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New Jersey OUTDOORS



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INVESTMENT IN NEW JERSEY'S
NATURAL RESOURCES
(A Center Spread Snapout)

- Water Supply Bond Issue
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From The Editor

NATURAL RESOURCE EDUCATION

Although I'm writing this editorial in the middle days of July, it's about several educational articles that are appropriate for this issue which will be delivered to your house about the same time that the new school year starts.

Science educator Steve Zipko, a dedicated environmental education teacher and a frequent contributor to *New Jersey Outdoors*, writes about the *Study of Owl Pellets: A Motivational Technique in Environmental Education*. This article is a must for educators interested in incorporating environmental science courses into the basic-skills curriculum.

A new author, Richard W. Zimmermann, Jr., says "the staff at Haddonfield School District has given environmental studies a priority status at all levels" in this decade. His article, *Haddonfield Develops Environmental Education for the 80s* discusses this

commitment.

Still another educational piece was provided by Charles C. Drawbaugh, Rutgers University professor of agricultural education, and Roger R. Locandro, Associate Dean of Student Services at Cook College. The article discusses a study by DEP's Division of Fish, Game, and Wildlife, in cooperation with Rutgers University, which attempted to evaluate the effectiveness of the Hunter Education Program. The article is titled, *Hunter Education . . . Does It Work?*

New Jersey Outdoors has always been interested in providing our readers with natural resource educational articles. Because our readers are interested in outdoor recreation and natural resources, we feel they are especially interested in environmental education studies which discuss, among other things, the impact of human activities on our ecosystems.

In this issue:

We open with an article entitled *New Jersey's Rivers . . . A Recreational Resource*. In it, writer/photographer Curt A. Gellerman classifies our state's rivers according to the New Jersey Wild and Scenic Rivers Act of 1977.

Next is a pictorial spread on *N.J. Zoos*, featuring Great Adventure Safari Park in Jackson and Space Farms Zoo in Beemerville. The photos are by Jeanne Quinn.

Tornados in New Jersey? is the title of an article written by David W. Letcher, an associate professor of physics at Trenton State College. It's also the response most New Jersey residents would give when told that more than 44 tornados have swept through parts of our state in the last 30 years, as Letcher's carefully compiled data shows. Photos for this article were provided by Fred Space of Space Farms.

Photographer Pat Boffo caught the spirit of Conservation and Recreation Day. It's an annual event presented by the English Setter Club of America, this year commemorating its 75th Anniversary.

DEP Does It in the Pines is a pictorial story about the first annual Department of Environmental Protection canoe trip, which turned out to be quite an adventure!

In time for the fall migration, Ruth Clark writes *A Sybarite's Guide to Hawkwatching*. Just the thing for all of us who enjoy birdwatching, but would rather have the birds come to us than to have to go traipsing all over the countryside ourselves. The illustration is by Tony Hillman.

For our *Wildlife in New Jersey* series, author Barbara Ford sent us an excerpt from her book *Alligators, Raccoons, and Other Survivors* (publ. by William Morrow). Carol Decker's illustration, *Canada Geese*, on the inside back cover introduces one of the New Jersey species that Ms. Ford discusses in her article.

Donald Knezick, a tree-improvement forester with the New Jersey Bureau of Forestry at Lebanon State Forest, tells of a project there to combine the good form and fast growth of a loblolly pine with the ability of our native pitch pine to grow on less fertile sites. He calls his article *Super Trees Invade New Jersey* and he provided the photographs as well.

The front cover, *Operation Greendike*, introduces an article by the same name. Writer Deborah A. Boerner presents some background information as to why Boy Scout Troop 10 of Makefield, Pa. (and others) participate in the dune grass planting every year on the Long

Beach Island dunes. Photographer Chip Hoever captured the event last October, including the picture of young scout Rick Amadio on the cover.

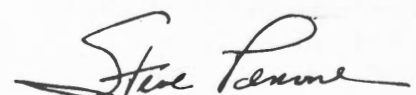
The Carranza Memorial Ceremony, which takes place every year at the Carranza Memorial in the Pine Barrens, is always a colorful affair. Carol Nash's photos of this year's event verify this.

In his story, *116-Year-Old Perch*, Wayne Heinze informs us that New Jersey holds the oldest freshwater fish record in the world, a yellow perch dating back to 1865. The ancient fish is illustrated by Tony Hillman.

And if you don't believe Mr. Heinze, just turn the page to the *N.J. Record Fish List*. You'll see the 116-year-old perch recorded along with more recent record catches. This spread was put together by Deborah Boerner.

Doris W. Pelosi, in *Spice to Life at 60 Plus*, will delight you with the adventures she took up after she reached the age of 60. Tony Hillman illustrates those adventures.

