcasses of some high-rise towers still mar our shoreline, standing in mutely eloquent testimony to the economic recessions of the early 1970s. Some high-rise structures were, of course, built, including one at the height of the Atlantic Highlands, the highest point along the Atlantic Ocean and Caribbean Sea between Maine and Guatemala.

However, strong implementation of the Coastal Area Facility Review Act of 1973

has brought a change in this policy area, a change generally welcomed by New Jersey citizens. New high-rise construction in oceanfront and bayfront municipalities has been authorized, but only on a very selective basis, in existing built-up portions of Atlantic City, Long Branch and Asbury Park. At the same time, CAFRA permits for new high-rise construction have been denied in Brigantine and Toms River.

As the nation's economic picture improves, pressures are increasing for new high-rise construction in areas that experienced a boom in high-rise construction in the early 1970s, particularly in Monmouth County. Consequently, attempts will be made to "fill in" oceanfront blocks that stand between existing taller structures. Residents of the existing oceanfront high-rise structures will urge, not surprisingly, that new high-rise structures not be built. Recent real estate advertisements in New Jersey newspapers have proudly referred to the new coastal policy limiting high-rise construction by encouraging prospective tenants or condominium owners to get a apartment in the "last oceanfront high-rise to be built in New Jersey."

## OFFSHORE OIL AND GAS DEVELOPMENT

Clearly the decision of the U.S. Department of Interior to accelerate its program of leasing offshore tracts on the continental shelf for oil and gas exploration has presented the New Jersey oceanfront, barrier islands, and back bay region with a striking new set of challenges not anticipated a decade ago. After several years of debates and battles by environmental impact statements, the process of exploration has indeed begun.

So far, the onshore effects have been limited. The significant onshore effects will be felt when active development of the offshore areas begins, through the construction of onshore support bases in New Jersey and elsewhere, to be followed by the construction of an offshore pipeline which is likely to seek a route through New Jersey's barrier islands.

As state coastal policy, New Jersey has discouraged the location of onshore support bases within the oceanfront, barrier island, and back bay region, except for limited facilities to store emergency spill cleanup and containment equipment, in established harbor areas such as Atlantic City and Cape May. The state coastal policy has also directed the siting of most onshore facilities related to oil or gas pipelines outside of the coastal area covered here, although linear facilities such as pipeline corridors must of necessity transverse this area as they tie into the existing pipeline distribution systems and refining centers in the Camden and northern New Jersey regions.

The next decade of development of the offshore hydrocarbon resources may bring



CHRISTOPHER JONES

varying levels of onshore activity or nothing may be required, depending upon whether the resources are found to be of a commercially exploitable quality and quantity. The slow starting of this new technology in New Jersey has had the salutary effect of enabling the state to define more precisely its coastal policies regarding offshore and onshore development, as well as to increase public understanding of the implications of this new industrial enterprise, particularly with the assistance of county governments. As a result the state is now more prepared to deal with the new challenge of offshore resource development.

#### CASINOS IN ATLANTIC CITY

The approval by the voters of New Jersey of the November 1976 constitutional referendum on casino gambling has mightily bolstered the formerly sagging fortunes of the once premier oceanfront resort in the nation, Atlantic City. The infusion of new capital investment and hopes for profit have also added to the challenges of revitalizing the city and its environs in order to cope with these new pressures.

**The past three years of casino related development have seen three hotel casinos open, the renovated Chalfonte-Haddon Hotel complex purchased astutely by Resorts International prior to the casino gambling referendum and then renovated in order to open one year after the passage of the enabling legislation; the Boardwalk Regency operated by Caesars; and Bally Park Place. In these three years, eight other projects—Playboy, Holiday Inn, Benihana, Greate Bay, Claridge, Golden Nugget, Dunes, and Sahara have all received DEP construction permit approval under the Coastal Area Facility Review Act (CAFRA).**

At the same time, the pressures on the residents of Atlantic City, particularly the underhoused residents, have increased enormously. What was once a serious housing situation in Atlantic City has only been exacerbated by rising land values, land speculation, efforts of unscrupulous landlords to remove tenants, and general anxie-

ty that results from a highly charged land-speculation atmosphere. Although some new housing construction is about to begin, the situation remains critical.

The most serious challenge involving the Atlantic City region is dealing with uncertainty, as few state or local officials have ever witnessed or tried to manage a boom situation such as that now experienced. Within the next five years, 15 hotel-casino projects could be in operation; at least 25 hotel-casino projects are in various stages of discussion with the Department of Environmental Protection. While not all projects will come to fruition, this quantity of development at least is an indication of extensive developer interest in hotel-casino projects.

In terms of the entire Atlantic oceanfront, barrier island, and back bay region, the focusing of public and private sector attention on Atlantic City may deprive other areas of the attention they need to be managed properly. Also, efforts to expedite decision-making in Atlantic City may lead to legitimate cries of favoritism; yet this cry can be answered by responding that the voters of the state have indeed singled out Atlantic City as a special area deserving special attention.

#### WETLANDS AND HABITAT PROTECTION

Prior to 1970, New Jersey lost each year an estimated 1,900 acres of coastal wetlands to indiscriminate filling and dredging oper-

ations. The thousands of lots of existing residential lagoons along the bays bear permanent testimony to the destruction of this precious natural area. However, passage and implementation of the Coastal Wetlands Act of 1970 has dramatically reduced the destruction of wetlands, with the result that only 397 acres of wetlands have been filled since the law took effect in the early 1970s. The law has been upheld in several court challenges, although a denial of a wetlands permit application has not yet been subjected to full judicial scrutiny.

**One of the challenges confronting the Department of Environmental Protection is the development of the pre-existing lagoons, those built by destroying the wetlands in the 1960s and 1970s. As regional wastewater treatment plants and associated collector systems are installed within the coastal region, low-lying areas whose development was halted as a result of the "critical areas" designation in the early 1970s will now be available for development; these areas will include pre-existing lagoons, as well as some wetlands. Therefore, pressure for use of wetlands may be expected in the next few years.**

#### WATER QUALITY

In the late 1960s and early 1970s, the Department of Environmental Protection condemned and closed a number of bay and

PHOTOS PROVIDED BY DEP



ocean areas to shellfishing, as a result of pollution of these waters largely by sewage effluent, either untreated or with only primary treatment. As a result of the state's implementation of the construction grants program under the federal Water Pollution Control Act Amendments of 1972, massive regional wastewater treatment systems have been built. Once operation begins, the bay and ocean waters tend to become cleaner and shellfishing can resume.

Also, these same bay and ocean waters are extensively used for recreational purposes. Improvement and maintenance of high water quality contributes fundamentally to the tourism attraction of this environment.

The next decade should bring continued improvements in water quality as a result of the water pollution control projects underway—at some cost, however, to the state's energy supply. The secondary treatment afforded by the regional treatment plants is very energy-intensive. The regional treatment systems will become among the major consumers of electricity in this region, an effect not clearly anticipated at the time of construction of these projects, when electricity was a cheaper resource.

#### FISHERIES

**While not commonly thought of as a marine fisheries state, New Jersey does have a fairly extensive commercial fishing industry, with fishing ports at Cape May, Point Pleasant, Atlantic City, and areas in Monmouth County. New Jersey annually ranks in the top ten nationally in commercial fish landings. In 1977, 134 million pounds of fish and 45 million pounds of shellfish were harvested. The dockside value was \$38 million and the total value including processing and marketing was \$134 million. Thirty-two million man days and over \$400 million were expended for recreational fishing.**

Various congressional, legislative and executive initiatives in the late 1970s, have focused public attention on living marine resources and their associated potential for commercial development onshore. Unfortunately, we know too little about New Jersey's marine fisheries resources to make proper policy judgments. The next decade should see redoubled efforts at analyzing, protecting, and managing fisheries resources for commercial and recreational purposes, particularly as the state endeavors to carry out its responsibilities for managing fisheries resources within the three-mile territorial sea, now that the Mid-Atlantic Regional Fisheries Council is managing these resources out to the 200-mile limit.

#### BARRIER ISLAND DEVELOPMENT

The fundamental development decisions on New Jersey's barrier islands were made

about 70-100 years ago. The railroads and land development companies worked together, with the State of New Jersey to build causeways to the barrier islands, filling the marshes, and sell off lots for summer homes. Consequently, the challenge in managing New Jersey's barrier islands is not to set the clock back 100 years, but rather to recognize the natural hazards these areas face and implement public policies that will protect public property and not overly subsidize private property located in inappropriate areas.

As a result of the construction of regional wastewater treatment facilities and local collection systems, building moratoria in effect on New Jersey's developed islands, particularly Long Beach Island and Brigantine, are being lifted, with small booms in development taking place as developers and home builders seek to fill in remaining lots, particularly in sections of less than 25 dwellings units that will escape state jurisdiction under the Coastal Area Facility Review Act.

National attention is focusing on the nation's barrier islands, particularly as a result of President Carter's 1977 Environmental Message which established a national task force on barrier islands. However, the fundamental development decisions have already been made for most of New Jersey's barrier islands.

State coastal policies now basically prohibit the extension of development at the extremities of barrier islands, but do recognize as acceptable new infill development, on lots that have been passed over within existing developed barrier islands. At the same time, the state's coastal policies limit development in the sensitive fringe areas that constitute the edges of barrier islands—the beaches, dunes, wetlands, and appropriate buffer areas.

**The challenge for the next several years is to protect these areas effectively, devise more consistent state and local policies in these areas, and strictly limit development to what the Department of Environmental Protection has referred to as the "Central Barrier Island Corridor." Then, at the same time, the state and local governments must prepare for the next disaster and make plans to acquire as public open space lands that will be destroyed by the next storm, rather than allow redevelopment to take place.**

#### SUBURBANIZING THE COAST

As the nation's most densely populated state, New Jersey experiences development trends and the consequences of urbanization sooner than most other states. Given its megalopolitan location and the powerful roles that New York and Philadelphia exert on the process and shape of urbanization in New Jersey, the coastal region under discussion here has experienced a

slow but steady trend toward suburban development.

The process of urbanization is difficult to discern from year to year, but a retrospective view of Ocean County in the past 15 years shows that the pattern and pace of development have definitely increased, particularly as large-scale, senior-citizen retirement communities have been established. Less visible but equally important are the even greater concentrations of senior citizens in Atlantic and Cape May counties, where the percentage of persons 52 years and older is higher than in Ocean County, or any other county in New Jersey.

**The challenge for the next decade is to halt the suburbanization that has taken place indiscriminately along the coast and instead to channel appropriate growth to appropriate locations. In short, what is called for is a holding of the line of development. If the general pattern of development is to be concentrated, as one of the basic policies in New Jersey's coastal management program mandates, development will take place but at locations and at a density that will conserve land, energy, and economic resources.**

New Jersey's Rules on Coastal Resource and Development Policies define broad regional growth policies for the Bay and Ocean Shore Region. By defining the area around Mullica River and the area around the Great Egg Harbor River as low-growth regions, a clear line has been drawn in order to limit sharply new development in these areas. At the same time, certain high-growth regions have been designated, in particular all of Monmouth County within the coastal zone and northern Ocean County, together with the Absecon-Somers Point Corridor. Over the years, as these regions are developed in accordance with these general policies, broad changes should become visible as the pattern of development does indeed begin to concentrate or at least stop spreading indiscriminately.

#### COASTAL REGULATORY DECISION-MAKING PROCESS

As new state coastal laws have been enacted, new regulatory requirements sometimes confront developers as well as local governments and individual citizens with a maze of hurdles. Now that the latest of the two regulatory programs have been in effect for a number of years—particularly the wetlands permit program and the CAFRA permit program—the ground rules are relatively well understood by those concerned. In spite of the institutionalization of the permit process, room remains for improvements in the procedures of decision-making.

In July, 1979 the Division of Coastal Resources, the former Division of Marine Services, was reorganized into the following seven bureaus; Tidelands, Coastal Enforcement and Field Services, Coastal Project

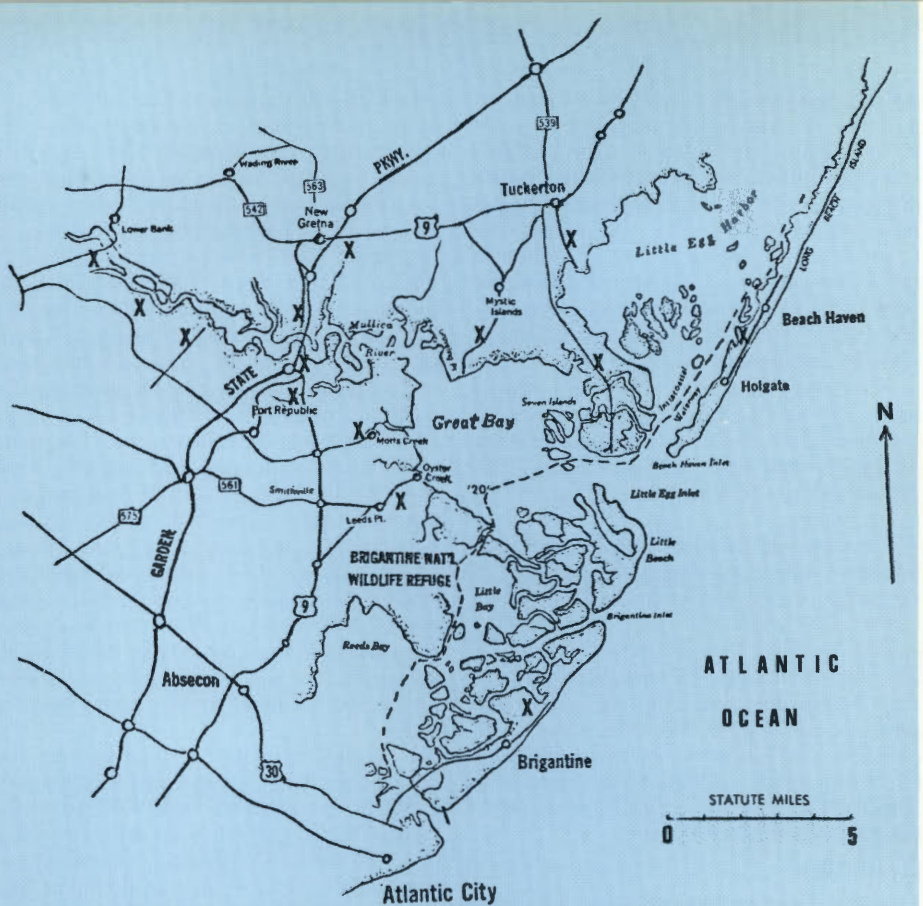
*Continued on page 30*

# Spring Fishing in Great Bay

PAUL OLSEN

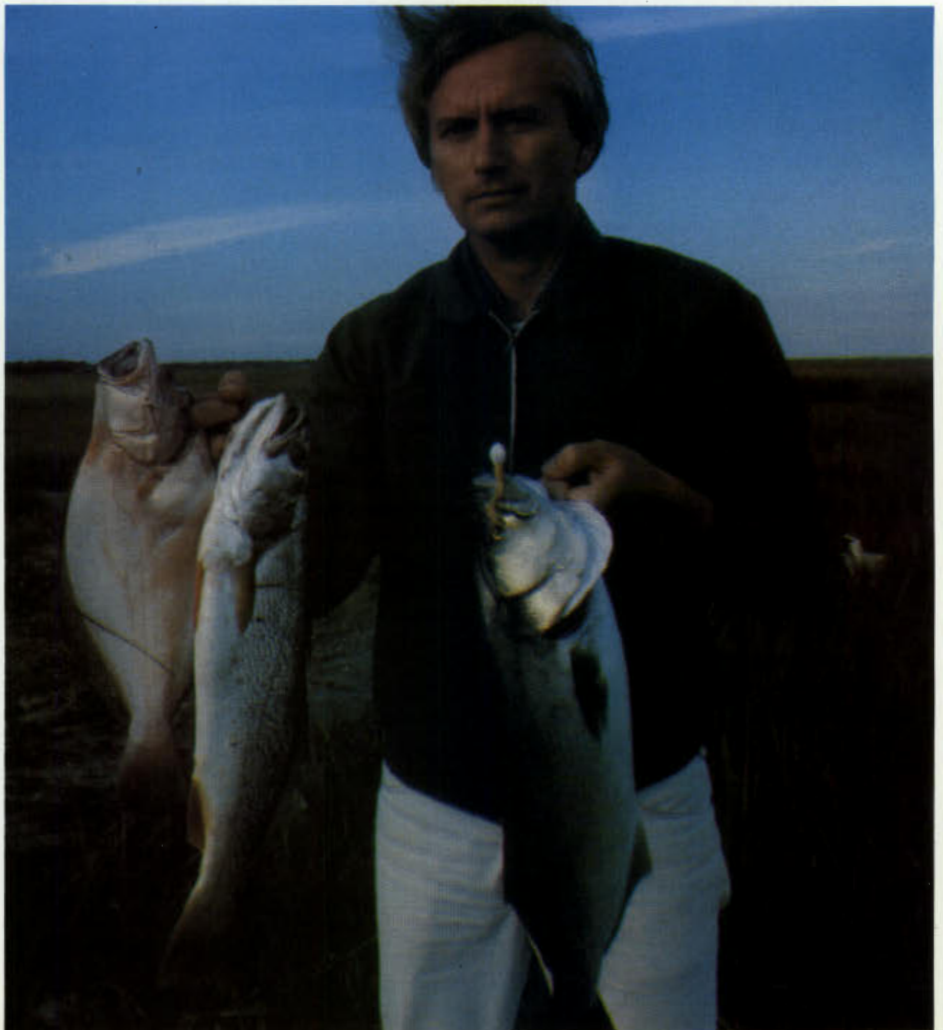
Great Bay lies 10 miles north of Atlantic City in a relatively unspoiled section of the New Jersey coast. This shallow, roughly circular basin receives the flow from the Mullica River as it mixes with ocean waters entering via Little Egg Inlet. The inlet complex is the widest break in the sea shore between Cape May and Sandy Hook; thus, geographically, the angler is in a strategic position to intercept migratory fish moving to and from the estuary. The total harvest may not be as substantial as that in Delaware Bay or in the Sandy Hook area; but this maze of channels, sand bars, sloughs, flats, and marshes each year produces some of the first significant sport catches of saltwater fish in this region.

Great Bay is within two hours driving of the metropolitan centers to the north and west. Access areas are indicated (X) in the map figure. Those closest to Great Bay are reached from U.S. Route 9 via Leed's Point, Mott's Creek, Chestnut Neck (near the Garden State Parkway bridge), Mystic Islands (by Radio Road), and Tuckerton (by Great Bay Blvd., locally known as "Seven Bridges Road"). Most of these have bait, tackle, boat, and launching facilities, with information on current fishing usually at hand. Adding color to the local scene, experienced fishermen are often willing to share specific information if a freindly approach is used. Some areas provide access for bank fishing; a boat, however, enables you to locate fish anywhere in the bay area. The boat should be seaworthy enough to negotiate a fair chop, which can be kicked up by even a moderate wind from any direction. This require-



MAP OF GREAT BAY AREA. 'X' INDICATES ACCESS ROADS OR FACILITIES.

Bluefish, weakfish, and fluke; a typical spring grab bag from Great Bay.





**A fat seventeen pounder taken in May from Grassy Channel.**



**Steep marsh banks in many locations allow close approach by boat when tide is up.**

PHOTOS BY AUTHOR

ment is even more important when fishing in the inlet or ocean. An outboard offers the advantage of navigating in water less than four feet deep.

For a person unfamiliar with the area, local geography can be confusing. The main basin is in the form of a vast bowl. Unlike adjacent waterways, where shore communities lie just eastward of bay and marsh areas, the orientation from most ports in Great Bay is southward. This causes further disorientation to the boater, and other landmarks must be used for reckoning one's position. The small towns of Mott's Creek and Oyster Creek lie just south of the river mouth. The ever present Atlantic City skyline and the lone outline of the Brigantine Hotel lie five to ten miles farther south. The town of Mystic Islands lies just northeast of the river mouth. The most prominent landmark, the old "fish factory," lies eastward at Seven Islands, with the old Coast Guard station just behind it at the entrance to Little Egg Inlet.

More immediate landmarks are present, which aid the boater in navigation. Just opposite the Coast Guard station the inner spit of Little Beach protrudes from the south side of Little Egg Inlet. The Intracoastal Waterway, which is indicated by bouys or markers, extends westerly from the inlet and makes a sharp turn at marker "20" to continue southward into Brigantine National Wildlife Refuge via Main Marsh Thorofare. Closely arranged in parallel rows, cedar stakes mark shellfish beds. In Great Bay the most prominent of these extend from the southwest side near Oyster Creek, with other staked areas present between Seven Islands and Graveling Point. Lone stakes, or those farther apart in single rows, indicate sloughs between bars and should be approached with caution. Between the Intracoastal Waterway and the southeastern shore of Great Bay is an area locally known as "Grassy Channel."

This is an ill-defined channel, which must be negotiated with caution, especially at low tide. Its head is marked by a spoil bank of mostly clam and oyster shells (near marker "20"), while the lower end is partially blocked from the inlet by the inner spit of Little Beach. Shifting of sands from year to year has caused some modification of currents and contours, particularly near the inlet, with consequent repositioning of stakes by local fisherman. Nautical Chart 12316 (National Oceanic and Atmospheric Administration) is essential, especially for avoiding the maze of sand bars on either side of the Intracoastal Waterway, between the main basin and the inlet. Stakes, however, are not charted and may be shifted periodically. Charts are available at most marinas, where up-to-date information regarding local navigation can also be obtained.

Traditionally, interest has focused on Great Bay for its early season striped bass fishery. In recent years it has had the most publicized March and April run of stripers in this region. This has been attributed to the wintering population of mostly school size fish (under 15 pounds) in the Mullica River. First catches of the year are normally from the river in the vicinity of the Garden State Parkway, and upstream toward the town of Lower Bank. These fish begin to feed when the water temperature exceeds 40°F. The section near Mystic Islands, in the vicinity of Graveling Point, offers access to fish moving to or from the river. That another body of bass winters in nearby ocean waters has been evidenced by some of the earliest catches from the inlet surf areas of Little Beach, Brigantine, and Holgate. Unfortunately for many fisherman, access to these places is limited to those possessing either a boat or a beach buggy. Most early catches are made still-fishing with live bait, with a major portion taken by anglers casting from bank or

beach locations using surf tackle. Bloodworm is the preferred bait, fished on either a top-and-bottom or "doodlebug" rig, with a two- to four-ounce pyramid weight. In the past decade early spring catches in the Great Bay area have surpassed those in Barnegat Bay, whose wintering striper population has not been substantial as in the 1960s. Wintering bass are caught in other state waters such as Sandy Hook Bay, Great Egg Harbor River and Bay, and tributaries of Delaware Bay, especially the Maurice River. More recently, however, overall numbers of striped bass have declined, so that catches from eastern coastal waters generally are not equal to those of several years ago.