A new author, Emil F. Williams, takes us on a canoe trip in south Jersey in his article, *Short Weekend on the Great Egg Harbor River*. The photographs are his, too.



New Jersey's Rivers...

a recreational resource

BY CURT A. GELLERMAN

Most people would like to live in an area with half its land remaining undeveloped, a state with vast forests, extensive farmlands, and beautiful rivers, rich in the history of America's heritage and at the same time, close to city life, with all its cultural advantages. If you're a New Jersey state resident you already do! New Jersey!! Look before you laugh. It's those who only drive through, who make up the jokes and perceive our state as a knotted ribbon of highways and industrialization. Our unique status as the nation's most densely populated state has resulted in intense competition between land and water uses for certain natural resources. Many of these conflicting demands involving land and river uses can be accommodated in harmony or by compromise. Outstanding natural, cultural, and recreational qualities of a river can often be preserved and protected while successfully blending in certain types of development and water uses. The water from our rivers can often be used for household consumption, agricultural practices, and industry without detracting from the use of these rivers for recreational purposes.

Rivers have always been highly regarded as prime recreation resources for boating, fishing, swimming, hiking, picnicking, and hunting—and these are just a few of the activities that take place along a river. The history of our state has centered around rivers for transportation, power, and drinking water. To ensure the protection and

management of the natural, historical and cultural resources of state rivers and their adjacent lands, in 1977 we welcomed the passage of the New Jersey Wild and Scenic Rivers Act. Modeled after the National Wild and Scenic Rivers System, the 1977 Act called for the development of a state rivers system. The Department of Environmental Protection was assigned the responsibility for the state river system's development. Four categories of river experiences and related policies for their preservation have been defined.

Wild River Areas have insignificant or fading evidence of human activity. They are generally inaccessible, except by trail or canoe, and have primitive shorelines and unpolluted water. Contrary to popular belief several "wilderness" areas do exist in New Jersey. One such river experience can be enjoyed by paddling the 12-mile segment of the Mullica River known as the Lower Atsion branch.

As called for by the Wild and Scenic Rivers Act, the Lower Atsion will become the first river to be included into the system. Located entirely within the Pinelands National Reserve and Wharton State Forest, this section of river has very little evidence of human presence. After starting the trip at Atsion Lake on Route 206, development is left behind while entering extensive pine, oak, and cedar forests. Because it's a very narrow stream at the start, beginners often kiss bushes around its many sharp and meandering curves. There may be a fallen tree or two to carry the boat around, but this provides a good opportunity to examine one of the many varieties of orchids growing in the area. One may even see fascinating carnivorous plants, such as the pitcher plant or the more common sundew. The acidic water is stained the color of tea from the surrounding bogs; it remains pure, however, and is especially refreshing on a hot summer day. On this river you need not limit your activities to summer alone, as it remains free flowing even in the coldest winter months. An enjoyable two-day adventure can be planned, with camping at the wilderness campsite about halfway down the stretch. Motorized vehicles are not permitted in the campsite, so there will only be hikers, canoeists, and the occasional horseback rider. The bridge at Route 542 marks the end of the wilderness experience and within easy

walking distance is the restored pre-colonial village at Batsto, once the site of a thriving bog iron industry.

The Pine Barrens region also offers the Oswego and Batsto rivers with their interesting flora and fauna and the many historic sites located throughout the area. In northern New Jersey, there remain two rivers with wild characteristics, the Flat Brook and the Walkkill Rivers, both of which flow through extensive wooded areas.

The Delaware River is probably the most well known and popular river in the state. Large segments of the Delaware have been identified as **Scenic River Areas**, which means that these sections are free flowing without obtrusive impoundments and diversions, but accessible in places by paved roadways. An example of such a segment is the area between the Delaware Water Gap and Route 95. The alternating stretches of rapids and large pools along this segment's wooded shorelines make for an outstanding variety of recreational opportunities including fishing, whitewater canoeing, swimming, powerboating, water skiing, and camping. The Delaware Water Gap, splitting the Kittatinny Ridge, is one of the Delaware's most impressive natural features. Despite its close proximity to the New York City-Philadelphia urban corridor, this area and much of the river have amazingly remained free from industrialization and development. Among other historic sites the Delaware River boasts of the adjacent "22-mile feeder" of the historic Delaware and Raritan Canal, first opened in 1834 for freight transportation purposes. The canal, which is being developed into a linear state park featuring biking, canoeing, hiking, and horseback riding, serves as an important source for water supply.

A lesser-known scenic river area, abounding with pastoral charm, is the Paulins Kill, located in Sussex and Warren counties. Flowing mostly through farmlands, it parallels the picturesque Kittatinny Mountains. Sections of the Paulins Kill can be cruised during most of the year, but long continuous cruises must be confined to the spring or after heavy rains. Occasional heavy rapids require scouting or portaging to ensure the safety of the canoeist; one such rapid can be found at an unrestored historic colonial village at Marksboro. Fishing for trout in the stocked waters is the most popular



PHOTO BY AUTHOR

South of Stillwater, Sussex County, the Paulins Kill meanders through pastoral farmlands.



PHOTO BY AUTHOR

An experienced solo canoeist attempts a series of rapids below Belvidere, just north of the Pennsylvania Power and Light Company access area at Martins Creek, PA.



Paddling against the current on Cedar Creek from the Route 9 bridge.

PHOTO BY AUTHOR

recreational activity on the Paulins Kill.

The upper Passaic River and the South Branch of the Raritan River are other rivers in North Jersey that have scenic qualities; each has a hemlock-lined ravine with fast-flowing water. Cohansey Creek and a tidal portion of the Mullica River are two scenic rivers in South Jersey meandering through saltmarshes that provide excellent waterbird habitats.

Rivers considered for the system need not remain completely natural; often, rivers flowing through suburban or even industrial settings can provide enjoyable recreation. **Recreational**

Continued on page 30

Great Adventure Safari Park ■ N.J.

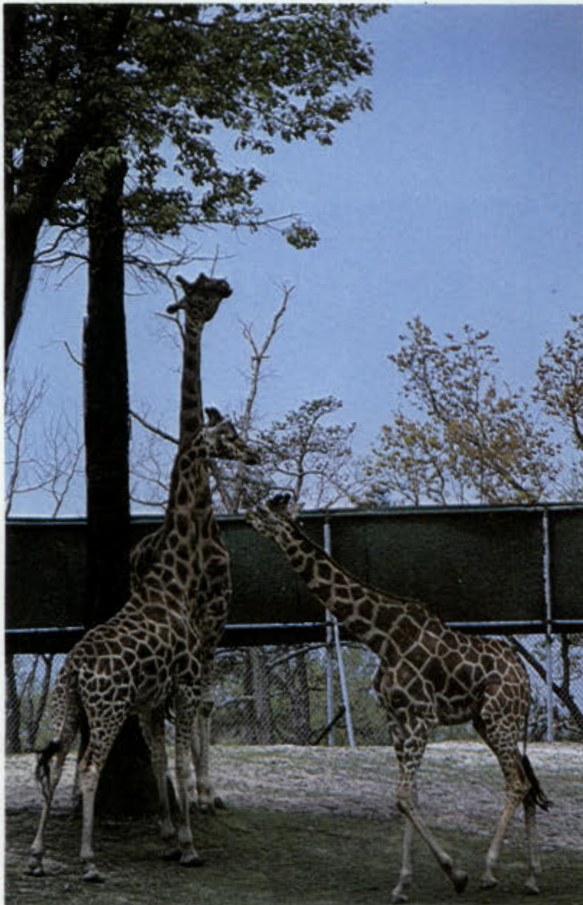
Great Adventure in Jackson, N.J. boasts "the world's largest drive-thru safari outside of Africa itself". It covers 450 acres and is six miles of driving that would take a 25,000 mile journey around the world if you were to see all the animals in their native habitats. The safari takes you to most continents, including Australia; this is the first time Australia has been represented in a drive-through safari. Other sections include the American Plains, the African Veldt, the Serengeti Plains, a Mediterranean Reserve, and a bird sanctuary. There are also special sections for African lions, Siberian tigers, leopards, American black bears, European brown bears, and baboons. The animals are abundant and easily visible from your car. The safari is open daily from 9 A.M. to 5 P.M.



The rhinos at Great Adventure Park know when it's time for a good meal.



A group of American bison roam the "plains" of Jackson, New Jersey.



Giraffes find the leaves at Great Adventure Safari Park very palatable. The trees are easy for them to reach, since a giraffe can attain a height of 19 feet and has an 18-inch-long tongue.



The photographer acknowledged this zebra's request and snapped her good side.

ZOOS ■ Space Farms Zoo

Space Farms Zoo is the largest private collection of North American wild animals and species from around the world. There are over 500 birds, mammals, and reptiles of more than 100 species within this 50-acre preserve located in Beemerville (Sussex County). Along with the Early American Museum and the Old Car and Carriage Museum, the zoo is owned and operated by three generations of Spaces—Ralph, Fred, and Eric. Established in 1927, the zoo started out as a small collection of animals which were mostly native to the area. Fifty years of capturing and raising wild animals from all over North America and even the world has given the Space family a fair amount of expertise in feeding and caring for the animals. Recent expeditions have taken Fred Space on safaris anywhere from the Alaskan tundra to the Florida Everglades. The entire Space family is dedicated to the conservation of wildlife as well as the preservation of the American heritage, and this is exemplified by their work at the Space Farm Zoo and Museum. Space Farm is open daily 9 A.M. to 6 P.M. from May 1 to October 31.