While striped bass cannot be taken legally before March 1, other fish are prevalent in the area at this time. Most dramatic is the winter run of white perch in the Mullica River, particularly in the cove just west of the Parkway bridge. Here, when conditions permit, substantial catches are made by scores of anglers fishing through the ice. White perch are the only notable nonmigratory species in this and surrounding brackish waters, with a largely untapped fishery existing year-round. Numbers of perch and winter flounder often exceed those of other early-season species sought in inland waters. Catches of winter flounder normally increase in March, when bay temperatures approach 45°F. Sections four to ten feet deep, of mud or soft bottom, nearer the inlets, are productive of this species. This includes adjacent bay areas of Little Egg Harbor, Tuckerton, and Brigantine, as well as Great Bay. Fishing from an anchored boat with small bottom baits of bloodworm or clam, while chumming with crushed clam or mussel, is the preferred method, often best on an ebbing tide.

In the wide expanse of bay, activity of migrating fish increases. Because the bay is shallow, its water temperatures

*Continued on page 26*



**A successful clammer participating in the transplanting of clams from polluted waters to leased grounds for depuration. Note the long-handled shinnecock rake.**

PHOTOS PROVIDED BY AUTHORS

# NEW JERSEY'S BAY SHELLFISHERIES

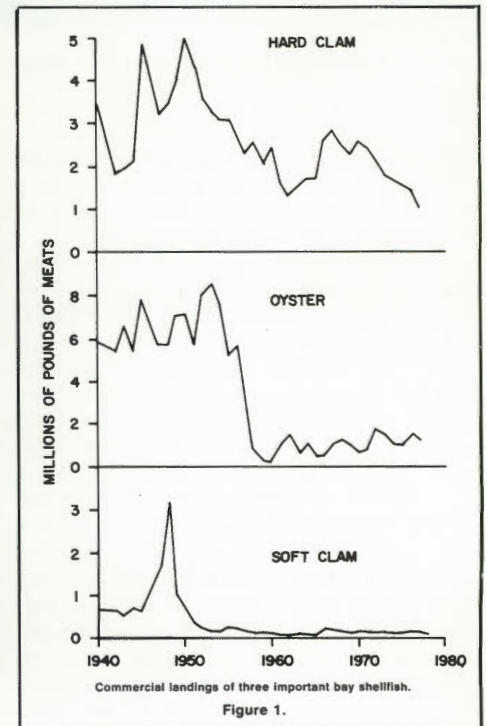
By Bill Figley, Tom McCloy and Staff of Nacote Creek Research Lab

The shellfish resources of New Jersey were of extreme importance prior to the appearance of the white man. Native Indian tribes such as the Lenni Lenapes made summer excursions to the Jersey shore to take advantage of the abundant fish and shellfish. Not only were shellfish a main source of food but the shells were used for pottery, ornaments, and wampum.

The white settlers also took advantage of the state's vast shellfish stocks. In 1719 the first laws were passed to regulate the harvesting of oysters in New

Jersey. Today, the shellfish resources of New Jersey support a commercial fishery with a dockside value in excess of \$23 million (1977 figures) as well as an important recreational fishery.

Pollution, habitat destruction, the tremendous demand for seafood, and in some cases, environmental factors have placed a growing burden on New Jersey's shellfish populations. A look at the graphs of the historical commercial catch of three of the state's most important bay shellfish exemplifies this point (Figure 1). Although exhibiting natural



cyclical variations, the hard clam harvest has experienced a steady decline over the past 40 years. Much of this decline was probably the result of the closing of clam beds because of pollution. The closure of more than 100,000 acres of the state's more heavily polluted hard and soft clam waters was to protect human health. The clams in these waters, through their filter-feeding process, collect and concentrate bacteria and viruses, and if eaten raw or improperly cooked, can cause diseases such as hepatitis. In an effort to allow use of the shellfish from the moderately polluted areas, the state has authorized some cleansing programs that have been proved capable of rendering the shellfish suitable for human consumption. The harvesting of soft clams on the Navesink and Shrewsbury Rivers is now only possible through the operation of depuration plants which purify the clams before sale. The precipitous decline in oyster catch in the late 1950's was the result of a lethal disease known as MSX

which almost wiped out the oyster beds.

To ensure that New Jersey's shellfish populations remain healthy and continue to satisfy the state's commercial and recreational needs, it is important that these resources be managed wisely. An important ingredient in any fishery management program is information on the number of people involved in the fishery, how much effort they expend, and how much they catch.

In January 1979, the Division of Fish, Game and Shellfisheries conducted a survey of the state's licensed bay shellfishermen. The survey did not include ocean shellfishermen or the oystermen that operate dredge boats on Delaware Bay. The Division sent out questionnaires to 1447 shellfishermen selected randomly from 1978 license stubs; 947 (65 percent) were returned, suggesting a sincere interest by most shellfishermen in the well-being of the state's shellfish resources. The responses were then analyzed by computer.

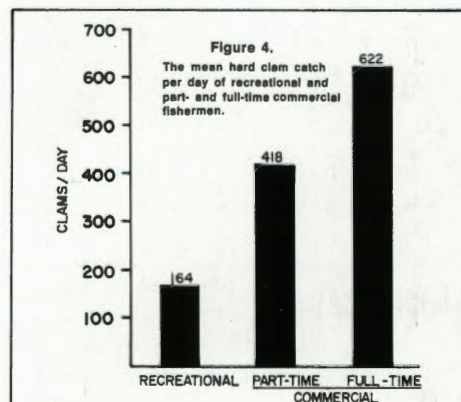
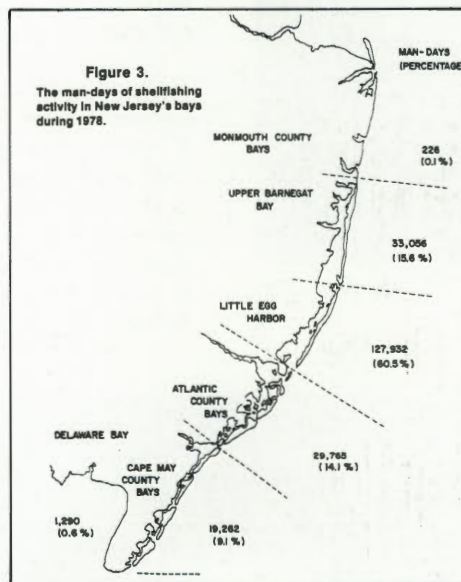
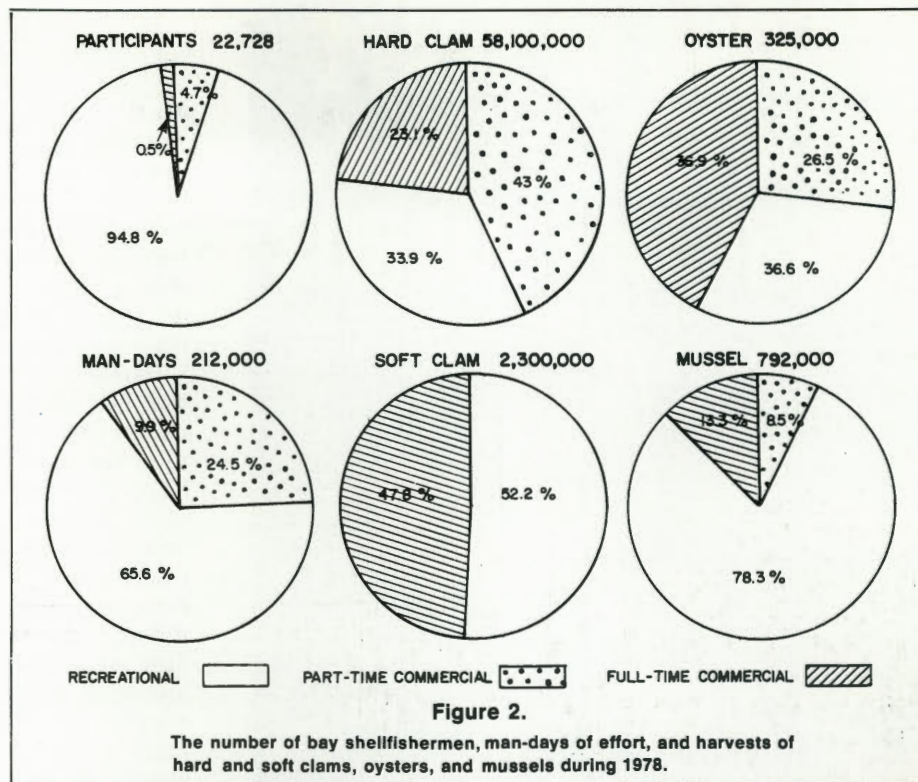
In 1978, there were 22,728 licensed shellfishermen in New Jersey, including:

Resident Adults	11,763
Senior Citizens	9725
Resident Juveniles	657
Nonresident Adults	505
Nonresident Juveniles	78

About 95 percent of those licensed shellfished for recreation; the remaining five percent shellfished commercially on a full- or part-time basis (Figure 2). Women comprised 10 percent of the recreational and five percent of the part-time commercial shellfishpersons.

There were 212,000 man-days of effort expended shellfishing during 1978, two-thirds of which were recreational activity and one-third full- and part-time commercial. The most intensive sport and commercial shellfishing occurred in Little Egg Harbor (about 60 percent), followed by Upper Barnegat Bay (16 percent), and the Atlantic County bays (14 percent) (Figure 3). The effort expended by full-time commercial shellfishermen was fairly constant throughout the year; recreational and part-time commercial activity was concentrated during the period from June to September.

The estimated harvest by New Jersey bay shellfishermen during 1978 was 58 million hard clams, 2.3 million soft clams, 325,000 oysters and 792,000 mussels (Figure 2). All the estimates are considered conservative because of such factors as the catch by unlicensed individuals and the possibility of a reduced responding rate of commercial men. The estimated oyster harvest does not include the extensive catches made by the Delaware Bay dredge boats. While commercial men comprised only



five percent of the total shellfishermen in the state, they accounted for 66 percent of the hard clam, 49 percent of the soft clam, 66 percent of the oyster, and 22 percent of the mussel catches. However, recreational shellfishermen did account for a significant portion of the total shellfish harvest of all species, and should be seriously considered under any management plan.

The primary species sought by New Jersey shellfishermen was the hard clam; only five to seven percent of the shellfishermen harvested any soft clams, mussels, or oysters during 1978. Of those who went clamming, 58 percent caught fewer than 1000 clams during the year, 33 percent caught between 1000 and 5000, and only nine percent caught more than 5000. Recreational clambers harvested an average of 164 hard clams per day, part-time commercial 418, and full-time commercial 622 (Figure 4).

In the survey, about two-thirds of the recreationalists were satisfied with their catch; in contrast, about three-quarters of the commercial men were not satisfied.

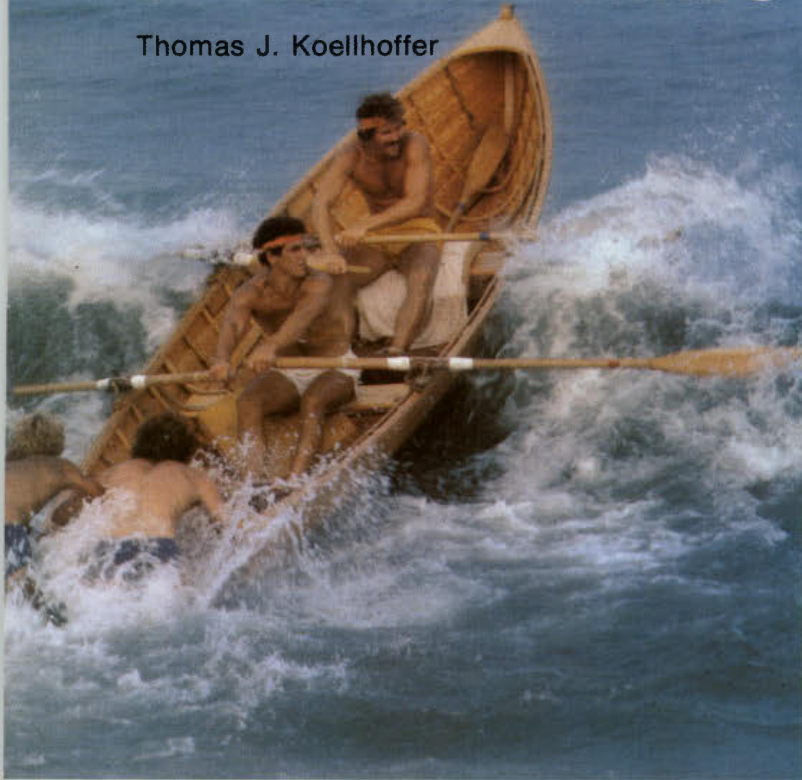
Respondents had a variety of comments; the most common were:

- New Jersey's hard clam resource is declining.
- There is a lack of enforcement of shellfish regulations.
- Improve water quality and open more clamming areas.
- Legalize Sunday clamming.
- The state should seed oysters and clams.
- Daily harvest limits should be established.

Continued on page 28

# STAYING IN SHAPE WITH THE JERSEY SHORE LIFEGUARDS

Thomas J. Koellhoffer



In tournaments as in rescue situations, the launch can spell success or failure for the operation.

New Jersey is rich in a wide variety of coastal resources, from crystal clear mountain lakes to cascading white water rivers, from tidal wetlands to deepwater ports, but the most famous of all its coastal resources are New Jersey's 126 miles of ocean front beaches that stretch from Cape May to Sandy Hook. These beachfront areas attract a significant percentage of the three to six billion dollars that are spent on tourism in New Jersey annually, and the state's coastal municipalities go to great lengths to make their oceanfront areas as attractive as possible to vacationers and tourists from all over the world.

Part of this effort is manifested in the great emphasis that has traditionally been placed on the safety of the ocean bather. New Jersey lifeguards are highly trained to possess a wide range of skills that can be utilized in hazardous rescue situations, and must be familiar with such pieces of rescue equipment as the lifeboat, rescue board, torpedo buoy and the rescue line. In the tricky currents and heavy surf conditions common to New Jersey beaches, a few seconds can mean the difference between a successful rescue and disaster. The local departments of recreation, as well as state and federal jurisdictions that maintain recreational operations on the oceanfront, have devised exhaustive training programs that are designed to ensure that their lifeguards possess these crucial skills and that they maintain themselves in top physical condition throughout the summer season.

One of the means to test these skills that has developed over the years is the lifeguard tournament. Begun in New Jersey shortly after the end of World War II, these tournaments serve as proving grounds for individual guards and as showcases for the collective skills of lifeguard crews. Teams from federal and state parks, municipally-run beaches and private beach clubs come together at various times during the season to compete in a series of events that are designed to imitate the conditions of actual rescue situations. These



An appreciative crowd watches from the boardwalk and from the sand as the events are run in this tournament in Bradley Beach.

events require the utilization of the full range of rescue equipment including the lifeboat, rescue board, rescue line, and there are other events that test the guard's swimming ability as well.

Typical of these events is the boat-out, boat-in, in which two guards must row through the surf, round a marker, row back to shore and land the boat safely. The line-pull event is one that tests the guards ability to function as a team. In this event, a swimmer equipped with a rescue harness and line must swim to a marker located approximately 500 feet from shore. When he tops the marker, the guard on shore must pull him back as quickly as possible and the swimmer must sprint across the finish line. There are numerous additional events that may vary in scope and complexity according to the rules laid out by the host team, but they typically include the mile row, the two-man line-pull, numerous boat, rescue board and swimming relays and many individual swimming events. But perhaps the most demanding of all these events, and one of the most exciting to watch, is the iron-man event, in which a single lifeguard must demonstrate his abilities in the use of the lifeboat, the rescue board and as a swimmer. In this event, the guard must first row through the surf, round a marker, row back to shore and land the boat safely. He must then negotiate the same course while paddling a rescue board, and finally, the guard must swim the 1000-foot course and cross the finish line.

According to Howard Roland, Director of Beaches for the city of Belmar and a man who has been involved in these tournaments for over a quarter of a century, the tournaments provide the guards with an added incentive for staying in top condition, and this results in safer overall conditions for the bather who visits New Jersey's beaches. In addition, the tournaments provide tourists, vacationers and year-round residents alike with access to some thrilling and often spectacular athletic competition. Traditional rivalries cause emotions to run high, and there is always plenty of pressure on the home team to do well. The additional variables

of swell height and wind direction often combine to make the ocean as fierce an adversary as the competitors themselves.

Lifeguard tournaments are held throughout the summer and are usually scheduled after the season has gotten under-way. It is therefore suggested that those who are interested in attending tournaments this summer should contact the Department of Recreation of their favorite resort community for a schedule of events, or contact the information center at Convention Hall in Asbury Park.

**The Atlantic City Beach Patrol will be involved with a number of competitions during the summer of 1980, according to Chief Arthur Brown.**

**The first of these events will be the Atlantic City Beach Patrol Championship Swim Race around Steel Pier which will be held in late July—no projected date at the moment. This race always starts at 6:30 p.m.**

**Also in late July or early August will be the Atlantic City Beach Patrol Boat Races. These consist of semi-finals and finals "doubles" races, and "singles" races. No projected date at the moment. They will be held in early evening.**

**The purpose of the above races is for the winners to participate in the Brigantine races; the Margate Memorial races; the Longport Memorial races; and the Dutch Hoffman races in Wildwood.**

**The Atlantic City Beach Patrol will also participate in the John Gowdy Memorial Races, which will be held in Ventnor and consist of a series of rescue races with boat, can and buoy.**

**The biggest race that the Atlantic City Beach Patrol will compete in is the South Jersey Championships which will this year be held in Brigantine, probably in August.**

**All of these are early evening races.**

**The Atlantic City Beach Patrol Benevolent Organization will sponsor a marathon, the 10 mile Run, which will be held on the beach in August, starting at 6 p.m. No date set yet.**

PHOTOS BY AUTHOR



◀ **The strain of the line pull event is reflected in the face of this Long Branch Guard.**

▶ **Howard Roland signals the start of yet another of the hundreds of boating events he has witnessed over the years.**



# BEACH WATCHING

SUSAN D. HALSEY



FIGURE 1. Generalized drawing of a typical fully constructed New Jersey beach showing major features and terminology. HTL = high time limit, LTL = low tide limit.



PHOTOS BY AUTHOR

FIGURE 2. View north along crest (top) of berm at Surf City. Note red lifeguard stand near crest of berm. The last high tide limit can be seen just seaward of the berm crest where the sand darkens.

As we celebrate the Year of the Coast, many of us will try to heighten our awareness of coastal environments, especially beaches and dunes, to try to find out what's happening. In all phases of nature study we know there's definitely a difference between "looking" at something and actually "seeing" it. How many times have you driven down a familiar road or street and said, "In all the times I've driven down this street, I never noticed that before?" Beach-watching is like that too.

There are many interesting features of beaches. Looking at the larger scale features in Fig. 1, we see the dune and the berm with the ocean to the right. The berm is the triangular-shaped wedge of sand making up the bulk of the "beach" as we know it, and the beachface is the rather steep slope we walk down to get to the water's edge when the tide is low (LTL = low tide

limit). Many times there are offshore bars just visible at low tide.

When there are breaches in these bars, one must be very cautious. Breaches are quite noticeable because the water is quieter, waves do not break in them because the water is deeper there, and the water is cloudy. What happens is that the water from breaking waves builds up landward of the bars and is only able to escape to the sea through these breaches. This exiting of water to sea creates "rip currents" in these channels. Usually you can see the more turbid plumes of water moving seaward between the bars. If you or one of your children should get caught in a rip current and feel like you're being pulled out to sea, try not to panic; try calmly to orient yourself and then attempt to swim parallel to shore in either direction. This will bring you out of the influence of the current and will allow you to swim

safely to shore over the bar.

The crest of the berm is an interesting place (Fig. 2). It's usually the highest place on the beach itself, and that's why in the summer the lifeguards place their stands there. And there's another reason; if you watch the tide come in, you'll notice that it comes up the beachface and stops at the high tide limit (HTL) just below the crest of the berm.

What we've been describing up to now is a beach that is called by scientists "a fully constructed beach"; one with a nice big berm. During and after times of storms, however, the beach looks dramatically different. Beach erosion occurs during storms; northeasters and hurricanes doing the most damage to beaches. Moderate to severe storms often erode into the foredunes. Although hurricanes have a specific season from May to November, northeast storms (named after the orien-

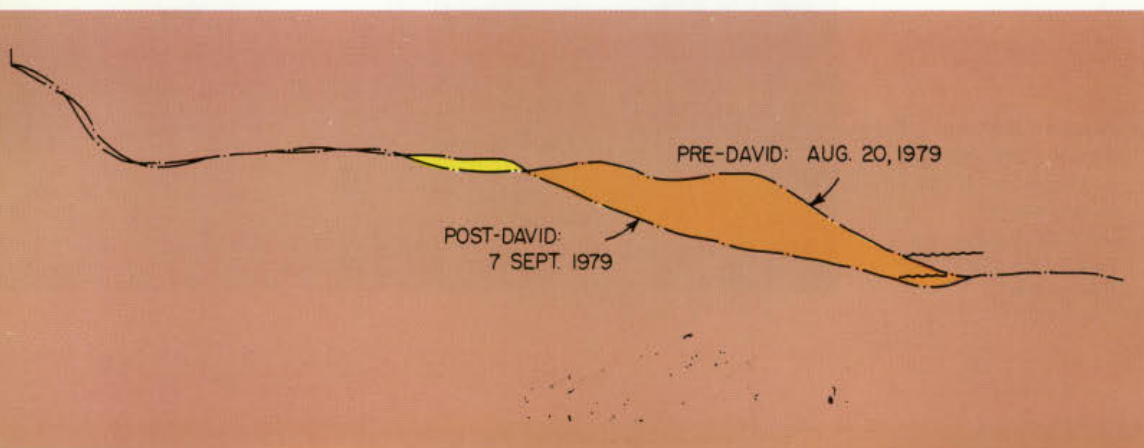


FIGURE 3. Actual surveyed beach profiles of a section of beach at Barnegat Light Borough showing level of beach before (Aug. 20, 1979) and after (Sept. 7, 1979) Hurricane David. Volume of sand lost shown in orange, some gain shown in yellow. By Sept. 21, 1979 the beach had repaired itself back to the late August level.

tation of the winds and the waves striking the beach) can occur anytime of year, even in the summer months. That's why here on the East Coast we don't call the full constructed beach the "summer beach" and the eroded beach the "winter beach" as they do on the West Coast.

Even though we may get more northeasters in the winter months, storms that occur in the spring, summer and fall can do extensive damage to the beaches and dunes especially if they are closely spaced. The timing of storms is very important because if there is not enough time between storms for the beach to heal itself, the second or third storm does even more damage. This is what happened in the winter of 1977-1978 when there were three significant storms, one each in December, January and February. The February one was the worst, and there was insufficient time between the December and January storms for the beach to repair itself before the February northeaster hit.

The healing process referred to above is an interesting and often beautiful sequence to watch. After a storm the beach profile will look different depending on the severity of the storm. The undercutting nature of this process can cause a significant amount of damage to a beach in a very short period of time.

After a moderate storm, a large wedge of the beachface, including portions of the berm, can be removed by the increased wave action. The resulting beachface will have a concave profile. Figure 3 shows the before and after profiles of Hurricane David (Sept. 5-7, 1979) which was considered a moderate storm. The majority of the sand that is stripped from the beachface is temporarily "stored" in off shore bars and is available to be brought onshore again by fair weather waves. (As a rule of thumb, you can tell whether a beach is eroding or constructing by counting the number of wave crests passing a certain point in a minute. If you count 10 or more, the beach is usually eroding; under 10 it is constructing).

The usual configuration of a constructing beach is a pond and bar profile, properly called the "ridge and runnel" (Fig.4). On each successive flooding tide the waves build the ridge landward into the runnel (pond) until the runnel is filled and the ridge welds onto the beachface, rebuilding the



**FIGURE 4.** The beach repairs itself after a storm by the formation, then landward migration, of the ridge and runnel. The long pond, or runnel, separates the ridge (right) from the beachface (left). In time, the ridge builds landward over the runnel and welds to the berm. Low tide at Loveladies in January.



**FIGURE 5.** Aerial view south to the Holgate Unit of Brigantine National Wildlife Refuge with the southern end of Beach Haven in the foreground. Washover fans (light sand) are visible encroaching into the vegetated area (green) of the middle barrier. Note how much further landward (Right) the Unit is than the developed section. This erosion is caused by the trapping of sand behind the three groins (far left) thus starving the Unit of sand. This trapping updrift and the resulting starving downdrift is called "the Jetty Effect." (Photo by S.C. Farrell)

eroded berm. Along most portions of the New Jersey coast this process takes about a week to complete because our tidal range (height between mean high tide and mean low tide) is only about a meter (39 inches). However, in areas such as New England, where the mean tidal range is 2.5 meters, this reconstruction process takes much longer.

The destruction of a beach during a severe northeaster or hurricane can result in the removal of the entire berm and even a significant portion of the dune. The resulting beach profile will be a scarped dune and a gently sloping concave beachface. Due to the large volume of sand removed during the storm, the reconstruction process may take weeks to completely rebuild the

berm. Sometimes the berm that is rebuilt after a severe storm is more landward on the beach than usual because the beach was eroded so low. Consequently, if fair weather follows the initial berm-building, another berm can be built further seaward on the beach, forming two berms with a swale between.

In time, the beach usually repairs itself back to its previous shape and level. However, an eroded dune takes much longer to repair because the shape of the natural dune has been permanently altered. This alteration becomes an acute problem in areas that are developed with houses and other construction (piers, boardwalks). The presence of this construction does not allow the natural process of dune build-

*Continued on page 24*



PHOTOS BY AUTHOR

## Wildlife in New Jersey

# THE WOODCHUCK

THOMAS ALTAVILLA

Anyone in New Jersey who has traveled near fields and woods during the early morning or evening has certainly seen a woodchuck, one of New Jersey's most abundant mammals. One reason they are found in large numbers is because man, in some cases, has altered the environment in favor of the woodchuck. Even though they are so common, however, some aspects of their lives are not yet fully understood. However, this much is known—woodchucks are hibernating animals that love to eat and dig.

The scientific name of the woodchuck is *Marmota monax*; it is a member of the squirrel family. The name *woodchuck* is said to be derived from the Indians. The Cree and the Chippewa called the fisher *otcheck* and *otchig*, respectively. White traders and trappers are said to have corrupted these words into *wojack*, *woodshaw*, and *woodhook* and then misapplied them to the marmot.

The woodchuck that inhabits New Jersey is found throughout the eastern and midwestern United States, from South Carolina north to New York State and west to Nebraska and Kansas. It is a diurnal animal that dens underground. They are said to

climb, albeit slowly, but well. A woodchuck may live five to six years in the wild, though chucks in zoos have lived up to ten years.

Woodchucks are not highly vocal animals, their vocalizations being limited to a short series of sharp whistles. They whistle when they're alarmed or sometimes when their den is being approached. When one 'chuck whistles others take notice and will flee upon the second whistle.

When a woodchuck becomes excited it emits a musky odor that is not easily detected by humans; this secretion is probably used for communication rather than protection (as in the skunk). The 'chuck threatens an intruder by arching its back, raising its tail, erecting the hair, and baring its incisors. It will flee from danger if given the chance, but is a formidable fighter if cornered; however, a woodchuck is no match for a large dog or pack of dogs.

In New Jersey, foxes, dogs, and man are the woodchuck's main predators; snakes, owls, and badgers threaten them in other areas. As a species they are relatively free of disease and parasites, though they can carry rabies, tularemia, and rocky mountain spotted fever. They are subject to malocclusion (faulty closure of the teeth) which results in starvation as the condition of the teeth worsens.

A full-grown male woodchuck is about 27 inches long, including a 6-inch tail. His female counterpart measures 22 inches. Weights of woodchucks vary; one of the largest captured weighed 15 pounds, whereas some woodchucks in captivity have reached 37 pounds. Woodchucks are lightest after hibernation (in spring) and heaviest just before hibernation (in fall). They usually double their weight between hibernations.

Their fur is double coated. The outer coat is of long brownish or dark gray hairs. The undercoat, soft and wooly, may be cinnamon or pale gray on the back and sides and reddish on the belly. Young woodchucks are paler than older chucks. Individual wood-



Young woodchucks are paler than full grown 'chucks. They are also grey, whereas older 'chucks are reddish brown.



Woodchucks are well camouflaged. From a distance they appear as stumps in wooded areas.

Older woodchucks seem to be curious and less timid. This female approached within 20 feet of me.

Woodchucks like to build their dens under tree roots for support.

chucks can easily be distinguished by pelage differences.

Woodchuck tracks resemble that of a raccoon's with five toes on the forefront and four toes on the hindfoot.

Eating is the main occupation of woodchucks. They eat some succulent plants, clover, chickweed, alfalfa, dandelions, some fruits and vegetables, including soybean and corn. Chucks will eat as much as one pound of food at a feeding when putting on weight for hibernation.

In New Jersey, chucks hibernate from mid-November to mid-March. Older and fatter animals begin and end hibernation earlier. The average woodchuck loses from one-third to one-half its body weight during hibernation. In the dormant state their teeth and toenails do not grow.

According to *Grzimek's Animal Life Encyclopedia*, a captive woodchuck was examined once a week during hibernation. Even though the animal was handled its eyes did not open. It took but one breath and had but one heartbeat every six minutes. Its body temperature dropped from 96.8° F to 50° F.

The woodchuck breeding season in New Jersey begins in late February or early March, after the animals emerge from hibernation. Few 'chucks breed as yearlings; most become sexually mature at the age of two years. During mating season stray males travel great distances searching for mates. There is conflicting information concerning cohabitation of woodchucks. Some say contact is limited to copulation, after which the female drives the male off before giving birth. Others say males have been seen sharing a den with a nursing female.

The gestation period is 31 to 32 days. The average litter is four to five young, although some litters have contained as many as nine. The young are born blind, toothless, and hairless, with the hindlegs more developed than the forelegs. They are about four inches long, with a half-inch tail, and weigh about one ounce. Young woodchucks begin to crawl when they are three weeks old. By the time they reach four weeks their eyes open and they are well furred.

When their eyes open they begin to venture from the den and to eat solid food. Most of their time outside the den is devoted to sunning themselves and playing.

The young are weaned by their mother leading them farther and farther from the den until they must eat to quell their hunger. At approximately six weeks the mother establishes each one in a freshly dug den; there the mother visits daily, spending the time grooming her young. In midsummer the young leave their dens and begin to move on. They may go a long way or they may move just a few hundred yards, but nevertheless they are now on their own.

Woodchucks live in two types of dens. One is the hibernation den, usually located in a well-drained wooded area on high ground where it cannot be flooded by water; when possible it is dug under the roots of a tree or stump. The nesting area is blocked off from the main passage. The second type is the summer den, located in woods or near tilled fields. This den is occupied one month after hibernation.

Dens are usually established at some distance from each other, but in crowded areas woodchuck dens may be relatively closely spaced. The dens are dug in well-drained soil, preferably sandy loam, and are

*Continued on page 25*

# Lake Assunpink

N.J. Division of Fish, Game and Wildlife  
Assunpink Wildlife Management Area  
Monmouth County

Lake Assunpink is the product of the joint efforts of the U.S. Soil Conservation Service, the New Jersey Division of Fish, Game and Wildlife, the Department of Environmental Protection's Green Acres Program, and the Federal Aid to Sportfish Restoration Program administered by the U.S. Fish and Wildlife Service. It was completed in 1975 to provide flood protection for the Assunpink drainage as well as fishing and hunting opportunities. It was designed to accommodate modern fish and wildlife management practices. It has a surface area of 225 acres and a maximum depth of 14 feet.

The fisheries management program here is being directed toward the development of a warmwater fishery based upon largemouth bass, channel catfish and the native chain pickerel. Largemouth bass were first introduced here in 1974 and channel catfish followed in 1976.

Parking and launching facilities for both car top and trailered boats are available at the access site off the Clarksburg-Robbinville Road. Only electric motors are permitted.

Shoreline fishing is available at a number of locations.

## LOCATION

Eastern part of the Assunpink Wildlife Management Area off the Clarksburg-Robbinville Road.

## CHEMICAL FEATURES

**pH:** Slightly acidic, generally about 6.5.

**Dissolved Oxygen:** Adequate for fish life at all depths, except in summer when a void of oxygen occurs below the 12 foot level.

## BIOLOGICAL FEATURES

**Aquatic Vegetation:** Moderate stands of submergents are limited to the shallow area of the lake.

**Water Color:** Normally a slight brownish tint, however sometimes a greenish hue due to summer algal blooms.

## FISH AND FISHING

**Largemouth Bass:** A very good population is present. Two to three pound bass have been reported as common with five pounders occasionally caught.

**Sunfish:** Both the bluegill and pumpkinseed sunfish are present in good numbers. The growth rate appears to be about the state average

which means they reach five inches in length by their third summer of life.

**Black Crappie:** Population checks have found large numbers of good size fish. The growth rate is good, with fish reaching five inches in their second summer.

**Brown Bullhead:** The fishery here is good with an average fish being about nine inches in length.

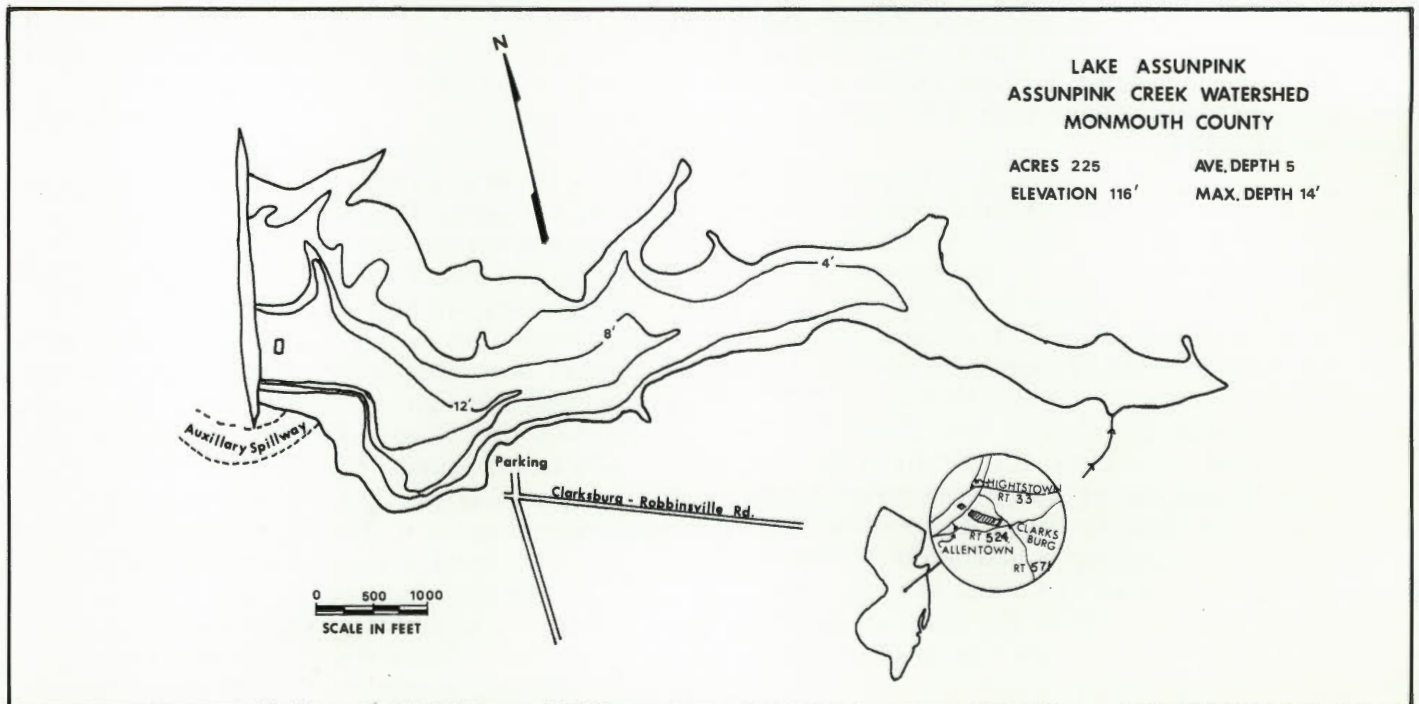
**Chain Pickerel:** Excellent fishery. Many individuals exceeding 20 inches are caught each year. The growth rate is good.

**Channel Catfish:** Some individuals up to 20 inches have been caught. No reproduction has been reported up to this time, however, it is anticipated that this species will be maintained here through periodic stocking.

**Other Species:** The following have been verified:

- Golden Shiner
- Lake Chubsucker
- Common Killifish
- Yellow Perch

Prepared by: Michael Welshko  
Ass't Fisheries Biol.





# Environmental News



**HERE'S HOW IT'S DONE.** Patrolman Robert Czarnecki demonstrates the correct procedure for donning a personal flotation device (life vest) to a group of schoolchildren during a safe boating class. The program, called "Make Sure—Make Shore," has been a public service project of the New Jersey Marine Police since 1971. The program, given during the January-June semester, is for sixth, seventh and eighth graders in particular. In 1979 alone, approximately 55,000 youngsters received basic boating instruction through the program. School officials interested in scheduling the course (during the school day) in the January-June 1981 semester can get full particulars by writing to DEP, Bureau of Marine Law Enforcement, Box 1889, Trenton 08625.

## NEW TROUT HATCHERY/CONSERVATION CENTER CONSTRUCTION BEGINS

Construction is underway on a new trout hatchery/conservation education center near the town of Pequest in Warren County. Ground was broken in early spring for the facility that not only will provide the most modern methods of rearing trout (eventually more than 600,000 ten-inch trout will be produced), but also will provide recreational and educational services to over half a million of New Jerseyans, and will serve as a tourist attraction for out-of-state residents. The hatchery/education center is also expected to serve as a major educational supplement to the schools in the northern half of the state, as students can visit it and return home within one school day. The land adjacent to the hatchery, being managed as a Wildlife Management Area, will be used for such compatible recreational purposes as

fishing, hunting, hiking, bicycling, nature photography, picnicking, and the like. The approximately 1,400-acre site is located along the Pequest River across from State Route 46. A bridge and access road to the facility will be built. Completion of the project is expected in 1982.

Commissioner English explained that the Pequest Hatchery/Conservation Education Center project is to be funded with state Green Acres development money and a grant from the federal Heritage, Conservation and Recreation Service. The annual cost of operation and maintenance will be borne by DEP's Division of Fish, Game and Wildlife, which operates on a dedicated fund derived from the sale of hunting and fishing licenses, and would not impact upon funds derived from taxation.

## CLEANUP OF CHEMICAL DUMP SITES IN PROGRESS

DEP's "war on hazardous waste dumping" in New Jersey announced by Commissioner English in early March included a full-scale effort to clean up illegal dumps around the state. A total of \$3 million has been allocated for this year's efforts under terms of the New Jersey Spill Compensation and Control Act (see these pages, March/April NJO).

By March 20, three of the sites targeted for immediate attention had been cleared of illicitly dumped drums of chemicals. A total of 49 drums were removed from the sites, all in East Rutherford. This represents removal of 2,500 gallons of hazardous substances from the environment. In addition, cleanup operations had begun at Liberty State Park in Jersey City, where approximately 600 illegally dumped drums and a quantity of contaminated soil are slated for removal; and at the Atlantic Development Company site in Sayreville, where 800 drums will be removed. Also, a site in Sparta and one in Howell Township will be cleared this spring.

Paul Giardina, director of the Hazard Management Program, said that in the on-going cleanup operation at Chemical Control in Elizabeth, more than 8,000 drums (or about 400,000 gallons of hazardous materials) had been removed by mid March.

### New law

## HIGH PENALTIES FOR ILLEGAL DUMPERS

Legislation (Assembly bill 3473) amending the New Jersey Solid Waste Management Act was signed into law by Governor Byrne on February 6. The law provides for criminal penalties for violations pertaining to the disposal, treatment or storage of hazardous waste; and increases civil penalties from \$3,000 per day to \$25,000 per day.

At the signing ceremony, Commissioner English remarked, "This bill, one of Governor Byrne's initiatives to curtail illegal dumping, will increase the deterrent to those involved. The almost 10-fold increase in the penalties and the

*continued on page 16D*

## ENGLISH ON THE ENVIRONMENT



*Beginning with this issue of NJO, the Environmental News pages will feature a column dealing with environmental concerns by DEP Commissioner Jerry Fitzgerald English.*

We in the state Department of Environmental Protection have two basic and overriding priorities: first, to fulfill our legal mandate to preserve and improve the physical environment of New Jersey; second, to inform the public honestly and fully about our activities, since these activities both directly and indirectly affect all who live and work in the state.

DEP constantly issues press releases pertaining to its functions. But, press releases must be restricted to specific facts about a specific topic. I feel there are times when it would be helpful to us in the department, and to you whose life is being affected and whose tax monies are being spent, to talk in broader terms about the rationale underlying our policies—to discuss alternatives that face us—to explain far-reaching trends that have clearly predictable effects on our future environment and life-style. I believe that this column can provide such a forum. Also, since effective communication involves both give and take, I hope that the column will generate reaction and input from you.

*At present, high on the list of pressing environmental matters meriting your informed consideration is the protecting of New Jersey's water supply.*

We all know that air and water are necessary to sustain life. In New Jersey, the most densely populated of the 50 states, not only are wholesome air and water at a premium, but also they are constantly threatened by three prime sources of pollution: high concentration of population, of motor vehicle traffic and of industry. The incredible complexity of pollution control becomes apparent when we realize that every human activity can contribute to producing pollution, and that most forms of pollution are interrelated.

For example, some water pollution results from air pollution carried to the ground by precipitation (rain or snow). Precipitation then washes it, along with chemicals and pesticides used in farming and gardening and hydrocarbons spewed from automobile exhausts and



**TROUT FISHING IS BOUND TO BE GOOD.** *There'll be about 610,000 trout in New Jersey waterways by the time DEP's Fish, Game and Wildlife crews and volunteer crews finish stocking trout streams on May 30. Most of the state's larger trout streams are being stocked by crews floating the fishes from boats drifting downstream spreading trout over many miles of water (above, in the Paulinskill River, Sussex County). Trout anglers, please note: The daily bag and possession limit in most state waters changes from six trout to four on June 1. The four trout limit will be in effect until the close of this season in March 1981. Consult the Summary of 1980 Fishing Laws for exceptions.*

coating our streets and highways, into nearby streams, rivers and lakes which are sources of drinking water. (Technically, this runoff pollution is called "non-point source pollution" because its origin is general rather than specific, as in the case of pollution from a landfill or factory which can be pinpointed.)

Of course, not all precipitation runs off into the nearest body of water. Some soaks into the ground, possibly carrying polluting elements from the surface into wells and aquifers (natural underground sources of water). This leaching action is especially serious when moisture seeps through landfills where hazardous and toxic materials have been discarded. New Jersey is among the states and federal agencies enacting laws and regulations to control present and future disposal of hazardous wastes. But what of our inescapable legacy of pollution from the past? New York State's Love Canal situation has given us a dramatic object lesson about the serious long-term effects of pollution from the past.

Two of the most pervasive causes of water pollution are improperly or inadequately treated sewage and industrial wastes. In a day when we were a less populous and less industrialized nation,

we could consign these wastes to our streams and rivers and natural forces were adequate to counteract them. But today these effluents are produced in such quantities that natural forces are inadequate to cope. Therefore, for the sake of public health and welfare, we must on occasion limit overdevelopment, shut down noncomplying landfills, and require industries and sewage treatment facilities to install equipment incorporating the most advanced state-of-the-art technology.

New Jersey pioneered in the field of clean-water legislation—the state's original stream pollution control regulations go back to 1899. In the 1980's, over a billion dollars, mostly from federal sources administered by state agencies, will be spent in New Jersey to continue upgrading and augmenting sewage treatment facilities. DEP will also escalate its campaign for clean water by imposing administrative penalties against local governments, municipal sewerage authorities or industries violating New Jersey pollution control laws. We will continue to publicize these actions through the news media in the hope that responsible people will realize

*continued on page 16D*

1980 SCHEDULE

**DIRECT FERRY SERVICE FROM LIBERTY STATE PARK TO THE  
STATUE OF LIBERTY AND ELLIS ISLAND**

Circle Lines, in cooperation with DEP and the National Park Service, is again operating a regular ferry service from Liberty State Park to Liberty Island and Ellis Island. The boats make three trips a day, seven days a week. The service began on April 26 and will continue through October 26.

Boats leave Liberty State Park for the Statue of Liberty at 10:30 a.m.; 12:45 p.m.; and 3 p.m.

Boats leave Liberty State Park for Ellis Island, "America's Immigrant Gateway," at 10:30 a.m.; 1:15 p.m.; and 3:45 p.m.

Fees for the ferry service: Adults, \$1.50; Children under 12 years of age, 50 cents; Groups (more than 25 persons), \$1.20/person; Groups of High School Students, \$1/person; and Groups of Boy/Girl Scouts, \$1/person.

For additional information, call (201) 435-8509.

Liberty State Park is reached by car from Exit 14-B of the New Jersey Turnpike, or by bus from Journal Square in Jersey City.

*a guide to*  
**NEW  
JERSEY  
BEACHES  
1980**

**PUBLIC TRANSPORTATION TO THE  
SHORE**

**BUS LINES:**

**Atlantic City Transportation  
(609) 345-8966**

Atlantic City to beach towns between Brigantine and Ocean City.

**Lincoln Transit Co. (201) 621-7333**

New York City to beach towns between Atlantic City and Cape May.

**Long Branch Co. (201) 291-1300**

New York City and Monmouth County towns to beach towns between Sandy Hook and Long Branch.

**Asbury Park-NYC Transit Corp.**

**(201) 774-2727**

New York, Keyport, and Red Bank to beach towns between Long Branch and Point Pleasant.

**Transport of New Jersey**

**(201) 621-7333**

New York City to Ocean City, Wildwood, and Cape May.

**Transport of New Jersey**

**(609) 399-1296**

Philadelphia and Camden to beach towns between Atlantic City and Ocean City.

**Boro Bus Co. (201) 741-0567**

Red Bank to Asbury Park and Long Branch.

**Mercer Metro (609) 396-9171**

Trenton to Asbury Park and Seaside Heights.

**TRAIN LINES:**

**ConRail and NJ Transit (800) 242-0212  
(Toll free call)**

From New York City, Newark, and other North Jersey towns to beaches between Long Branch and Bay Head.

**ConRail and PATCO (215) 397-6600**

**(609) 784-1177**

From Philadelphia, Camden, Lindenwood, and other South Jersey towns to Atlantic City, Ocean City, Wildwood, and Cape May.

**CALENDAR OF EVENTS (State Parks  
and Forests): May-June**

**ALLAIRE**

May 17—Flea Market, 10 a.m.-4 p.m.

May 18—Pine Creek Railroad—The Great Locomotive Chase, Noon-4 p.m.

May 31—Spring Antique Show, 10 a.m.-4 p.m.

June 1—Spring Square Dance Festival, 2 p.m.

June 8—Howell High School Band Concert, 2:30 p.m.

June 22—North Shore Antique Auto Show

June 28—Flea Market, 10 a.m.-4 p.m.

**LIBERTY**

June 1—Hudson County Community College Graduation Ceremony

**MONMOUTH**

June 28-29—102nd Anniversary of the Battle of Monmouth Re-enactment

**ROUND VALLEY**

June 28-29—Boat Inspection by Coast Guard Auxiliary (tentative)

**WHARTON**

June 15—Batsto—Annual Craft Show, 10 a.m.-5 p.m.

**RINGWOOD**

May-June—Spring flower bloom (flowering shrubs, trees and flowers) in Skylands Botanical Gardens

June—Art shows—held in Ringwood Manor and Ringwood Barn

**STOKES**

June—Laurel and Rhododendron bloom. Outstanding areas, Tillman Ravine and Sunrise Mountain

**HIGH POINT**

June—Laurel and Rhododendron bloom. Outstanding area, Kuser Natural Area

**WORTHINGTON**

May—Spring shad run in Delaware River



**State of New Jersey**

**Brendan Byrne,**  
*Governor*



**Department of  
Environmental Protection**

**Jerry Fitzgerald English,**  
*Commissioner*

**The Shore Resorts**

RESORT	ZIP	PARKWAY EXIT	PHONE NUMBER	BEACH	BOARDWALK	ACCOMMODATIONS	AMUSEMENTS	SURFING	SCUBA DIVING	RAFTING	BEACH BUGGY PERMITS	BEACH FIRE PERMITS	PICNICKING	TENNIS	BATH HOUSES
Union Beach	07735	117	(201) 264-2277	*						*					
Keyport	07735	117	(201) 264-0431	*	*						*		*	*	
Keansburg	07734	117	(201) 264-0431	*	*	*					*	*	*	*	*
Atlantic Highlands	07732	117	(201) 291-1444	*										*	
Highlands	07732	117	(201) 872-1515	*	*					*				*	
Sandy Hook	07732	117	(201) 872-0115	*				*	*	*	*	*	*	*	*
Sea Bright	07760	117, 109	(201) 842-0099	*	*			A	*	*	*	*	*	*	*
Long Branch	07740	105	(201) 222-0400	*	*	*	*	*	*	*	*	*	*	*	*
Deal	07723	105-S 100A/B-N	(201) 531-1454	*				*	*	*	*	*	*	*	*
Asbury Park	07712	102-S/100A-N	(201) 775-7676	*	*	*	*	*	*	*	*	*	*	*	*
Ocean Grove, Neptune Twp.	07756	100A-S/100B-N	(201) 775-9433	*	*	*	*	*	*	*	*	*	*	*	*
Bradley Beach	07720	100B-S/100-N	(201) 774-8488	*	*	*	*	*	*	*	*	*	*	*	*
Avon	07719	100B-S/98-N	(201) 774-0871	*	*	*	*	*	*	*	*	*	*	*	*
Belmar	07719	97	(201) 681-1176	*	*	*	*	A	A	*	*	*	*	*	*
South Belmar	07719	97	(201) 681-3081	*	*	*	*	*	*	*	*	*	*	*	*
Spring Lake	07762	98	(201) 449-8920	*	*	*	*	*	*	*	*	*	*	*	*
Sea Girt	07762	98	(201) 449-9433	*	*	*	*	*	O	*	*	*	*	*	*
Manasquan	08736	98	(201) 223-0544	*	*	*	*	*	*	*	*	*	*	*	*
Brielle	08730	98	(201) 528-6600	*	*	*	*	*	*	*	*	*	*	*	*
Point Pleasant Beach	08742	98-S/90-N	(201) 899-2424	*	*	*	*	*	*	*	*	*	*	*	*
Point Pleasant	08742	98-S/90-N	(201) 899-2424	*	*	*	*	*	*	*	*	*	*	*	*
Brick Township	08723	98-S/90-N	(201) 477-4441	*	*	*	*	*	*	*	*	*	*	*	*
Lakewood	08701	91-S 83/90-N	(201) 363-0012	B	*	*	*	*	*	*	*	*	*	*	*
Bay Head	08742	98-S/90-N	(201) 892-0633	*	*	*	*	*	*	*	*	*	*	*	*
Mantoloking	08738	91/82-S 82/90-N	(201) 899-3434	*	*	*	*	*	*	*	*	*	*	*	*
Normandy Beach	08739	98/91-S 82-N	(201) 477-4441	*	*	*	*	*	*	*	*	*	*	*	*
Ocean Beach	08739	98/91-S 82-N	(201) 793-7272	*	*	*	*	*	*	*	*	*	*	*	*
Dover Township	08753	82-S/82-N	(201) 341-1000	B	*	*	*	*	*	*	*	*	*	*	*
Lavallette	08739	82-S/82-N	(201) 793-7477	*	*	*	*	*	*	*	*	*	*	*	*
Ortley Beach	08751	82-S/82-N	(201) 793-7477	*	*	*	*	*	*	*	*	*	*	*	*
Seaside Heights	08732	82-S/82-N	(201) 793-9100	*	*	*	*	*	*	*	*	*	*	*	*
Island Heights	08752	82-S/82-N	(201) 270-6415	B	*	*	*	*	*	*	*	*	*	*	*
Berkeley Twp.	08753	82-S/82-N	(201) 244-7400	*B	*	*	*	*	*	*	*	*	*	*	*
Toms River	08752	82-S/82-N	(201) 349-0220	B	*	*	*	*	*	*	*	*	*	*	*
Seaside Park	08752	82-S/82-N	(201) 793-0234	*	*	*	*	*	*	O	*	*	*	*	*
Island Bch. St. Park	08731	82-S/82-N	(201) 793-0506	*	*	*	*	*	*	*	*	*	*	*	*
Ocean Gate	08740	80-S/81-N	(201) 269-3166	*	*	*	*	*	*	*	*	*	*	*	*
Forked River	08731	74-2/69-N	(609) 693-7489	*	*	*	*	*	*	*	*	*	*	*	*
Barnegat Light	08006	63-S/63-N	(609) 494-7211	*	*	*	*	*	*	*	*	*	*	*	*
Loveladies	08006	63-S/63-N	(609) 494-7211	*	*	*	*	*	*	*	*	*	*	*	*
Harvey Cedars	08006	63-S/63-N	(609) 494-7211	*	*	*	*	*	*	O	*	*	*	*	*
North Beach	08006	63-S/63-N	(609) 494-7211	*	*	*	*	*	*	*	*	*	*	*	*
Surf City	08006	63-S/63-N	(609) 494-7211	*	*	*	*	*	*	O	*	*	*	*	*
Ship Bottom	08006	63-S/63-N	(609) 494-7211	*	*	*	*	*	*	*	*	*	*	*	*
Brant Beach	08808	63-S/63-N	(609) 494-7211	*	*	*	*	*	*	*	*	*	*	*	*
Beach Haven Crest	08808	63-S/63-N	(609) 494-7211	*	*	*	*	*	*	*	*	*	*	*	*
Brighton Beach	08808	63-S/63-N	(609) 494-7211	*	*	*	*	*	*	*	*	*	*	*	*
Peahala	08808	63-S/63-N	(609) 494-7211	*	*	*	*	*	*	*	*	*	*	*	*
Long Beach	08808	63-S/63-N	(609) 494-7211	*	*	*	*	*	*	*	*	*	*	*	*
Beach Haven Park	08808	63-S/63-N	(609) 494-7211	*	*	*	*	*	*	*	*	*	*	*	*
Beach Haven Terr.	08808	63-S/63-N	(609) 494-7211	*	*	*	*	*	*	*	*	*	*	*	*
Beach Haven Grdns.	08808	63-S/63-N	(609) 494-7211	*	*	*	*	*	*	*	*	*	*	*	*
Spray Beach	08808	63-S/63-N	(609) 494-7211	*	*	*	*	*	*	*	*	*	*	*	*
No. Beach Haven	08808	63-S/63-N	(609) 494-7211	*	*	*	*	*	*	*	*	*	*	*	*
Beach Haven	08808	63-S/63-N	(609) 494-7211	*	*	*	*	A	*	*	*	*	*	*	*
Holgate	08808	63-S/63-N	(609) 494-7211	*	*	*	*	*	*	*	*	*	*	*	*
Barnegat	08005	67-S/63-N	(609) 494-7211	*	*	*	*	*	*	*	*	*	*	*	*
Manahawkin	08050	67-S/63-N	(609) 494-7211	B	*	*	*	*	*	*	*	*	*	*	*
Tuckerton	08087	58-S 50/58-N	(609) 296-4900	*	*	*	*	*	*	*	*	*	*	*	*

N—GSP North    S—GSP South    A—After Hours    O—Off Season    N—No Lifeguards    B—Bay Beach

**N.J. YEAR OF THE  
COAST CALENDAR OF EVENTS:  
Summer 1980**

**N.J. Beach Buggy Association**—May 24—9 a.m., Beach Cleanup: Brigantine Beach. Contact: Bruce Allen, (609) 268-0845.

**South Jersey American Youth Hostel Outdoor Club**—May 31—please call, Canoeing the Toms River: Bring Lunch and canoe. Contact: Frank Kopec, (609) 365-5451.

**N.J. Audubon Magazine**—June—Coastal Article. Contact: William Baranyay, Jr., (201) 891-1211.

**Ocean County Parks and Recreation**—June 1—3am-9am, Forked River Mountain Sunrise Hike \$1.00. Contact: (201) 363-8712.

**N.J. State Library-Costume exhibit entitled "Down the Shore"**—June—Camden County Library. Contact: Bob Flanagan, (609) 772-1636.

**City of Burlington**—June 7—all day—call for details, International Day to honor the first people to come to Burlington Island in 1624. Contact: Dr. Kamaras, (609) 386-3993.

**Environmental Education Center, Lord Stirling Park**—June 7—please call, Festival of Renewable Energy Exhibits. Contact: Kevin Kavanaugh, (201) 766-2489.

**Ocean County Park and Recreation**—June 7—10 a.m.-12 p.m., Toms River Canoe Float \$2.00; 2-4 p.m., Catus Island Float \$2.00. Contact: (201) 363-8712.

**Ocean County Park and Recreation**—June 15—4 a.m.-7 a.m., Sunrise Bay Float \$2.00/person. Contact: (201) 363-8712.

**Wetland's Institute**—June 28—8:15, Cape May County Wildlife (especially for Children). Contact: Anne Galli, (609) 368-1211.

**Monmouth Museum**—June-July-August—Coastal Awareness Display. Contact: (201) 747-2266.

**N.J. State Library—costume exhibit entitled "Down the Shore"**—July—Lakewood Public Library. Contact: Jan Hermann, (201) 363-1435.

**Ocean County Parks and Recreation**—July 5—4-7 a.m., Sunrise Canoe \$2.00. Contact: (201) 363-8712; July 6—2-4 p.m., Seine Sifting Session, free; July 6—9 a.m.-5 p.m., Barnegat Marshes \$10/Canoe.

**Raritan River Friends of the Clearwater**—call for date, Festival of Blueberries. Contact: Rik Palieri, (201) 521-3114.

**American Littoral Society**—call for date, Sandy Hook. Contact: (201) 291-0055.

**Ocean County Parks and Recreation**—July 20—8 a.m.-5 p.m., Little Egg Marsh Trip \$10.00/canoe. Contact: (201) 363-8712; July 25—4 a.m.-7 a.m., Sunrise Ocean float \$2.00/person.

**American Youth Hostel, Outdoor Club of South Jersey**—July 26—10:00 a.m., Bike Ride—Batsto-Port Republic—Smithville (46 miles). Contact: Ruth Hiking. (609) 429-7034.

**Ocean County Parks and Recreation**—July 28—12:30 p.m.-7:30 p.m., Boat Trip around Island Beach Bay, Marsh, Beach, and Ocean Environment interpretation. Please register \$10.00/canoe. Contact: (201) 363-8712.

**N.J. State Library-Costume exhibit entitled, "Down the Shore"**—August—Bernardsville Public Library. Contact: Gerry Burden, (201) 766-0118.

**Ocean County Parks and Recreation**—August 2—9 a.m.-5 p.m., Fort Delaware Bus/Boat Trip, \$10. Please register. Contact: (201) 363-8712.

**Oceanic Society Mid-Atlantic Region**—August 2-9—Coast Week at Gardner's Basin, Atlantic City, with the East Coast Flagship, The Young America. Contact: Jeffrey Cleveland, (609) 348-1529.

**Ocean County Parks and Recreation**—August 3—10 a.m.-12 p.m., Annual Berkeley Crabbing contest, \$1. Contact: (201) 363-8712; 10 a.m.-12 p.m.—Seine Sifting Session, free.

**N.J. Society of Professional Engineers**—August 5—please call, Conference on beach erosion. Boardwalk, Asbury Park. Contact: Leon Avakian, (201) 922-9229.

**Ocean County Parks and Recreation**—August 9—7 a.m.-6 p.m., Long Beach Island/Little Beach Boat Tour, \$10. Please register. Contact: (201) 363-8712.

**Ocean County Parks Recreation**—August 10—9 a.m.-5 p.m., Barnegat Marshes Trip \$10.00/canoe. Contact: (201) 363-8712.

**Raritan River Friends of the Coast—New Brunswick's 300th Anniversary Committee**—August 16—please call, Raritan River Festival, Boyd Park, New Brunswick. Contact: Dr. Babcock, (201) 246-0603.

**Ocean County Parks and Recreation**—August 16—9 a.m.-12 noon, Little Egg Harbor Canoe Float Day please register \$8.00. Contact: (201) 363-8712.

**Youth Environmental Society**—please call, Highland Park Festival. Contact: Maurice Sampson, (201) 828-6880.

**Ocean County Parks and Recreation**—August 24—8 a.m.-5 p.m., Little Egg Marsh Trip \$10.00/canoe. Contact: (201) 363-8712.

Public awareness is a major emphasis of New Jersey's participation of the *Year of the Coast*. DEP is publishing several editions of a coastal calendar in the Division of Coastal Resources newsletter, *The Jersey Coast*. For further information contact Adele Gravit, Division of Coastal Resources, Bureau of Coastal Planning and Development, P.O. Box 1889, Trenton, New Jersey 08625.

**The Cape Resorts**

RESORT	ZIP	PARKWAY EXIT	PHONE NUMBER	BEACH	BOARDWALK	ACCOMMODATIONS	AMUSEMENTS	SURFING	SCUBA DIVING	RAFTING	BEACH BUGGY PERMITS	BEACH FIRE PERMITS	PICNICKING	TENNIS	BATH HOUSES
Brigantine	08203	40-S 36/38-N	(609) 266-7421	.	.	.	.	.	.	.	.	.	.	.	.
Ventnor	08406	36/38-S 36/29-N	(609) 823-4118	.	.	.	.	.	.	.	.	.	A	.	.
Margate	08402	36-S 36A-N	(609) 822-0424	.	.	.	.	.	.	.	.	.	.	.	.
Longport	08403	36/30-S 29-N	(609) 823-2731	.	.	.	.	.	.	.	.	.	.	.	.
Somers Point	08244	30-S 29-N	(609) 927-9088	B	.	.	.	.	.	.	.	.	.	.	.
Ocean City	08226	30/25-S 25/29-N	(609) 399-6111 ext. 222	.	.	.	.	.	.	.	.	.	.	.	.
Upper Township	08250	25	(609) 628-2011	.	.	.	.	.	.	.	.	.	.	.	.
Sea Isle City	08243	17-S 13-N	(609) 263-4461	.	.	.	.	.	.	.	O	.	.	.	.
Avalon	08202	13	(609) 967-8200	.	.	.	.	.	.	.	.	.	.	.	.
Stone Harbor	08247	10A-S 10B-N	(609) 368-5102	.	.	.	.	.	.	.	O	.	.	.	.
North Wildwood	08260	6-S 4-N	(609) 522-1407	.	.	.	.	.	.	.	.	.	.	.	.
Wildwood	08260	4B-S 4-N	(609) 522-1407	.	.	.	.	.	.	.	.	.	.	.	.
Wildwood Crest	08260	4B-S 4-N	(609) 522-1407	.	.	.	.	.	.	A	O	.	.	.	.
Lower Township	08204	4A-S 4B-N	(609) 886-2005	*N	.	.	.	.	.	.	.	.	.	.	.
Cape May	08204	0	(609) 884-8411	.	.	.	.	.	.	.	.	.	.	.	.
Cape May Point	08212	0	(609) 884-8411	.	.	.	.	.	.	.	.	.	.	.	.

A—After Hours O—Off Season N—No Lifeguards B—Bay Beach

**State Parks, Forests and Natural Areas**

ADDRESS	FACILITIES				WATER ACTIVITIES				OTHER ACTIVITIES				WINTER ACTIVITIES										
	Water Center	Picnicking	Plastic Shelter	Playground	Restrooms	Overnight Accommodations	Boating	Small Boat Launch	Motor	Boat and/or Canoe Rentals	Fishing	Hiking Trails	Junior Trails	Canoeing Trails	Hunter Traps	State Centers	Great Country Skiing/Snowing	Seesaw	Ice Skating	Ice Fishing	Ice Boating	Skiing	
Abram S. Hewitt Forest	% Ringwood Park																						
Allaire Park	Box 220, Farmingdale 07727	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Allamuchy Mt. Park	Hackettstown 07840	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Stephen's Section	% Allamuchy Mt. Park	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Barnegat Lighthouse Park	% Island Beach State Park	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Bass River Forest	New Gretna 08224	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Belleplain Forest	Box 450, Woodbine 08270	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cape May Point Park	Box 107, Cape May Point 08202	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cheesapeake Park	Matawan 07747	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cook Natural Area	% Washington Crossing	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Corson's Inlet Park	% Belleplain	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Delaware & Raritan Canal Park	Canal Rd., Belle Mead 08502	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Bull's Island Section	% Delaware & Raritan Canal Park	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Fort Mott Park	R.D. 3, Salem 08079	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hacklebarney Park	R.D. 2, Long Valley 07853	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hammonton Lake Natural Area	% Wharton Park	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
High Point Park	R.R. 4, Box 287, Sussex 07461	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hopatcong Park	Landing 07850	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Island Beach Park	Seaside Park 08752	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Jenny Jump Forest	Box 150, Hope 07844	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lebanon Forest	New Lisbon 08064	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Liberty Park	Wolf Drive, Jersey City 07304	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Monmouth Battlefield Park	R.D. 1, Freehold 07728	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
North Brigantine Natural Area	% Wharton Forest	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Norvin Green Forest	% Ringwood Park	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Parvin Park	R.D. 1, Elmer 08316	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Penn Forest	% Bass River Forest	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Princeton Battlefield Park	% Washington Crossing	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ramapo Mt. Forest	% Ringwood Park	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Rancocas Park	% Lebanon Forest	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ringwood Park	R.D., Box 1304, Ringwood 07456	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ringwood Manor	% Ringwood Park	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Shepherd Lake	% Ringwood Park	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Skyland Section	% Ringwood Park	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Round Valley Park	R.D. 1, Round Valley Rd., Lebanon 08833	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Spruce Run Park	Box 289 A, Van Syckel Rd., Clinton 08809	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Stokes Forest	R.R. 2, Box 260, Branchville 07826	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Swartswood Park	R.R. 5, Box 548, Newton 07860	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Swimming River Natural Area	% Allaire Park	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Voorhees Park	R.D. 2, Box 80, Rt. 513, Glen Gardner 08826	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Washington Crossing Park	R.R. 1, Box 337, Titusville 08560	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Washington Rock Park	% Cheesapeake Park	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Wayandanda Park	Box 198, Highland Lakes 07422	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Wharton Forest	Batsto, R.D. 4, Hammonton 08037	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Whittingham Natural Area	% Swartswood Park	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Worthington Forest	Old Mine Road, Columbia 07832	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

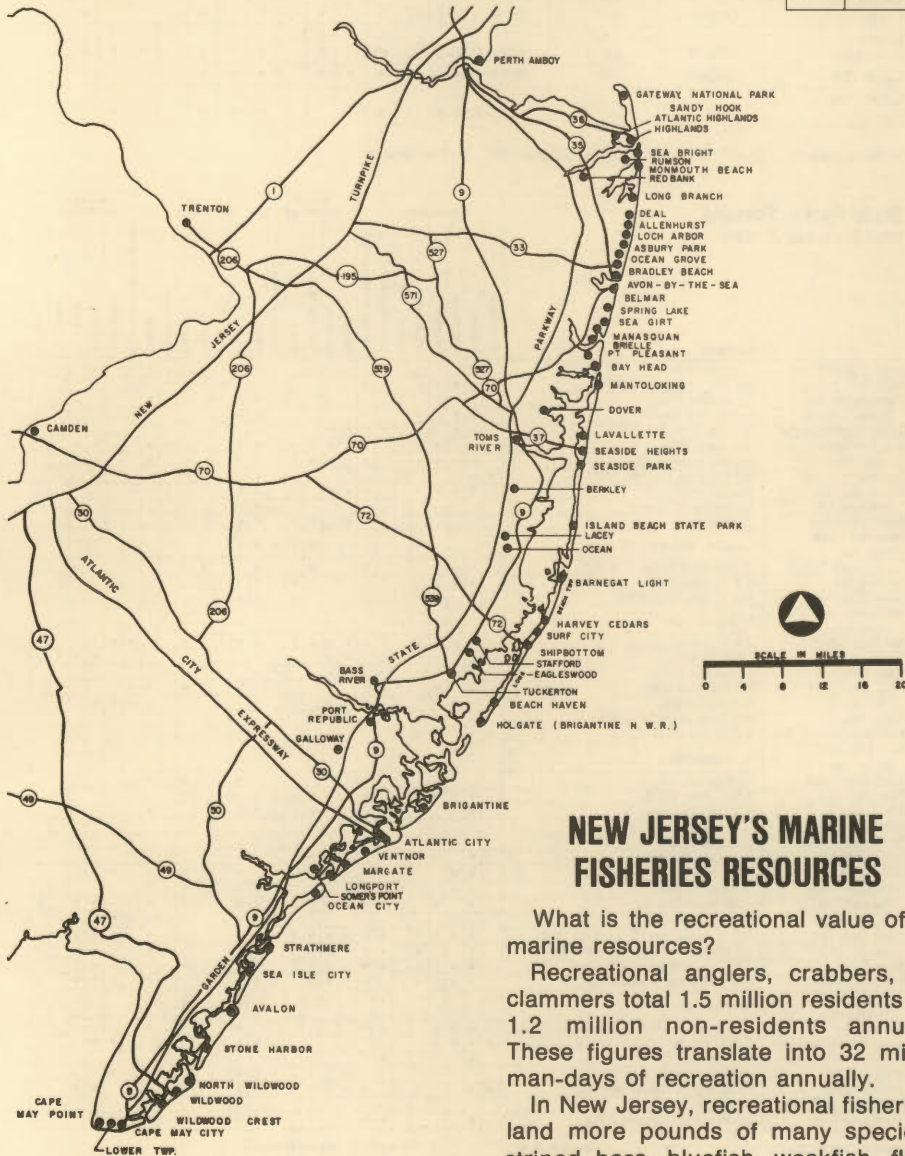
\*Suitable areas for this Activity, but not formerly designated

MOTORS Y = Yes up to 10 HP  
E = Electric motor only

1. Gas motors in Delaware River only  
2. Operated by New Jersey Audubon Society, R.D. 1, Mount Holly, N.J. 08060

A FEW OF THE MANY PLACES  "WHERE THEY BITE"	GAME FISHING TROLLING					BOTTOM OR DEEP SEA STILL AND DRIFT					INSHORE FISHING INLET AND BAY					SURF FISHING BEACH, PIER, ROCK PILE													
	ALABACORE	BLUEFISH	BONITO	DOLPHIN	MARLIN	SWORDFISH	TUNA	CROAKER	FLOUNDER	KINGFISH	MACKEREL	PORGY	SEA BASS	TAUTOG	WEAKFISH	BLACK DRUM	CRAB	CROAKER	FLOUNDER	KINGFISH	STRIPED BASS	WEAKFISH	FLOUNDER	KINGFISH	SNAPPER	STRIPED BASS	TAUTOG	WEAKFISH	
ASBURY PARK	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
ATLANTIC CITY	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
ATLANTIC HIGHLANDS	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
BARNEGAT LIGHT	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
BEACH HEAVEN	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
BELMAR	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
BIVALVE	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
BRIELLE	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
BRIGANTINE BEACH	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CAPE MAY	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
FORKED RIVER	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
FORTESCUE	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
ISLAND BEACH	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
LONG BRANCH	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
MANASQUAN	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
OCEAN CITY	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
POINT PLEASANT	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
REED'S BEACH	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
SEA BRIGHT	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
SEASIDE HEIGHTS	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
SOMERS POINT	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
STONE HARBOR	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
STRATHMERE	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
TOWNSEND'S INLET	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
TUCKERTON	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
WILDWOOD	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

		"WHEN THEY BITE"					
		MAY	JUNE	JULY	AUG.	SEPT.	OCT.
GAME FISHING TROLLING	ALBACORE				FAIR	PEAK	GOOD
	BLUEFISH		FAIR	PEAK	PEAK	GOOD	FAIR
	BONITO		FAIR	PEAK	GOOD	FAIR	
	DOLPHIN			GOOD	PEAK	FAIR	
	MARLIN			PEAK	GOOD	FAIR	
	SWORDFISH			FAIR	FAIR		
BOTTOM OR DEEP SEA INCL. DELAWARE BAY	CROAKER		PEAK	FAIR	FAIR	FAIR	
	FLOUNDER		FAIR	FAIR	GOOD	PEAK	FAIR
	KINGFISH		FAIR	PEAK	GOOD	FAIR	
	MACKEREL		PEAK	FAIR			PEAK
	PORGY		FAIR	GOOD	PEAK	PEAK	FAIR
	SEA BASS		GOOD	PEAK	PEAK	FAIR	FAIR
INSHORE FISHING INLET AND BAY	TAUTOG		PEAK	FAIR	FAIR	FAIR	PEAK
	WEAKFISH		FAIR	GOOD	PEAK	FAIR	
	BLACK DRUM		PEAK	FAIR			FAIR
	CRAB		FAIR	PEAK	PEAK	GOOD	FAIR
	CROAKER		FAIR	GOOD	FAIR	FAIR	FAIR
	FLOUNDER			FAIR	FAIR	PEAK	PEAK
SURF FISHING BEACH, PIER, ROCK PILE	KINGFISH			FAIR	PEAK	GOOD	FAIR
	SNAPPER (SMALL BLUEFISH)			GOOD	FAIR	FAIR	PEAK
	STRIPED BASS		GOOD	FAIR	FAIR	FAIR	GOOD
	TAUTOG		PEAK	FAIR	PEAK	GOOD	FAIR
	WEAKFISH		FAIR	GOOD	PEAK	GOOD	FAIR



### NEW JERSEY'S MARINE FISHERIES RESOURCES

What is the recreational value of our marine resources?

Recreational anglers, crabbers, and clambers total 1.5 million residents and 1.2 million non-residents annually. These figures translate into 32 million man-days of recreation annually.

In New Jersey, recreational fishermen land more pounds of many species—striped bass, bluefish, weakfish, fluke,

SALT WATER FISHING FACILITIES	PARTY BOATS	CHARTER BOATS	ROWBOATS	U-DRIVE LIVERIES	BANK	SURF	JETTIES	PIERS	CRABBING
ASBURY PARK	•	•	•	•	•	•	•	•	•
ATLANTIC CITY	•	•	•	•	•	•	•	•	•
ATLANTIC HIGHLANDS	•	•	•	•	•	•	•	•	•
BARNEGAT LIGHT	•	•	•	•	•	•	•	•	•
BEACH HEAVEN	•	•	•	•	•	•	•	•	•
BELMAR	•	•	•	•	•	•	•	•	•
BIVALVE	•	•	•	•	•	•	•	•	•
BRIELLE	•	•	•	•	•	•	•	•	•
BRIGANTINE BEACH	•	•	•	•	•	•	•	•	•
CAPE MAY	•	•	•	•	•	•	•	•	•
FORKED RIVER	•	•	•	•	•	•	•	•	•
FORTESCUE	•	•	•	•	•	•	•	•	•
ISLAND BEACH	•	•	•	•	•	•	•	•	•
LONG BRANCH	•	•	•	•	•	•	•	•	•
MANASQUAN	•	•	•	•	•	•	•	•	•
OCEAN CITY	•	•	•	•	•	•	•	•	•
POINT PLEASANT	•	•	•	•	•	•	•	•	•
REED'S BEACH	•	•	•	•	•	•	•	•	•
SEA BRIGHT	•	•	•	•	•	•	•	•	•
SEASIDE HEIGHTS	•	•	•	•	•	•	•	•	•
SOMERS POINT	•	•	•	•	•	•	•	•	•
STONE HARBOR	•	•	•	•	•	•	•	•	•
STRATHMERE	•	•	•	•	•	•	•	•	•
TOWNSEND'S INLET	•	•	•	•	•	•	•	•	•
TUCKERTON	•	•	•	•	•	•	•	•	•
WILDWOOD	•	•	•	•	•	•	•	•	•

mackerel, cod—than our commercial fishermen. And some \$300-\$400 million annually are spent on fishing equipment, bait, transportation, food, and lodging by recreational anglers in New Jersey.

To accommodate this fishing public we have 485 marinas, 125 bait and tackle shops, over 30,000 boat slips, 160 boat ramps, 100 party boats, 235 charter boats, and over 2400 rental boats.

## GRANTS FOR NEIGHBORHOOD ENHANCEMENT PROJECTS OK'D

DEP recently awarded 10 neighborhood enhancement project grants totaling \$87,294 to municipalities which qualify as Urban Aid Cities or Depressed Rural Centers. This grant program, carried out under terms of the Aid for Environmental Concerns Act of 1979 and funded through legislative appropriation, provides up to 80 percent financial grants (not to exceed \$10,000 per project, per year) to eligible communities for open space neighborhood projects such as streetscaping, sitting places, recreation areas, fountains and artwork in public places. Each recipient municipality must provide at least 20 percent of the project's cost in funds, material or labor-in-kind. In addition, the municipality must provide for the operation and maintenance of the project. The program, known as the Urban Neighborhood Environmental Assistance Program, is administered by DEP's Green Acres Administration.

In most cases the municipalities are incorporating the financial aid provided by the Urban Neighborhood program with other federal and state grants to revitalize waterfront parks, develop recreation facilities, or provide environmental aesthetics in downtown business areas. All projects are the result of local planning efforts and community participation.

The four Depressed Rural Centers and six Urban Aid Cities receiving grants are: City of Beverly (Burlington County), \$9,000; City of Camden (Camden), \$10,000; Borough of Califon (Hunterdon), \$8,000; Borough of High Bridge (Hunterdon), \$8,300; City of Trenton (Mercer), \$10,000; City of New Brunswick (Middlesex), \$9,994; City of Perth Amboy (Middlesex), \$4,000; City of Elizabeth (Union), \$10,000; and City of Rahway (Union), \$10,000.

## U.S. AWARDS \$500,000 FOR PINELANDS PLANNING

A \$500,000 matching grant from the U.S. Department of the Interior will be used to assist the State Pinelands Commission in developing a Comprehensive Management Plan for the one-million acre Pinelands National Reserve. The grant will be matched with \$500,000 from the state portion of Green Acres funds, bringing the total to \$1 million.



**AN 'ORCHID' FOR THE COMMISSIONER.** *Photographer Alphonso Adams (left), presents a color photo of the lovely Arathusa—known as the Pine Barrens Orchid—to Commissioner English. The Arathusa photograph is one of six pictures of Pinelands floral beauties, all taken by Adams, that hang in the Commissioner's office. (A story about the photographer, and reproductions of his Pine Barrens flower pictures will appear in the July/August issue of NJO.)*

## SWIMMING AREAS WILL SOON OPEN

The swimmin' season begins Memorial Day weekend at state-administered inland bathing areas with the two oceanfront facilities opening about three weeks later when the water temperature becomes more comfortable. This year, all inland swimming areas will open on May 24 and the oceanfront areas on June 14. All are served by lifeguards who had to pass a difficult series of performance tests given at the various facilities, and who must take part in a summer-long organized program of physical conditioning, first aid and water safety.

Here's a list, by county, of state-operated facilities with swimming areas: **Inland:** BURLINGTON—Bass River State Forest (SF), Lebanon SF; CAPE MAY—Belleplain SF; HUNTERDON—Round Valley State Park (SP), Spruce Run SP; MIDDLESEX—Cheesequake SP; MONMOUTH—Prosperitown Recreation Areas; MORRIS—Hopatcong SP; PASSAIC—Shepherd Lake in Ringwood SP; SALEM—Parvin SP; SUSSEX—Stokes SF, High Point SP, Swartswood SP and Wawayanda SP.

**Oceanfront:** OCEAN—Barnegat Light-house SP and Island Beach SP.

## NEW ASSISTANT COMMISSIONER



Dr. Aiden McLellan, 44, of Lawrenceville (Mercer County), has been appointed Assistant Commissioner for Science and Research by Commissioner Jerry Fitzgerald English. Effective January 7, McLellan

took charge of DEP units involved in research on cancer and toxic substances to provide a data base about the manufacture, storage, repacking and disposal of carcinogenic substances in New Jersey (this will help reveal ways of reducing or eliminating release of such substances into the environment); New Jersey's position on the storage and disposal of nuclear wastes; and coordination of DEP's activities with the state Department of Health on a variety of issues dealing with environmental health problems. He will direct research in technologies for oil spill controls and cleanups, scientific and engineering assessments of treatment methods for handling hazardous waste substances and for resource recovery technologies, and investigate new methods to upgrade DEP's data management and communication systems. McLellan will be DEP's liaison with appropriate U.S. agencies concerning such matters.

Dr. McLellan, who holds a Ph.d. in theoretical physics from the University of Nevada with prior education at the University of Stuttgart in West Germany and the University of California at Berkeley, is also a Professional Engineer.

## GIARDINA DIRECTS HAZARD MANAGEMENT

Paul A. Giardina, 30, of New York City, joined DEP in January as director of the department's new Hazard Management Program which has responsibilities for hazardous substances control including oil and chemical spill response and abandoned dump mitigation (cleanup), and overall coordination of procedures, budget and special projects for hazard management.

Giardina, chief of the Radiation Branch for the U.S. Environmental Protection Agency's (EPA) Region II office for more than four years, is on a two-year loan to DEP. At EPA he was responsible for the complete technical and administrative management of an entire regional radiation protection program. Giardina led the first in-depth study of a radio-

*continued on page 16D*



## PARKS/FORESTS RECREATION GUIDE FOR VACATION PLANNERS

If you are planning a "close to home" vacation this year or just want to get away for a day of outdoor relaxation, the DEP brochure, *New Jersey Invites You to Enjoy its—State Forests, Parks, Natural Areas, Marinas, Historic Sites, Wildlife Areas*, can help you choose just the right place to find the activities you prefer. The glove-compartment size, foldout, color brochure offers descriptive text about recreational opportunities at New Jersey's many state-owned facilities plus five charts and a map which shows where the facilities are located. To obtain a copy, write to DEP, Division of Parks and Forestry, P.O. Box 1420, Trenton 08625, and request the "New Jersey Invites You" brochure.

## MEMO TO ANGLERS

DEP's Division of Fish, Game and Wildlife reminds anglers that their New Jersey fishing licenses must be prominently displayed on their outer clothing while fishing. And, when purchasing a fishing license or trout stamp, be sure to ask for a free copy of the New Jersey Summary of 1980 Fishing Laws.

## ARE YOU ELIGIBLE?

**Free Park Passes:** A New Jersey resident, age 62 or over, may obtain a *Senior Citizen Pass* for free admission and free parking to day-use facilities at any state park, forest or historic site by presenting proof of age and completing an application form. Other fees are not covered by the pass. The forms are available at each park/forest/historic site office or from DEP, Division of Parks and Forestry, Box 1420, Trenton 08625.

Any resident of New Jersey who is totally disabled may obtain a *Totally Disabled Persons Pass* which provides the same free parking and free admission privileges as the Senior Citizen Pass. The applications are available at places given in the preceding paragraph. Both programs are administered by DEP's Division of Parks and Forestry.

**Free Clamming and Oystering Licenses** (one license is issued for both activities) are available to New Jersey residents age 62 or over. **Free Fishing Licenses** are available to New Jersey residents age 70 or over. Applications for one or both are available from DEP's Division of Fish, Game and Wildlife which administers the program. Write to the Division at Box 1809, Trenton 08625.

continued from page 16B

## ENGLISH ON THE ENVIRONMENT

that pollution is bad business.

During 1979, 30 such penalties, totaling more than \$87,450, were imposed: In the first two months of 1980, seven penalties, totaling over \$52,730, were assessed. The collected fines are turned over to the general coffers of the state. However, the main intent of such penalties is to achieve compliance with regulations by making violations economically unfeasible. These administrative penalties are arguable and can be withdrawn, provided full and permanent compliance can be demonstrated.

We in DEP will continue to maintain an unrelenting vigilance against pollution of the water and other elements of the state's environment. But we cannot succeed fully without your cooperation. Since most pollution results from human activities, people can cure pollution. As the motto on our department logo says—for the welfare and happiness of us all—LET'S PROTECT OUR EARTH.

## FREE ENTERTAINMENT IN 24 STATE PARKS

This summer the New Jersey State Council on the Arts and the Department of Environmental Protection will present free performances of mime, theatre, dance, folk and bluegrass music, and puppet shows on a regular schedule (below) at 24 state parks/forests. A flag with a picture of a butterfly on it will be raised on performance day at the parks . . . watch for it. Specific program information will appear in your local newspapers.

Allaire—Sundays 2:00 PM  
Atsion—Tuesdays 1:00 PM  
Bass River—Thursdays 7:00 PM  
Batsto—Sundays 1:00 PM  
Belleplain—Saturdays 8:00 PM  
Cape May—Sundays 2:00 PM  
Cheesequake—Tuesdays 2:00 PM  
Fort Mott—Wednesdays 1:00 PM  
Hacklebarney—Saturdays 2:00 PM  
High Point—Sundays 2:00 PM  
Hopatcong—Tuesdays 2:00 PM  
Lebanon—Saturdays 7:00 PM  
Liberty—Saturdays 2:00 PM  
Monmouth—Thursdays 7:00 PM  
Parvin—Tuesdays 1:00 PM  
Ringwood—Fridays 2:00 PM  
Round Valley—Thursdays 2:00 PM  
Spruce Run—Thursdays 2:00 PM  
Stephens—Saturdays 7:00 PM  
Stokes—Saturdays 7:00 PM  
Swartswood—Tuesdays 1:00 PM  
Washington Crossing—Memorial Day-noon; 4th of July-noon; Labor Day-noon  
Wawayanda—Tuesdays 2:00 PM  
Worthington—Saturdays 7:00 PM

continued from page 16A

## ILLEGAL DUMPERS

establishment of criminal sanctions for those who illegally dispose of hazardous wastes will discourage those who think about it, and penalize those who choose to destroy our lives and those of future generations. We have a strike force operating which will catch those involved and we do not intend to relent in bringing those responsible to justice."

continued from page 16C

## GIARDINA DIRECTS

active waste disposal site at West Valley, N.Y. in 1975 and coordinated the monitoring of radioactivity in Region II following the accident at the Three Mile Island nuclear plant near Harrisburg, Pa. in 1979. Giardina received his B.S. degree in nuclear engineering from the University of Michigan and his masters degree in radiation protection and toxicology from the New York University Institute of Environmental Medicine.

## STATE PARKS/FORESTS RE: CAMPING RESERVATIONS

Though general camping information pamphlets are available from DEP's Division of Parks and Forestry, Box 1420, Trenton 08625, NO RESERVATIONS ARE HANDLED BY THE TRENTON OFFICE. All arrangements should be made through the park or forest office in charge of the campsites desired.

For specific information about cabins, shelters, campsites, lean-tos, group camping and application forms for reservations at a particular campground, write directly to that park/forest area office as follows:

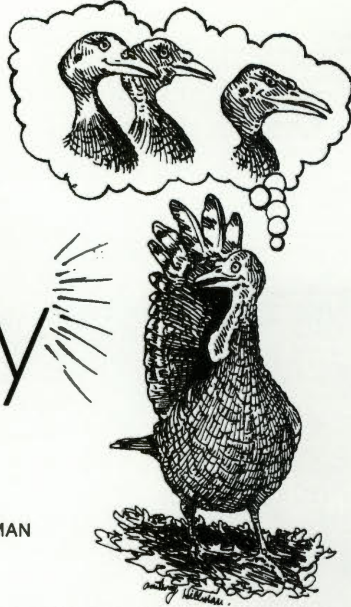
**Northern New Jersey Locations:** Bull's Island section of Delaware and Raritan State Park (SP), R.D. #1, Box 4, Canal Rd., Belle Mead, 08502; High Point SP, R.R. #4, Box 287, Sussex 07461; Jenny Jump State Forest (SF), Box 150, Hope 07844; Round Valley SP, R.D. #1, Round Valley Rd., Lebanon 08833; Stephens section of Allamuchy Mountain SP, Hackettstown 07840; Stokes SF, R.R. #2, Box 260, Branchville 07826; Swartswood SP, R.R. #5, Box 548, Newton 07860; Voorhees SP, R.D. Glen Gardner 08826; and Worthington SF, c/o Jenny Jump SF, Box 150, Hope 07844.

**Southern New Jersey Locations:** Allaire SP, Box 220, Farmingdale 07727; Bass River SF, New Gretna 08824; Belleplain SF, P.O. Box 450, Woodbine 07747; Cheesequake SP, Matawan 07747; Lebanon SF, New Lisbon 08064; Parvin SP, R.D. #1, Elmer 08318; and Wharton SF, Batsto, R.D. #1, Hammon-ton 08037.

# It's Tom-foolery

ROBERT ERIKSEN

ILLUSTRATIONS BY ANTHONY HILLMAN



What drives normal, healthy Americans with good jobs and families to rise at 3 A.M. and flounder around the spring woods before even the robins awaken? Why do they dress in camouflage clothing, looking more like oak trees than humans? What causes them to sit under a tree making strange noises with a little wooden box?

It's weird, it's crazy, it's . . . tomfoolery!

The object of all this baffling behavior is the wild turkey gobbler. In many states, May heralds the coming of Spring Gobbler Season. New Jersey, which has recently reintroduced the wild turkey, may soon be among those states.

The gobble of the male turkey, though often associated with Thanksgiving, is more of a spring phenomenon. Tom turkeys may gobble at any time of year, and often do so in response to a loud noise. It is in the spring, however, that gobbling begins in earnest.

Gobblers sound off to stake out a territory. The sound warns other males that the hens of a given area belong to the gobbling tom. More importantly, hens are attracted by the sound so that the business of breeding can be attended to.

Hens cannot gobble, but do have a repertoire of calls all their own. They communicate with each other through a series of yelps, whines, purrs, and whistles, sounding more like a rusty gate than a bird.

To let a gobbler know where she is, a hen will call to him in yelps. When she is really serious about mating, she emits a series of fast, high-pitched yelps called a cackle. The tom answers by gobbling and moving toward her. He fans his tail, puffs himself up and drags his wings in full strut. This display impresses the hen and puts her "in the mood" for breeding.

Gobblers are polygamous and collect a harem of hens. Interested in hens only for breeding, they do not take part in rearing the young. Because one tom can easily inseminate seven or more hens, there are always surplus toms in the turkey population, and these gobblers may be harvested without endangering the reproductive success for a given year. This is the reasoning behind a spring season for gobblers only.

The hunting season is carefully timed to coincide with the period when the hens are incubating. At this time, the gobblers are "excess baggage," having completed their portion of the reproductive process. They are, however, still interested in mating and will respond to a hen. Toms will also investigate a man imitating the call of a hen.

Some turkey hunters call using their own voices. Most, however, use a handmade or commercial calling device. To

be legal, such a caller must be manually operated; no electronic calls are permitted.

Turkey calls come in a variety of shapes and sizes. Some are hand operated, using a lever or striker on a wood, slate or aluminum surface; friction between the surface and the striker produces the sound. Other calls utilize air blown from the mouth or pulled into the call by mouth. The beginner should try a number of calls to determine which he can best master.

Once a type of turkey call is decided upon, practice is the key to success. Many tapes or records featuring champion callers are available, and learning from these is almost as good as rubbing elbows with a knowledgeable caller.

After mastering the art of turkey calling, the hunter must find a gobbler. This can often be done just before dark. Toms often gobble before retiring for the night, and at that time may answer hen yelps or the call of a barred owl. Once the bird has been "put to bed," the hunter has a good idea where to start the next morning.

The would-be turkey hunter must be out long before daylight, positioning himself near the roosting gobbler. Ideally, the seductive notes of the hunter's turkey call should be the first thing the tom hears when he awakens.

It's a good idea for the turkey hunter to be familiar with the terrain lest he find himself stepping over the rim of a deep ravine in the dark. He should also carry a compass and a topographic map, as turkey hunters have been known to get lost occasionally.



Complete camouflage is also indispensable. Wild turkeys see in color and their vision is 10 times better than man's. No skin or metallic objects should be visible, and movement should be limited. Though sitting on a sharp stick and being drilled by seven mosquitos simultaneously, the hunter must remain still as a statue while the gobbler approaches.

Does all this preparation guarantee a gobbler for dinner? Certainly not! Even the most meticulous hunter will fail to bag a turkey more often than not: The odds are something like 33 to 1 in favor of the turkey. But that's what makes spring gobbler hunting what it is—tomfoolery. □





## “EXPECT THE UNEXPECTED!”

TONY PATTERSON

The splendor of New Jersey's 21 counties and their many tourist attractions was recently bannered in a brand new four color booklet, "New Jersey's Got It! . . . Your 1980's Vacation Guide." And just as the first inside page proclaims . . . expect the unexpected! The *new* New Jersey is up ahead. Truly a multi-colored printed harbinger of all things unique to this four-season state, the new brochure takes you on an exciting, vicarious trip through the regions of the Skylands, Gateway, Delaware River, Shore, Cape and Atlantic City.

Our journey begins in the Skylands Region, which encompasses the counties of Sussex, Warren, Morris, Somerset and Hunterdon. Situated in the north and west country of the State, the Skylands Region virtually teems with mountain splendor, superior skiing and clear lakes.

One of our first stops is the famous Vernon Valley/Great Gorge ski area, which at the flip of a springtime converts into a summer park of sun and fun with scaled down race cars to drive, roller skating and water slides. Nearby the restored village of Waterloo beckons to those wishing to take a step back in time. Or for those with a western quest, it's Wild West City at Netcong.

New Jersey's Lake Hopatcong, has the rides and amusements of Bertrand Island with boating, fishing and swimming.

Somerset County boasts the majesty of Duke Gardens, where flowers are found in an abundance of sculptured beauty.

At Hunterdon County we find the verdant lands of one of the state's many parks, Round Valley State Park at Lebanon.

To the east lies the Gateway Region, the most populous section of the Garden State and the Counties of Bergen, Passaic, Hudson, Essex, Union, and Middlesex. Here you will find a splendid view of the mighty Hudson River. Or perhaps you will want to see one of the New Jersey's newest attractions, Liberty Park, for a close-up view of the Statue of Liberty.

For you sports fans, the excitement of watching the Giants football team or the Cosmos soccer team or horse racing; all at the huge Meadowlands Sports Complex.

Nearby attractions you won't want to miss include the Great Falls of Paterson, Thomas Alva Edison's laboratory at West Orange or Revolutionary homes such as Boxwood Hall in Elizabeth.

And we should mention at this point that a number of attractions are "Barrier Free" to accommodate the handicapped.

And now it's off to the miles of prime beaches of New Jersey's famous Shore Region of Monmouth and Ocean Counties. Here, you will see Great Adventure-Safari Park, amusement piers and hundreds of miles of boardwalks to stroll. Nearby is "Old Barney," the second oldest lighthouse in the United States; then stop off and see the Twin Lights of Atlantic Highlands.

Add to this the races at Freehold and Monmouth Park, the exciting shows of the Garden State Arts Center and the historic scenes at Allaire State Park, and you have seen only a hint of what New Jersey is all about.

From the Shore, our journey takes us to the Delaware River Region, where once the proud Leni Lenape Indians lived; to the counties of Mercer, Burlington, Camden,

Gloucester and Salem.

From Washington's Crossing State Park to the historic sites of Mercer and Burlington Counties, the River Region abounds in historic lore. You will definitely want to see where Washington and his Army crossed the Delaware.

At Princeton, you will see the Princeton Battle Monument, the home of Albert Einstein, the famous campus of Princeton University and the Princeton Aerospace Lab which produced many satellites now in orbit. For those with a flair for the footlights, the nearby McCarter Theatre offers plays and ballets.

Then from the River Region, we journey to the famous splendor of the Cape Region of Cumberland, Cape May, and Atlantic Counties, where Victorian homes stand proudly as a tribute to the care and affection shown by their owners. This area has long been a popular vacation spot for many Canadians and one should not be surprised to hear French accents in restaurants or while walking on the sandy beaches or boardwalks. Your visit to the Cape will never be complete without a visit to Lucy the Elephant in Margate or Wheaton Village in Millville. Or perhaps you will enjoy just walking on the golden beaches in Ocean City, Stone Harbor, Avalon or the Wildwoods.

For campers looking for hiking trails and wooded simplicity, there are more than 114 private campgrounds in New Jersey, many of them on the Cape and most are close to either lakes, streams or ocean fishing.

And don't forget the wineries and the Cape May "diamonds" that lie in abundance on the beaches waiting to take their place on your shelf as a souvenir of your visit to the Garden State.

But for now, it's off to the entertainment capital of the east—Atlantic City. The rolling waves, rolling trams and rolling dice echo the excitement of casino glamour. From the lounges and theaters of the casino hotels comes the sounds of big name stars . . . Frank Sinatra, Johnny Carson and Diana Ross.

But this city is famous for other things, such as the boardwalk, Miss America Pageant, salt water taffy and the romance of the era of sailing ships recaptured with a visit to Historic Gardner's Basin. And there is much, much more. Too much in fact to try to tell you in so few words.

So the word for now from the Skylands to the Cape . . . the message to those planning vacations or just a one-day trip . . . "Expect The Unexpected!"—New Jersey's Got It!

To receive your copy of the 1980 New Jersey Vacation Guide write to: Vacation Guide  
Box 400 NJO  
Trenton, N.J. 08625

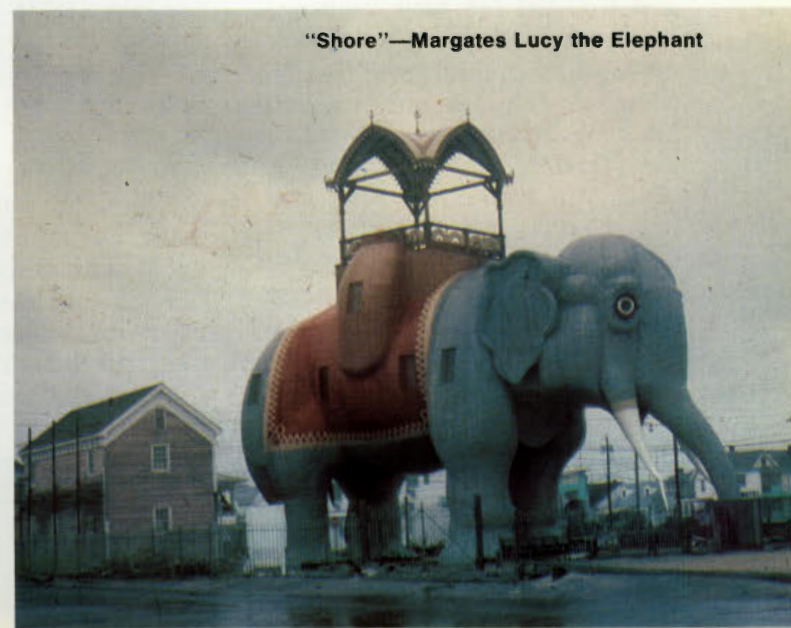
"River"—Washington Crossing Park



"Skylands"—Waterloo



"Cape May"—Victorian Era Homes



"Shore"—Margates Lucy the Elephant

# Fawntastic "Doe"

ALDEN STAHR

*How a very old mother gave up everything, including her fur coat, for her children*

The day "Doe" ate the wild geranium plant, blossoms and all, in front of my cabin I thought she looked different. But it wasn't until she came up to have her ears scratched that I noticed she looked a bit obese. "You're living it up too much, Doe," I said. "Better lay off the geraniums."

She looked at me with her big brown eyes and blinked her long dark lashes like miniature whisk brooms, insisted on another scratch behind her marvelous omnidirectional ears, then wandered off into the woods and disappeared.

I wouldn't have thought anything of that, or her corpulence, if she hadn't *stayed* disappeared. Usually she came around every day and often slept behind my log piles. But after she had been gone for several days I got to thinking: "Could she possibly be...?"

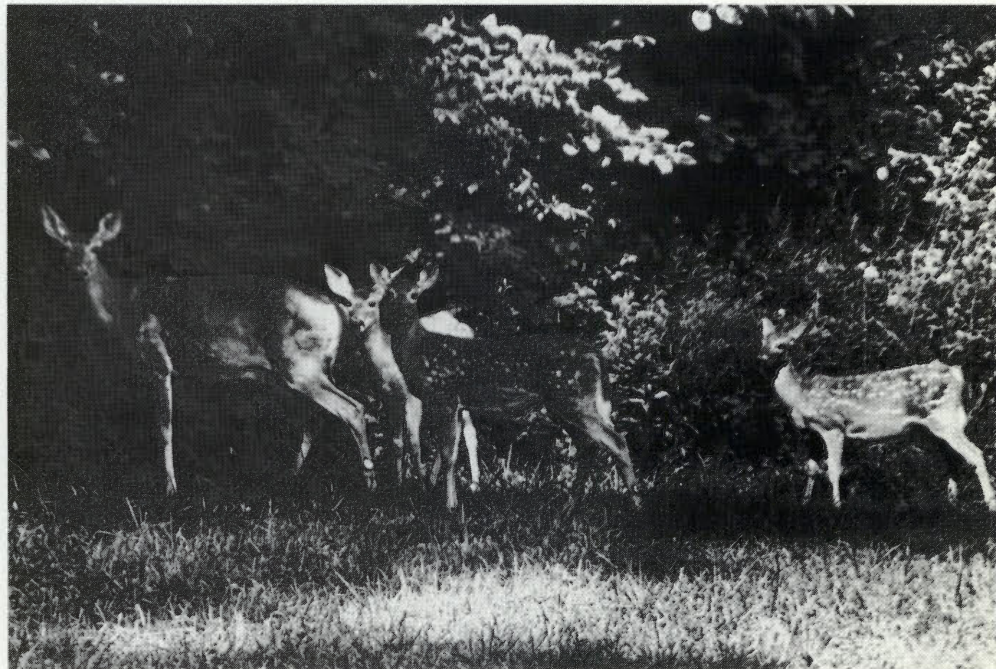
No, not possible! Doe was 16—the equivalent of 90 in a human—and too old for such foolishness. But after a week she ambled into my yard as serene as ever, sweeping those long lashes and presenting her long ears for scratching. I noticed then that she was thinner, and when she walked away I saw a bulge between her hind legs. Doe was in milk!

We played a game for a week or so. She showed up every day, alone, and when she headed for the woods I followed her at a discreet distance, hoping that she would lead me to her surprise. But she just kept on



"Baldy" Doe after nursing three fawns. Her hair is coming back.

PHOTOS BY AUTHOR



Doe and Dawn and Dusk and Trip alerted by whistle.

walking, looking back once in a while. She never led me to anything but more woods.

Then one day I started to walk up my back lane toward the mountain and thought I saw a tiny flash of white as I rounded a curve. As I came into a straightaway a baby deer bounded toward me, stopped

short about three feet away, suddenly discovered I wasn't a tree, leaped sideways, and flashed into the undergrowth. Only then did I notice Doe standing calmly in the lane. She hadn't stamped her hoof or sounded her "whoosh" warning to her fawn.

I had to have a picture. I got my

camera and followed Doe and "Dawn," as I named the baby, into the woods until they came to a place where a few sunbeams dripped through holes in the umbrella of leaves overhead. There I managed to get a hand-held telephoto shot of mother and doe-ter—poor photography at 1/4 second but better than no picture at all.

It had been wonder enough that Doe had even survived the severe winter of 1977, when the temperature swung down around zero to ten below for over a month. She was so old that her coat was thin, and nursing the fawn further pulled down her vitality. What winter coat she had soon started to look shaggy, as fur fell out. She would have shed it eventually but it came out faster and sooner than normally. And when her summer coat came in it was skimpy.

After she had had her fawn for a couple of weeks she appeared with *two* fawns! Could she have had twins? Unlikely. After I got over my initial astonishment I remembered having seen a small fawn circling the deer compound a couple of days earlier. Doe's second tag-along must have been the escapee. Generous and loving, Doe had adopted the stray and was nursing two fawns on her scant supply of milk. This one I named "Dusk." I stalked them with my camera daily until I got a picture of all three together, again a poor photo under bad conditions, but it was at least some memento. And I caught Dawn and Dusk together as they paused for a second or two while frisking past my cabin.

Doe's new fur coat didn't last long. It dissolved rapidly halfway down her sides until she looked like a man with a fringe of hair around a bald pate. She browsed on choice dogwood leaves and wildflowers and weeds all her waking hours to support herself and the fawns.

The situation then became ridiculous. A few days later Doe showed up with *three* fawns. She looked world-weary, her bag flat. All three babies nursed on her when they

could, and she was very patient with them. I don't know where the third fawn came from. Possibly "Triple," as I called her, lost her mother through accident or poaching, or she may have had triplets and couldn't or wouldn't take care of this one. In any case, what at first had been just Old Doe; then Doe and Dawn; later Doe, Dawn and Dusk; had now become a parade—Doe, Dawn, Dusk, and Trip.

I hoped to get a photo of Doe and her mixed "triplets," but every time I saw them it was either too dark or the fawns were scattered. Then, too, Trip didn't stay with the family all the time but awaited her adoptive dam and siblings near the cabin when they come out of the woods, usually at dawn and dusk. It didn't look as if I ever would get a picture of the quartet.

But I persisted. For about two months I stalked Doe and her gang, still hoping to get that ultimate picture. Then my sieve-like memory, which is usually a hindrance, turned out to be the hook that finally caught the elusive foursome. One day as I got into the jeep to go for logs I remembered something I had forgotten and went back to the cabin to get it.

As I stepped onto the porch I saw a sight that gave me palpitations. Doe and her troop were grazing on a patch of grass near the cabin—in good light! With shaking hands I put the telephoto lens on my camera and sneaked out; if I had so much as sneezed, the fawns would have rocketed away. They examined me suspiciously for a few minutes and resumed grazing. Doe, of course, showed no sign of alarm. At each click of the shutter the fawns jerked their heads up, but I managed to get in a few pix with the fawns in poor composition. Then as they started for the deep woods and photographic oblivion I whistled in desperation. They all stood at attention, ears and eyes focused on me while I focused on them and got the long-sought family portrait. Only then did I dare to breathe.

## **this and that . . .**

### **Earth and Space Photography Contest**

The Northeast Natural Science League, a nonprofit environmental organization, recently announced the sponsorship of its second annual natural science photographic competition. The deadline for entries is June 16, 1980.

Photographs must be taken anywhere in the thirteen state area of the Boston-Richmond megalopolis (Virginia to Maine), and may be of either nature subjects on earth or astronomical subjects in space. In other words, subjects may range from grasshoppers to galaxies. Color slides, color prints, and black and white prints will be included. A total of five slides and/or prints may be entered by each participant.

The winners of the two major divisions—EARTH and SPACE—will be awarded engraved plaques while those placing first, second, third, and honorable mentions in the six sub-divisions will receive certificates of merit. A selection of the winning photographs will become the basis of an exhibit to be circulated to various institutions in the northeast.

Photographs or slides of the top three New Jersey area winners will be reproduced in a future issue of *New Jersey Outdoors* magazine.

The winners will be selected by two panels of judges during the week of June 21 at Princeton University. All photographers, young and old, amateur and professional, are welcome to enter. For entry forms and complete details send a stamped, self-addressed envelope to the Northeast Natural Science League, P.O. Box 158, Wallpack Center, New Jersey 17881. □

### **Endangered Species of New Jersey**

A coloring book distributed by Essex County's Turtle Back Zoo, is now available to the public. The book illustrates and describes fifteen "endangered" animals, including the Pine Barrens Treefrog, Tiger Salamander, and the Humpback Whale.

Suitable for children and adults alike, the coloring book is a project sponsored by the Essex County Department of Parks and Recreation, the Ocean County Conservation Agency and the New Jersey Department of Environmental Protection Division of Fish, Game and Shellfisheries.

Twenty percent of the proceeds from the sale of the coloring book will go to the New Jersey Endangered species fund. For a copy, send \$1.00, plus \$.15 postage to: Turtle Back Zoo, 560 Northfield Avenue, West Orange, New Jersey 07052. Checks should be made payable to the Essex County Department of Parks and Recreation. □



# Take a Walk Along the Coast

BY D. W. BENNETT

It is my belief that New Jersey, more than any other coastal state, offers the most variety of what I shall call "coastal experiences." You can wallow in the oil-soaked marshes of Constable Hook in Bayonne and an hour later watch fiddler crabs scuttle across a mudflat in the Shark River estuary. From the loom of the World Trade Center to a clean *spartina* marsh in 60 minutes. Or from the sports complex in the Hackensack Meadowlands to Margate's elephant with a few extra miles. Canvasback ducks over-winter at Caven Point on Jersey City's waterfront while 135 miles to the south peregrine falcons swat shorebirds out of the sky at Cape May Point. Striped bass run up the Arthur Kill and shad up the Delaware River, and one summer two years ago a young beluga whale spent gentle afternoons around a sea buoy off Cold Spring Harbor. On the Navesink River in Coastal Monmouth County one October, I saw at different times a flamingo (who knows where from?), a golden eagle, a beaver, and a 34-pound striped bass.

The Jersey Coast is a wondrous place, and in summer millions go to it, mostly to swim or lie in the sand. Traffic jams are notorious. A favorite pastime for some is to wander over to the Toms River or Asbury Park toll plazas on hot Sunday afternoons to watch cars and drivers boil over. For wetter excitement, boat traffic in and out of Manasquan Inlet is worth watching in August. Most New Jersey inlets are difficult; on a busy weekend with a strong east wind the Manasquan is absolutely thrilling.

But there are ever so many times and places to see the coast and its wildlife in solitude. It is even still possible to do so in mid-summer, though spring and fall are better (and winter too). The key to such visits is, of course, to avoid the masses of people who aim for obvious destinations, the beaches and bays where

swimmers and boats coagulate. For offbeat coastal experiences, then, avoid weekend mid-days, avoid the big resorts, and avoid the places easy to get to by car. In other words get out of your car early in the day away from crowds. The Littoral Society is putting together a guide to such places, a guide that we have titled, "A Coast Walkbook." We do so with some trepidation, because once named and described, they might themselves become over-populated, but instinct tells us that only some will take advantage of the extra effort involved. For those, the rewards are many. So, here is a partial list of coastwalk suggestions:

## THE HACKENSACK MEADOWLANDS

Much maligned, the meadows are still capable of delivering an unsettling combination of experiences. Attack the meadows from the west side for trips around the edges of the Kearny marsh which can be lined with shorebirds and filled with ducks. Or try the Sawmill Creek area, excellent for wading birds—herons and egrets—and for waterfowl. The meadows are a stopping-off place for migrating birds, and it is possible in a day to see blue winged and green winged teal, canvasback scaup, shoveler, mallard, black, and widgeon, plus 15 species of shorebirds, and, usually, several marsh hawks flying low in search of prey. The meadows are full of muskrats, their houses of reeds poking above water. And you will see or hear pheasants, you can catch blueclaw crabs, and, when you raise your eyes, you can see the Manhattan skyline. Fields of reed grass (*Phragmites*) are so vast in the meadows that you can walk into it and be lost. I have ventured out into the reeds near a vegetable stand at the Park-and-Ride parking lot in Secaucus. Fifty yards in, it could just as well be the grasslands of Central Africa except for the sounds of trucks changing gears as they assault the hill leading to the Lincoln Tunnel.

## **HOBOKEN, LIBERTY PARK, CAVEN POINT**

Want to see urban waterfront at its best/worst? Drive to the Holland Tunnel, ditch your car near the New Jersey entrance, then walk north along the water to Hoboken, up the hill to Stevens Institute of Technology, down to the waterfront again, up river to the Maxwell House coffee factory, and south again, stopping at the Clam Broth House for refreshment. From there to Liberty Park to look at the Statue and at the ducks. Talk to the fishermen in the summer—full of hope but usually void of success. Then, a bit south to Caven Point, an abandoned Army base which now combines a salt marsh, huge piles of scrap iron, a diverse population of wharf rats, and rafts of canvasback ducks in winter.

## **SANDY HOOK**

Closed at this writing because dud artillery shells have been found on the beach, but to be opened as soon as the duds are cleaned out. By all means, avoid driving here on hot weekends (or weekdays, for that matter) from mid-June through September, unless you plan to arrive at sun-up or after six in the evening. Even then, park your car as soon as possible and travel by bike or foot. Avoid also the swimming beaches, or walk onto them and then go north or south. (It is a fact that, on a given swimming beach in New Jersey, 90 percent of the visitors hunker down within shouting distance of the lifeguard stands. If you are willing to walk even a quarter of a mile the beach is quite open.) Sandy Hook is a specially good place to see: Horseshoe crabs, coming on the bay beaches to lay eggs in June and July; migrating raptors in April and May; warblers in May; ospreys nesting, March-July; and, in all seasons, holly, semi-natural dunes, and dune grasses. Flounder fishing can be good on the bayside, spring and fall.

## **SHARK RIVER INLET**

The rock jetties on both sides of the inlet are speckled with settling organisms—sponges and anemones, hydroids, shellfish, and invertebrates, and the bay behind the inlet is good for seining up exotic tropical fish swept north in the Gulf Stream. In winter, the bay collects waterfowl, including a rare Barrow's goldeneye that has stopped there each winter since 1968. It is possible to see 12-20 species of ducks here during the hard winter freeze.

## **ISLAND BEACH STATE PARK**

But don't drive, take the shuttle bus near exit 82 on the Parkway in the summer on weekends. Again, the secret is to walk or bike away from the crowds. One good bet is to get to the bathing pavilions and then start walking south. Keep walking. This is New Jersey barrier beach at its best. Look at it and weep; it all used to be like this.

## **BRIGANTINE WILDLIFE REFUGE**

Probably the best single place in New Jersey to see the birds of the coast in all seasons, though January and February tend to be slow. This refuge is built for cars; the dikes are roads and if you drive, stop, stay in the car, and look, the birds hardly move. In fact, you may have to wait while Canada geese and their young

walk off the roadway. Out on the Brigantine Dike, you can see in the southeast distance the shimmering and ever-growing shafts of casino hotels rising in Atlantic City, a sort of plastic-and-polyester Xanadu. So far, no one going to Atlantic City to do what people going to Atlantic City do appears to have discovered the Refuge. Good news.

Just north of the Refuge off Route 9 is Leeds Point Road which goes down to the marsh and a few small clam shacks. This is a good off-the-beaten path trip. You can watch the boats off load and then buy good fresh clams and oysters. P.S. Eat half a dozen clams right there at room temperature. That's how Jersey clams should be eaten.

## **CORSON'S INLET**

An interesting place to visit because it is the one inlet in New Jersey that both the State and the Corps of Engineers have decided not to try to "stabilize." Thus it is natural, that is meandering, shoaly, tricky, and delightful. The proper approach to it is from the town of Strathmere, and it is good for shells and birds, and a nice place to fish.

## **STONE HARBOR**

Worth many visits. The rookery/sanctuary right in town is the best place on the east coast to see nesting egrets and herons. Arrive near dusk and you will be treated to the arrival of hundreds of snowy egrets, great egrets, blue herons, and glossy ibis, coming in from the nearby marshes. At the same time, night herons have completed their day of rest and leave the rookery to feed. Several blocks south and east of the rookery is Stone Harbor Point, a mile of still unspoiled barrier beach with dunes, shorebirds, places to walk, wade, fish, and swim. Fall fishing is excellent here; mullet school and run south for the winter and bluefish and striped bass and weakfish arrive to feed. It is a busy surf in October.

Stone Harbor is also the home of the Wetlands Institute, a research laboratory behind the barrier beach. It has an observation deck three stories up, a good, small library, aquariums, and an osprey nest close enough to study through the Institute's well-aimed telescope.

## **CAPE MAY/CAPE MAY POINT**

You are now 127 miles south of Sandy Hook at the other end of the state (and the sand on the beach is much finer). Cape May City has lovely Victorian houses. To the south, the Point is the best place to see migrating fall raptors; some 40,000-60,000 hawks pass by between Labor Day and mid-November. In the woods

*Continued on page 32*

ILLUSTRATIONS BY ANTHONY HILLMAN



## BEACH WATCHING

ing and related coastal processes to continue. In undeveloped natural areas such as Island Beach State Park or the Holgate Unit of the Brigantine National Wildlife Refuge, when the seaward sides of the dunes are eroded during storms, some of the sand from the beach and the dune is forced through low spots between dunes and spread out behind the dune area. This process is called "overwash" and the resulting deposits of sand are called "washover fans" (Fig. 5). The overwash process is a very important natural process because it allows the back side of the beach or barrier island to increase in height through time. This additional sand increases the protection from storm flooding, and provides material for the formation and growth of new dunes.

In some places along the East Coast, barrier islands can be overwashed once in ten years or even more frequently with additions of as little as a few inches to as much as a few feet of sand per overwash. As you can see this process can move significant amounts of sand. However, because of the construction in developed areas, this overwash process is prevented from occurring except in the most severe storms such as the 1944 hurricane or the 1962 March northeaster.

This latter storm, the Ash Wednesday storm, resulting in 40 deaths and over a half-billion dollars in property damage along the Mid-Atlantic coastline from Cape Cod to the Carolinas, occurred coincidentally during the highest tides of the month (at full moon) and resulted in complete overwash of sections of Long Beach Island and other New Jersey barriers. Not surprisingly, the vast majority of overwashes that occurred along the developed sections of the New Jersey coast took place at the ends of streets where there were low, unprotected walkways for beach access (Fig. 6). Most of the sand that did washover onto the islands was quickly removed by bulldozers and returned to the beach-dune areas. Thus, the back dune and back barrier areas of places such as Long Beach Island did not receive their beneficial increment of new sand which

leaves these areas more susceptible than ever to flooding and damage in the future.

Although the sand overwashed into the back barrier areas is "lost" from the beach-dune area, it is important for the future health of the barrier island. In fact, the overwash process is analogous to our putting money in the bank for future emergencies. The washover sand is there as a "sand bank" eventually allowing the whole barrier island system to move landward and upward through time, in effect "rolling over" itself. Barrier islands in Delaware and Virginia have been found to have moved landward their total width (one-half to one mile) since Colonial times. New Jersey has similar rates of landward migration even in developed areas.

In an attempt to halt or retard this natural landward migration of the coast, and thus protect their property, residents have turned to their elected officials and government agencies for protection and help. This has resulted in the construction of hard engineering structures such as seawalls, jetties, and groins which have received mixed reviews as to their effectiveness. For example, while the Sea Bright seawall has prevented the ocean from eroding the highway and houses, the land itself has not received any washover sand since the construction of the seawall and consequently this area is particularly prone to flooding during storms. Another example is that while the construction of the inlet jetties of both the Manasquan and Shark River Inlets improved navigation, their construction has interfered with the northerly longshore drift. This has caused severe erosion to the north of these inlets because the sand is deflected further offshore out of range of the constructional waves mentioned above. In turn, the overall decrease in sand throughout the area caused the affected municipalities to build a myriad of groins in an attempt to capture as much of the little sand that was left (Fig. 5).

Even on barrier islands that have not been substantially altered by man's activities there are certain sections more prone to erosion than others. Natural coastal processes in and around inlets affect neighboring beaches to either side. In particular, the areas just south of inlets in southern New Jersey from Barnegat Inlet to Cape May usually experience more beach erosion than

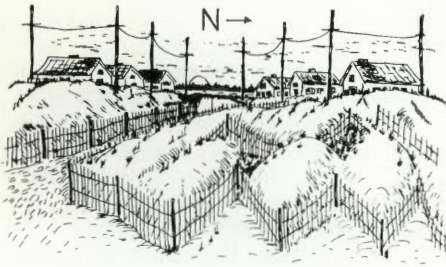


**FIGURE 6.** Typical beach access walkway through the dunes on Long Beach Island. View is to the east. Note view of the ocean at the top of the walkway. The orientation and unprotected nature of this walkway would allow flooding and overwash from storm surges to occur rather easily. Compare with Figure 8.



**FIGURES 7A and 7B.** Dune repair by the use of zig-zag and beach perpendicular sand fencing at Loveladies. 7A. Photo taken early March 1979. Note almost buried perpendicular fencing by angled pole and rather new zig-zag fencing to the left. 7B. November, 1979. Perpendicular fencing is completely covered by new sand and zig-zag fencing is half buried. New perpendicular fencing is needed now for added entrapment.

neighboring areas because of the pronounced refraction (bending) of the northeast storm waves around the ebb tidal delta (seaward inlet shoals) of each inlet. Thus, such localities as



**FIGURE 8.** Sketch from beach side showing recommended orientation of beach access walkway to the southeast and new dune area in foreground (northeast). The additional dunes with that orientation would deflect a westward or southward running storm surge to the south away from the walkway and prevent flooding down the street.

Loveladies on Long Beach Island, Brigantine on Brigantine Island, Atlantic City on Absecon Island, the southern Ocean City area on Peck Beach (Island), the Whale Beach area north of Sea Isle City on Ludlam Beach (Is-

land), Southern Avalon in the middle of Seven Mile Beach, Wildwood on Five Mile Beach (Island) and the Sewell's Point-Poverty Beach area of Cape May historically have greater losses of beach sand during storms.

In conclusion, there are some recommendations that can be made to minimize storm destruction along the developed beach and barrier islands of New Jersey:

1. Dune building should be encouraged everywhere on the seaward half of the barrier island. This includes the use of sand fencing to effectively wrap a house in a "mink stole" of dunes. Eventually this would result in houses *in* a dune field rather than houses *on* a barrier island. Vegetated dunes would replace front, side and backyards (and lawns) and the increase in topography height of the back barrier area would result in decreased destruction during future severe storms.

2. The primary dune line just landward of the beach should be carefully built up by the use of zig-zag and

perpendicular arrangements of sand fencing (Fig. 7). The recycling of Christmas trees behind sand fences for added wind baffling has been used extensively, but lately the "recipe" has been drastically altered by some coastal residents. Instead of using a *little* brush or trees to catch a *lot* of sand, some people have been using a lot of brush and only catching a little sand because the brush is so dense it becomes impenetrable and zig-zag fencing should be encouraged.

3. Beach access walkways at ends of streets should be angled from the northwest to the southeast and dunes should be built along the northeast-facing side to the same height as the adjacent dunes (Fig. 8). The additional dunes in that orientation would deflect the uprushing storm surge that comes down the beach from the northeast and keep the water from surging through the walkway and into the streets. Properly constructed, the added protection would retard overwash and flooding in all but the worst of coastal storms. □

*Continued from page 15*

## THE WOODCHUCK

architectural marvels. A den may be simply an entrance to a nest or a complicated maze of tunnels, nests, cul-de-sacs with one to five entrances. Such elaborate dens may be the work of several generations, each generation enlarging to suit its needs.

There are two types of entrances to the den. One is the main entrance, which leads downward at a moderate angle and has a mound of fresh dirt piled around it. The second type of entrance is called the *plunge hole*; it drops sharply, is small in diameter and has little dirt around it.

Beyond the entrance the tunnel angles upward to prevent flooding. It then branches out into several tunnels, one of which leads to the nest chamber. This chamber is very small, only 14 to 16 inches in diameter and is always higher than the lowest part of the tunnel to prevent flooding. The den also has several cul-de-sacs for depositing feces. Woodchucks clean out their dens several times a week and deposit the dirt around the entrance. You can tell if a den is occupied by looking for fresh dirt around the main hole. The average woodchuck den requires the moving of 400 pounds of dirt.

Authorities disagree over the territoriality of woodchucks. Some say only the immediate area of the den is defended, while others maintain that 'chucks will chase smaller 'chucks out of fields in which they are

feeding. I have seen as many as six woodchucks feeding together in a small area without any conflicts. In fact, when a rabbit ventured into the field to feed he was not bothered even though he passed within a few feet of them. Woodchucks are not communal animals; however, only yearlings who are not yet ready to mate sometimes consort together and share the same den.

Woodchucks are indirectly helpful to other animals and for this they were once a protected animal in Pennsylvania. Their abandoned dens are used by rabbits for shelter. Skunks, foxes, chipmunks, ground squirrels, weasels, mice, opossums, raccoons, quail, pheasants, and ruffed grouse have also been seen in abandoned woodchuck dens.

Although the building of homes and factories has destroyed so much of the woodchuck's natural habitat, the species has also benefitted from man's presence. The clearing of fields and tilling of farmland has improved the 'chucks food supply, thus increasing their population. In some areas woodchucks are routinely killed because they are so destructive to crops. Woodchucks dig up farmers fields, but while their holes are a danger to horses and cattle, their burrows also permit water to enter the ground and the soil to hold moisture. Woodchucks have adapted remarkably well to man, using telephone poles and buildings as support for their dens and building dens under junk piles and piles of dirt cleared from building sites. Unlike many other animals it seems the woodchuck is not immediately threatened by today's suburban sprawl. □

## Spring Fishing



Early spring school strippers.

may soon equal or exceed those in the river, while the ocean remains relatively cold. Also, forage in spring is more abundant in the bay, especially on the more shallow flats. Give or take several days depending on weather, the 50°F level is attained early in April, and wintering striped bass move into these areas to feed. At this time more bass may be taken by boaters, while drifting or at anchor, with baits fished on or near bottom. Preferred baits are weighted bucktails (3/8 to 3/4 oz.) tipped with bloodworm or pork rind, jigged or retrieved slowly, or bloodworm fished on top-and-bottom rigs. Rods are generally somewhat sturdier than those used in freshwater, with most of the action near the tip end. Spinning tackle gives an advantage in casting the lighter baits. Boat catches are accompanied by an increase in bank catches in the lower Mullica River and in the vicinity of Mystic Islands, with a major portion made at night. When ocean surf temperatures approach 50°F, normally after mid-April, wintering bass leave the bay to begin their northward migration, often in-

dicated by schooling near the inlets and an increase in surf catches at Long Beach Island. Almost simultaneously, migrating bass from places south enter the bay and river to feed.

Prior to 1974, major ocean runs of migrating striped bass occurred in this locale, beginning about the end of April, when ocean surface temperatures exceeded 50°F. The particular rendezvous was in the area between Little Egg Inlet and Brigantine Shoal, up to few miles from the beach, and may have included some wintering fish leaving the bay. This run usually corresponded with the appearance in the same vicinity of the vast schools of Boston mackerel, heading northward along the New Jersey coastline. While bagfuls of mackerel were the norm, daily limits of strippers (10 per angler) were not uncommon. The prime method used for bass was jigging bucktails tipped with cut mackerel strips. Subsequently, mackerel has been used effectively for bait in the bay as well. In more recent years ocean runs of both bass and mackerel have depleted, though some bluefish and large weakfish have arrived during this period. Concurrently, the winter ground fishery for whiting and ling has often moved within a few miles of the beaches, with ocean bottom temperatures at or below 50°F. In recent years this has been the "bread and butter" in area ocean waters, while codfish, formerly a major component of this fishery, have been scarce.

Meanwhile, the other important inshore species begin to enter the estuary. It is not unusual, during late April, to catch weakfish while fishing for striped bass. This causes speculation that some weakfish also winter in the general area. Bass and weakfish frequent the same sections of the bay or river, and are caught by similar methods. Both (but especially striped bass) tolerate lower salinity than other saltwater fish. Most early-caught weaks are moderately large fish of at least three pounds. Many striped bass and weakfish caught at this time are gravid females, thus there is evidence of spawning, primarily in the Mullica River. Though survival of spawn here is uncertain, as compared to larger estuaries such as Chesapeake and Delaware bays, coastal bays in general are important nursery grounds for the young of many species. In late April or early May, as bay temperatures approach 60°F, fluke (or summer flounder) arrive from their offshore wintering grounds about the time that winter flounder begin their offshore migration. Not plentiful during the 1960s, fluke have returned as one of the "bread-and-butter" fish of New Jersey's inshore waters. Fluke are first attracted to the same general areas of mud or soft bottom that are vacated by the winter species. Here drifting or

slowly trolling larger bottom baits, especially live killifish or cut mackerel strips, is effective. In May when bay temperatures reach or exceed 60°F, a component of the bluefish population migrating inshore appears, with the first fish usually in the two-to six-pound category. With the ocean still seasonally cool, particularly in the lower layers, these fish probably move nearer the surface until entering the bay. In recent years the bluefish population has maintained consistently high levels. Typical early fish are somewhat emaciated. This is also true of other species but is especially apparent in the bluefish, indicating that some fish migrate before feeding substantially. Once in the bay, fish may first be sluggish, but feeding activity increases along with water temperature. Bluefish are first caught by methods similar to those for bass and weakfish. During this period in Great Bay, it is not surprising to catch mixed bags of three or four of these species. Not necessarily great in size or numbers, they are the avant-garde of larger schools.

Because of accelerated warming, these first fish enter the bay, where they concentrate in areas readily accessible to anglers. The warming trend, which is governed by geological and meteorological forces, modified by tides and by local geography, ultimately affects the whereabouts of fish within the estuary. Water temperature and water clarity are also influenced by local wind and weather conditions, which can have a more immediate bearing on fishing and fish activity. In and near estuaries, tidal forces create visible current patterns, which aid fish in navigating toward areas of optimum temperature and forage. Unlike "lagoon" estuaries such as Barnegat Bay, Great Bay is completely flushed by tidal action, which is evident by the steep, scoured "sod banks" around most of its perimeter. On the flood, cooler ocean waters pervade the eastern portion of the bay, with the dominant flow through the northern half, eventually focusing on the mouth of the Mullica River. Spring fishing is often best in the vicinity of Graveling Point (including lower sections of the river), and near marsh banks on the south and west sides of the bay, where warmer water is concentrated at high tide. In the southern portion of the bay the warming process is enhanced by the dominance of ebb currents, or river outflow, and by the presence of extensive flats. A major volume of flow is conducted seaward through Grassy Channel. Here, spring fishing is often best on the ebb, as warmer water is drained from the shallows. Best fishing is normally had when the right conditions occur early and late in the day. There is a general tendency for fish to gravitate from faster warming

shallow areas with moderate tidal flow, to sections somewhat deeper or with greater flow, as the season progresses. Optimum temperatures appear to be around 60°F for striped bass, in the upper 60s for fluke and weakfish, and around 70°F for bluefish. The period from mid-April through June usually sees peak activity of these fish within the bay.

Toward late spring the average size of fish in the bay may decline, but often their numbers increase. In the early 1970s, following a substantial increase in the previously sparse weakfish population, small weaks (or "spikes," mostly under two pounds) were abundant in the Great Bay area. This run of fish, possibly spawned in Delaware Bay, peaked in June when bay temperatures were generally around 70°F. Many fish caught during this time were crammed with grass shrimp; thus small, "shad dart" bucktails (1/8 to 1/4 oz.) became very effective lures. Small fluke and bluefish were found in the same areas, around shellfish beds or flats, feeding on grass shrimp. In late spring and summer the art of chumming with grass shrimp, primarily for weakfish or school stripers, has been practiced in this and surrounding bay areas. In subsequent years numbers of weakfish have decreased somewhat, but their average size has increased. Small "snapper" bluefish (averaging less than two pounds) have often been plentiful in late spring, at first mixed with larger blues. Casting surface diving plugs has been productive, particularly on a flooding tide, with these fish chasing anchovies or spearing over shallow flats. Often larger weakfish have been found slightly deeper under the smaller blues. Around mid-June, fluke—beginning with larger fish (about two pounds or greater)—have shown a tendency to move toward sandy bottom nearer the inlets. The area between Seven Islands and the Inland Waterway has been particularly productive. Striped bass, including some larger fish, have been found in or near the channels of the Mullica River or around the sandbars of Little Egg Inlet beginning about mid-May. Here, drifting baits (mackerel strips, worms, or live eels), trolling, or casting plugs in the steeper shoreline sections has been effective.

While these four species have constituted the bulk of the sport fishery in Great Bay, others have been present, some in abundance. Black sea bass and tautog, common bottom-dwellers, have often entered the deeper holes of the bay during spring. Formerly plentiful but now scarce, the northern kingfish often appeared in bank and surf catches near the end of the early spring bass run. In late spring and summer kingfish formed a major portion of boat catches from the



**Bank fishing is often productive in early season.**

bay and lower Mullica River. Similarly the northern puffer (or "blowfish"), plentiful through the 1960s, has been quite uncommon in catches for the past seven years. Alewife herring and shad, ascending the river to spawn, pass through this estuary in spring. Also, the ubiquitous eel lingers on its way to and from the sea. Less-desired species have usually appeared during mid-to late spring. These include small sharks (some not so small) or dogfish, rays, sea robins, and toadfish (or "oyster crackers"). Species that have made rare appearances in spring include those normally ranging farther south, particularly channel bass (or red drum) and black drum. Other warmer water species have often appeared in summer; these include spot (or Lafayette), small amberjack, and needlefish, along with an occasional giant sea turtle. One noteworthy comeback in local waters has been the Atlantic croaker; virtually absent since the 1940s, in the past three years significant numbers of this species have been caught in the bay and adjacent ocean.

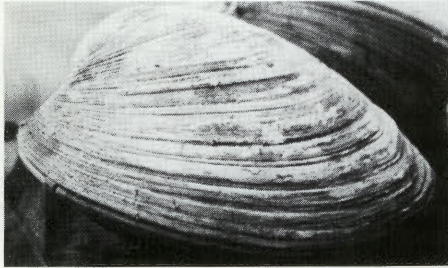
Striped bass which have not traveled farther north are found increasingly in the inlet areas, closer to ocean waters, where temperatures are still in their preferred range. In late May, beginning on or before Memorial Day, a run of larger bass (many over 15 pounds) traditionally occurs, centering on the north side of the inlet complex near Holgate. This run follows the period of spawning of striped bass, and may include fish leaving the Mullica River. Here larger baits, including live eels or species of herring (alewife or mossbunker), become effective. At this time stripers of various sizes are found around all surrounding inlet areas, though the main body of bigger fish in

this region concentrates in the northernmost sector of the New Jersey shore. During this period inlets are particularly productive on evening or early morning high tides, as cooler water is conducted from the ocean. This includes marsh areas adjacent to inlets, where shallow-running plugs or small bucktails cast along steep banks or dropoffs, are effective. Fluke at this time gravitate toward the inlets; here, and along surrounding beachfronts, they are caught until they begin their offshore migration in late summer or early fall. Weakfish are found in channels near the inlets or in deeper sections of the bay or river, where they show a preference for certain baits, especially shedder crab or grass shrimp. Bluefish of snapper size are often dominant, ranging throughout the bay, with schools of larger fish making occasional forays. Thus the transition to summer fishing occurs, when bay temperatures often become too warm, and fish activity increases in cooler ocean waters.

Recently, greater attention has been drawn to Great Bay because of public interest in the surrounding semiwild areas. A major portion of the surface and ground waters of the Pinelands is drained through streams which ultimately enter this estuary. Much of the adjacent wetlands, from the lower Mullica River to the bay, is state-managed for public hunting and fishing. Advancing seaward, the marshes and beaches of Brigantine, Little Beach, and Holgate are all part of the National Wildlife Refuge system. Though in view of both Atlantic City and Long Beach Island, the myriad side channels, flats, and marsh banks of Great Bay afford the boater good fishing that is away from crowds, yet not miles offshore. □

## BAY SHELLFISHERIES

### BIOLOGY AND ECOLOGICAL REQUIREMENTS OF SOME IMPORTANT NEW JERSEY MOLLUSCAN SHELLFISH

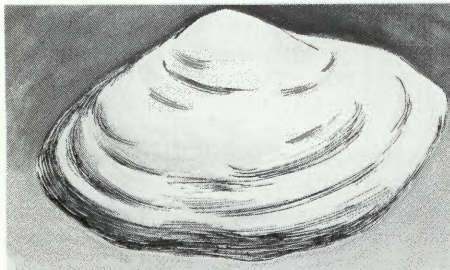


**Hard Clam—*Mercenaria mercenaria***

The hard clam, also known as the quahog and cherrystone, is found throughout New Jersey estuaries where the salinity is regularly above 15 parts per thousand. They occur in all types of bottom from the intertidal zone to depths greater than 30 feet. Hard clams may live to be 20-35 years old, during which time they reach a maximum size of 5-1/2 inches.

Hard clams become sexually mature within one to two years. Spawning occurs in the spring, stimulated by a rise in water temperature. Eggs and sperm are released into the water where fertilization occurs. The fertilized eggs develop into free swimming larvae which drift as plankton with the prevailing currents and wind for about two weeks at which time they settle to the bottom. Initially they attach to a grain of sand by a byssus thread and then burrow into the substrate. Although capable of locomotion throughout life, hard clams do not usually move very far from where they "set."

Hard clams, and most other bivalves, feed by straining plankton and detritus from the water which they draw through their siphons.

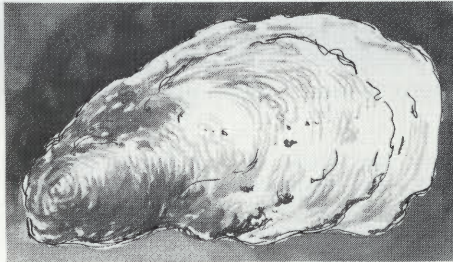


**Soft Clam—*Mya arenaria***

The soft clam is also referred to as the steamer clam and longneck clam. Soft clams can tolerate a salinity as low as five parts per thousand. Although sub-

tidal populations may exist, the major concentrations of soft clams are harvested from water less than five feet in depth. Maximum life expectancy is 13 years, during which time they may attain a size of 6-1/2 inches.

Sexual maturity is reached within the first year. As with other bivalves soft clams commence spawning in response to an increase in water temperature. The larvae develop for two to three weeks and then settle to the bottom. They attach to grains of sand by a byssus thread and eventually borrow into the substrate. By the time a soft clam reaches one inch it has become established in a permanent burrow. Although it is capable of locomotion throughout its life, the ability to burrow decreases with increasing size.

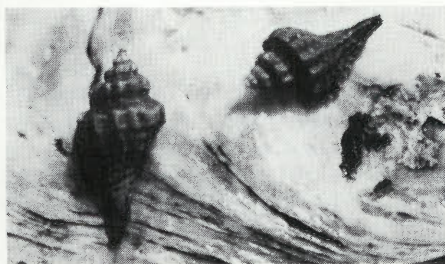


**Oyster—*Crassostrea virginica***

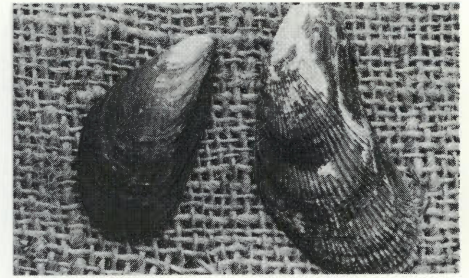
Oysters are found in many New Jersey estuaries from intertidal areas to depths of 40 feet. They can tolerate a relatively wide salinity range of 5-30 parts per thousand.

Oysters reach sexual maturity after the first year. Spawning occurs when the water temperature reaches 24°C. An entire bed of oysters will usually spawn simultaneously. The developing larvae spend approximately two weeks as part of the plankton. Near the end of this period they settle to the bottom and attach themselves to a clean, hard substrate such as shells or other oysters. Once attached the oysters are not capable of locomotion and must remain where they set throughout their entire life.

A firm substrate is necessary for oyster survival. Soft or shifting sediments quickly smother the sessile oyster. The best habitat for oysters consists of a stable, shell bottom.



**Two oyster drills, *Eupleura caudata*, preparing to drill an oyster shell. These small snails are a serious predator of oysters and hard clams.**



**Blue Mussel—*Mytilus edulis***

The blue mussel (on the left) is usually found in the intertidal zone attached to rocks and pilings but is also present on subtidal beds. Maximum life expectancy is six years, during which time they may reach a maximum size of four inches. Blue mussels are able to tolerate a salinity in the range of 9-35 parts per thousand.

Sexual maturity is reached in one year. Fertilization is external. Following several weeks of development the planktonic larvae settle and attach by a byssus thread. After attachment the mussel has no means of locomotion.

The ribbed mussel (on the right), *Geukensia demissa*, is a common resident of marsh sod banks above the low-tide mark. While not often harvested for food, they are often ground up and used for chum for winter flounder.



**Bay Scallop—*Argopecten irradians***

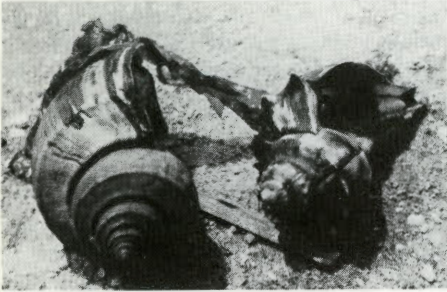
Bay scallops occur in estuarine waters where the salinity ranges between 22 and 30 parts per thousand. A firm substrate located in eelgrass beds is the most desirable habitat. The adults scoop out a shallow depression in the bottom in which they sit.

Unlike most other bivalve molluscs, adult bay scallops have a unique means of location. They are capable of swimming by rapid opening and closing of their valves.

The bay scallop only lives 18-24 months, reaching a maximum size of three inches. As is characteristic of organisms with a short life span, their population numbers fluctuate greatly.

Bay scallops reach sexual maturity within the first year. Spawning and larval development follow a rise in water temperature in the spring. After the planktonic stage the juvenile bay scallops will attach by byssus threads to eelgrass or other submerged vegetation. By attaching off the bottom they are not

as susceptible to the detrimental effect of siltation. After reaching three-quarters to one inch in size they drop to the bottom.

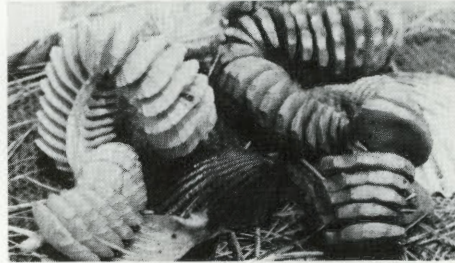


**Conchs—*Busycon carica* and *Busycon canaliculatum***

Two species of "conchs," the knobbed whelk, *Busycon carica* (right) and the channeled whelk, *Busycon canaliculatum* (left), occur in New Jersey estuarine and

nearshore waters. Conchs are snails (gastropods) that feed primarily on clams and oysters.

Conchs are found in all bottom types, usually where bivalve shellfish (oysters, clams, mussels) are present. A relatively long-lived species, conchs reach a maximum size of eight inches.



**Conch Egg Cases**

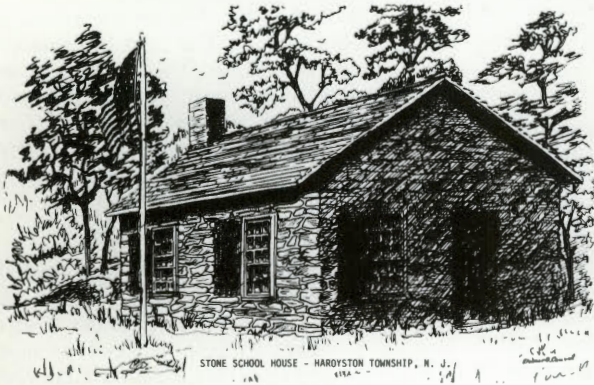
Fertilization is internal. The eggs are contained in capsules approximately an

inch wide. Numerous capsules, each containing several eggs, are connected together to form a segmented strip more than a foot long. The entire strip of capsules is anchored in the bottom to await hatching. The young whelks develop inside the capsule. Once developed, a "trap door" on the capsule opens and the miniature conchs emerge.

**For additional information on Shellfishing in New Jersey contact:**

**Nacote Creek  
Research Laboratory  
Route 9  
Absecon, N.J. 08201  
Telephone: 609-652-7662**

## Stone School Museum



In the November/December 1977 issue we printed an article on The Franklin Mineral Museum "Reflections From a Ghost Mine" by Jim Fitzsimmons. This spring, on May 26th, this area will have another Museum when the Stone School Museum will open. This stone school is over 160 years old (exact date not known). It was used as a school until 1926. The Hardyston Heritage Society received a grant from HUD to restore the building and to purchase additional property for a recreation area and parking.

The museum will open on Sundays 1-4 May thru October and will have tours in conjunction with the Franklin Mineral Museum.

## The Third Battle of Monmouth

The rumble of cannon and the crackle of firelocks, muskets and rifles will be heard again as the 202nd anniversary of the Battle of Monmouth is observed with full pomp and ceremony on Saturday and Sunday, June 28 & 29, 1980 at Monmouth Battlefield State Park in Manalapan Township New Jersey.

The State of New Jersey Department of Environmental Protection, Division of Parks and Forestry has granted, Commander Thaddeus J. l'Saacks, 1st Regt. Monmouth County Militia permission to recreate the Battle of Monmouth including an encampment.

Mr. l'Saacks has stated that some 200 invitations have been sent to Colonial Militia Units. These units are from 26 states and Canada. Some of the units that will participate are as follows:

23rd Regt. of Foot., the Royal Welch Fusilier,  
2nd Pennsylvania Regt., 8th Co. of the 4th  
New York Regt.,  
Cont. Line., Wake Field Co. Mass. 2nd Regt.,  
6th Connecticut Regt., 2nd Georgia Bn.,

Lt. Coy 33rd Regt. of Foot., Corps Fo Light  
Infantry.,  
Light Infantry Co. 2nd Maryland Regt.,  
Deutsch Regt.,  
Dearborn Company of N.H., First Continental  
Regt. of Foot.,  
Delancey's Brigade 1st, 2nd, & 3rd Batt., 1st  
Regt. Monmouth  
County Militia., Donegal Rangers/Capt. Mat-  
thew Smith's Co. of Riflemen., North Carolina  
Highland Regt.

Various activities proposed for that day and the next, Sunday June 29, 1980 are the following: Encampment and Demonstrations, Reenactment Starts at 1:00 PM on the 28th.

Anyone seeking information on any of the events may contact: Thaddeus J. l'Saacks, 247 Iron Ore Rd., Manalapan, N.J. 07726.

Also on Sunday June 29, 1980 will be 13 annual Battle of Monmouth Parade in Historical Freehold, N.J. Starting at 1:00 PM..

## Atlantic Oceanfront

Review, Coastal Planning and Development, Coastal Engineering, Marine Law Enforcement and Administration with offices located in Trenton, Toms River, and Atlantic City.

The reorganization consolidated three different permit offices (Coastal Area Facility Review Act, Riparian Lands Management and Wetlands Management) into one Bureau of Coastal Permit Review, placed into one bureau all coastal planning and development activities, and created a Bureau of Coastal Enforcement and Field Services.

This reorganization is already allowing DEP to process permit applications more thoroughly and efficiently.

These efforts toward permit consolidation and permit simplification must continue. However, the goal of one-stop permitting can be achieved solely through careful work in analyzing the requirements and basis for the permits in the first place, so that the original substantive goals are not lost while a short-term procedural goal of consolidation is being achieved.

The challenge for the next decade is to further institutionalize the regulatory decision making process, by involving local governmental agencies, particularly building inspectors, planning boards, and zoning boards of adjustment, more fully in the state coastal regulatory program, either through improvements in existing informal systems of cooperation or through a more formal collaborative approach through legislative reform.

The established policies used in the regulatory process do now provide an adequate framework for decisions on the location and design of development. This framework for the coast is embodied in the DEP Rules on Coastal Resource and Development Policies, which took effect on September 28, 1978. While the framework is adequate for individual decision-making, broader public understanding and support of the framework will be gained as the spatial implications of the rules are fully presented. For this reason, future efforts to improve regulatory decision-making must heavily emphasize environmental resource data coordination so that adequate mapping efforts can be completed to support more fully the coastal policies.

### COASTAL POLICY FORMULATION PROCESS

Public participation is an established part of coastal decision-making in New Jersey, yet efforts must continue and be expanded, as all areas of government endeavor to involve a wide spectrum of the public in the decisions that effect their daily lives. Public participation is particularly challenging

when the level of civic awareness is so low in our society that the vast majority of citizens do not even know the names of their elected officials. With that perspective in mind, the policy formulation process affecting the oceanfront, barrier island, and back bay regions must continue to recognize the critical role of responsible elected and appointed officials in devising and proposing policies, as well as their responsibility to inform and consult with various elements of the public, from individual citizens and property owners to representatives of national firms and international conglomerates who all have interests in New Jersey's coastal resources.

### PEOPLE AND COASTAL DECISION-MAKING

Procedures for swift coastal decision-making, for making more predictable decisions and reducing administrative discretion while retaining flexibility, do nevertheless require people to make decisions. People with confidence, vision, commitment, and enthusiasm must staff coastal decision-making programs, otherwise the best laid procedures will achieve nothing.

### PUBLIC EDUCATION AND AWARENESS

The long-term key to improved public understanding of the challenges facing the oceanfront, barrier island, and back bay region must be improved education, from the lowest grade levels of elementary school, throughout the lives of our citizens. For example, most visitors to Ocean City, Maryland, would not realize that the inlet at the south end of the island was created only in the 1930s. In New Jersey, the signs of the 1962 cuts in Long Beach Island created as a result of that year's storm are only visible now to very knowledgeable observers. Yet such events will recur and will shape strongly the patterns of development and use of coastal resources. Memories become dim and short as individuals forget the fury of the sea and ignore the effects of other disturbances of the natural environment. Public education is the key to explain to us all what will happen, based on scientific knowledge, if man takes certain actions to interfere with the natural environment of the coast.

### FILLING IN THE COASTAL FRAMEWORK

New Jersey's now federally approved coastal management program for the Bay and Ocean Shore Region represents a critical substantive and procedural framework for coastal decision-making for the Atlantic oceanfront, barrier island, and back bay region. More details are needed to make this framework work more smoothly. A fuller understanding is required of the implications of the policies. Greater state and local consistency is required. Further efforts must be made to promote appropriate uses of coastal resources, to pre-

serve our agricultural resources and our historical heritage.

Further investigation must take place on the proper scale for decision-making, involving federal, state, regional, and local interests. Some governmental agencies should override the decisions of other governmental agencies, but reform of land use and natural resource management decision-making will be needed in order to increase the role of better equipped local government. A collaborative state-local approach may be appropriate. The regulatory loophole allowing the building of 25 dwelling units before a CAFRA permit is required must be plugged, using a cooperative approach involving, state, county, and municipal government before seeking new legislation.

Considerable work must take place in order to cope with the challenges of casino development in Atlantic City region.

While new natural dunes exist today in New Jersey's coastal zone, those few dunes require or should benefit from protective dune management legislation.

In brief, while the framework exists, it must be fleshed out. The lines of development have been drawn; they must now be implemented. The coast, the natural and human resources of the coast, must be conserved while at the same time meeting the needs of residents, visitors, and workers of this coast.

### CONCLUSION

The management of New Jersey's coastal resources has been greatly improved in recent years. Some results are visible, others less so. Townhouses have been built on sites originally proposed for 20-story high-rise developments, yet only the knowledgeable observer recognizes the effects of state coastal management efforts. Many of the chances for striking, visible change in New Jersey's coastal zone have been lost or must await the next natural disaster. In the interim, the challenge is to hold the line while making the small incremental steps that will improve the full range of coastal resources for this and future generations.

### REFERENCES

- New Jersey Beach Access Study Commission, *Public Access to the Oceanfront Beaches: A Report to the Governor and Legislature* (Trenton, N.J.: State House, April 1977)
- New Jersey Department of Environmental Protection: *State of New Jersey Coastal Management Program—Bay and Ocean Shore Segment and Final Environmental Impact Statement* (Trenton, N.J.: New Jersey Department of Environmental Protection, August 1978)
- Rivkin Associates, Inc., *Guiding the Coastal Area of New Jersey: The Basis and Background for Interim Land Use and Density Guidelines* (Washington, D.C.: Rivkin Associates, May 1976) □

# SUMMER COLLEGE COURSES IN MARINE SCIENCE

The New Jersey Marine Sciences Consortium will conduct college-level courses in the marine sciences at its two field stations this summer. Graduate and undergraduate credit can be earned by taking courses at the Consortium's Sandy Hook and Seaville Field Stations.

**Among the courses being offered are:**

- Introduction to Marine Sciences
- Introduction to Marine Biology
- Marine Botany
- Marine Invertebrates
- Biology of Marine Fishes
- Seashore Ornithology
- Marine Geology
- Scientific Photography
- Basic SCUBA

The Sandy Hook Station will also offer four non-credit courses and the Seaville Station will offer three evening courses for college credit.

The Sandy Hook facility is located on The Gateway National Recreation area, Sandy Hook, New Jersey, and the Seaville facility is near Ocean City, New Jersey. Both facilities have food and dormitory housing available.

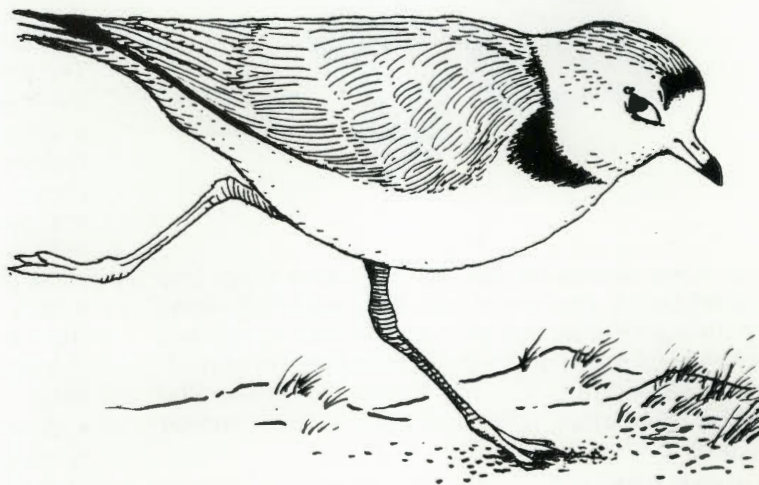
**For more information contact:**

Joan Sheridan  
NJMSC  
Building #22  
Fort Hancock, New Jersey 07732  
(201) 872-1300

OR

Thomas Farrell  
NJMSC  
P.O. Box 421  
Marmora, New Jersey 08223  
(609) 398-4000

# WANTED



## Information on the Whereabouts of the Elusive PIPING PLOVER\*

The Wetlands Institute, under contract to the N.J. Division of Fish, Game and Wildlife, will be conducting a survey during the Spring of 1980 to determine the state-wide breeding status of the piping plover, *Charadrius melodus*. Any sightings or information on nesting locations, current or historical, would be appreciated.

Send all information to: Anne Galli, Wetlands Institute, Box 398, Stone Harbor, N.J. 08247, (609) 368-1211

\*—uncommon; on the drier portions of sandy beaches. Note the pale back, single (usually partial) neck band, yellow legs and feet. Length —5-1/2"

## A PREVUE OF THE JULY/AUGUST ISSUE

**More on our New Jersey coastal resource . . .**

- Lobstering in New Jersey
- New Jersey Offshore
- Belting the Blues
- Oyster Chucking
- Cleaning and Preserving Fish

**Also . . .**

- Inner City Children in the Out-of-Doors
- Recycling in New Jersey
- Carnivorous Plants of the Pine Barrens
- Hail the Red Baron
- Pine Barrens Wildflower Pictorial
- And more

## Take a Walk



near the Point during the height of the migration, you can lean against a tree and watch sharp-shinned hawks wafting through the woods bent on the attack, kill, and consumption of some of the songbirds that are migrating at the same time. And the Point is where to find Cape May diamonds, little rounded stones, mostly cloudy quartz.

### DELAWARE BAY

On the Bay side of the State lies a whole section of tidewater country that few visit, an area lying in a sort of cul-de-sac north of Cape May ferry terminal and south of the Delaware Memorial Bridge. This bayshore is dominated by broad tidal marshes cut by winding rivers like the Cohansey and the Maurice, and dotted with unlikely named towns: Bivalve, Shellpile, Othello, Shiloh, and on up to Greenwich (pronounced Green-Witch or Gren Witch, depending on your source). Port Norris here is the oyster port for New Jersey; you can buy a bushel of oysters or a quart or two of meats. This is where the State's salt hay production is concentrated in diked fields. Muskrats live here and the hay (*Spartina patens*) lies close to the ground in huge cowlicks. This is mosquito country supreme, a fact that may help keep population pressure down and the land unspoiled.

New Jersey's coast goes on up the Delaware River to the tideline at Trenton, but north and south of Camden things are pretty grim. One should recall, however, that beneath that brownish, oil-slicked water, shad still make their way up to Port Jarvis and beyond to spawn,

and that shad juveniles will make it down the Delaware to the sea in the fall. The lower Delaware is also a major wintering ground for ruddy ducks, and golden and bald eagles feed along the low marshy fringes.

\* \* \* \* \*

These, then, are New Jersey coastal spots, worth a walk, a look-see. And when you are walking, or wading, or swimming, or getting there to do one of the above be on the look-out for:

- Diamondback terrapins, a salt marsh turtle about the size of a small dinner plate. Terrapins winter in the mud and dig out to feed, fatten, and breed in early summer. Terrapins are likely to walk across coastal highways on their way to lay eggs. Don't squash them.
- Want to watch boats offload? The best ports are Belford on Raritan Bay, Point Pleasant Beach at the mouth of the Manasquan River, and Cape May, right in the Harbor. Or, you can get down to the docks about 4:30 in the afternoon and watch the party boats come in, and you can buy fish from the fishermen or the boat's mates. Best places are Atlantic Highlands, Belmar on the Shark River, Point Pleasant Beach, Barnegat Light, Atlantic City, Sea Isle City, and Cape May.
- Go crabbing. Catch the nasty blueclaw crab, eternally pugnacious, totally delicious. Just drive around shore towns until you see a sign that says "CRAB-BING." Rent a boat, get some handlines, fish heads or chicken necks, and net, and a basket, and have at it. And throw back the females if they have eggs. They are the reddish spongy things on the crab's underside.
- Visit the night fishing fraternity at the Long Branch Fishing Pier. Pick a cold night in December, walk out on the pier (it's free if you're not fishing). There are these people out there, dressed in snowmobile suits, drinking wine, grunting and mumbling while they catch whiting and ling. It's weird.
- Another kind of crabbing. Walk along the high-tide line of a beach after dark with a good flashlight, and search for ghost crabs, small, all-white crabs that dig holes and stay out of the sun and then come out at night to scavenge.

The New Jersey coast is unabashedly walkable, ready to reward anyone willing to get up early in the morning, get out of the car, and wander off the usual track. You'll leave some tracks in the sand, but the tide will come and wash them away, and the person coming after you will have it fresh again. Go at it. □

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### FRONT COVER

Barnegat Lighthouse—Photographed by David Campione

### INSIDE BACK COVER

Woodchucks—Illustration by Carol Decker (See article on page 14.)

### BACK COVER

Little Angler—Photographed by Dr. E. R. Degginger, FPSA



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