A coyote stalks his area of the 50-acre Space Farm Zoological Park.



These mountain lions respond to the attention given them by Fred Space.



Fred Space shows off an Alaskan Brown Bear, which he claims to be the largest brown bear in captivity.



A gray fox, a native species of New Jersey, finds Space Farm Zoo very comfortable.



Owner Ralph Space looks on as workmen remove a section of roof 50 feet from its original position (Tornado date: Sept. 2, 1980)

TORNADOES IN NEW JERSEY?

DAVID W. LETCHER

PHOTOS BY
PAGANO & CONKLIN
SUPPLIED BY FRED SPACE FARMS

Thoughts about tornadoes usually bring to mind scenes of the American Midwest, with farm families running to a cyclone cellar in the face of an onrushing funnel cloud, or even the "Wizard of Oz" and the Wicked Witch of the West. A remark such as, "You can't be serious about tornadoes in New Jersey, can you?" is a typical response in New Jersey. Compared to the weather in our na-

tion's mid section, ours is much less severe. Yet we usually record one to two tornadoes each year somewhere in our state. Sometimes it is a small twister that sweeps across a field and causes little or no damage. Others are larger and may cause numerous injuries or even death as the one in Gloucester County did on August 25, 1941.

What is a Tornado?

A tornado means many things to many people throughout our country. It is not always called by the same name. Newspapers are fond of the term "twister," while people in the Midwest call them "cyclones." I shall define our subject just as it is described by the U.S. Department of Commerce's National Severe Storms Forecast Center in Kansas City, Missouri:

A violently rotating column of air, pendent from a cumulo-nimbus cloud and nearly always observable as a "funnel cloud" or tuba. The shape of the funnel cloud may range from a "rope" to a "cone" shape with the lower end usually touching the ground.

A tornado's circulation may be on the ground without visible (cloud) connection between the ground and the funnel.

However you define or describe it, anybody who has seen a tornado knows exactly what it is!

New Jersey Tornadoes

Through the kind assistance of the staff at the National Severe Storms Forecast Center, I have obtained a listing of all the New Jersey tornadoes and tornado-like weather recorded between 1950 and 1978. Before 1950 the only records are of two "killer" tornadoes, one in Warren County in 1929 and one in Gloucester County; each was responsible for one death. These listings are from a computerized bank of data that describe routine information such as time, date, and location of the event and many physical details like path length, visual descriptions, fatalities, and storm intensities.

I have condensed and tabulated some of this information to reveal

some interesting facts about our New Jersey weather. Many of you probably know about tornadoes, or tornado-like weather, that is not officially recorded. My hope is that you will convey to me your own first hand experiences in such weather so that I can include it in a much larger report.

A Survey of the NSSFC Data

How many tornadoes have occurred each year? What months show the highest frequency? At what time of day are they likely to occur? How far do they move along the ground? Where in New Jersey do they occur and how much damage and injury do they cause? The answers to these questions can be found in the tables I have included in the remainder of this article. Table 1 lists the number reported for each year included in the computer data bank.

Table 1

Year	No. of Tornadoes
1929	1 (killer)
1941	1 (killer)
1951	1
1952	2
1955	1
1956	4
1957	1
1958	3
1960	5
1962	3
1964	2
1967	1
1970	2
1971	3
1973	8
1974	2
1975	3
1976	1
1977	2
1978	0
Total	46

A total of 44 tornadoes occurred from 1951 to 1978, an average of 1½ per year. In 1960, there were five, and in 1973, eight! Most years show either zero, one, two or three.

During any given year, the likelihood of a tornado occurring is the highest during the warmer months of the year. This is equally true in such states as Kansas and Nebraska. Table 2 shows this to be essentially the story for New Jersey too. More tornadoes occur in July than in any other month.

Table 2

Month	No. of Tornadoes
January	0
February	3
March	2
April k	6
May	4
June	5
July	13
August k	5
September	2
October	2
November	4
December	0
Total	46

Yet the spread across the year is quite wide. From 1951 to 1978, and including the two "killers," February saw three tornadoes, and November saw four. The small "k" in April and August label the 1929 and 1941 killers. So, we can probably expect a tornado to occur in any month except December and January. Twenty-nine out of the forty-six, or 63%, occurred during the months of May to September.

Now, if most twisters occur during the warmer months of the year, at what time of the day should one expect a funnel or at least tornado-like weather?

Before I describe the results of Table 3, you have to realize that NSSFC tabulates the storms in terms of sequences or segments. That is, the same tornado may touch down in one locale, lift off, and reappear a short distance away. Thus the 46 events provided to me, resulted in 54 segments. Table 3 lists the hours of the day and number of segments that have occurred during that hour (a twister that occurred at 2:35 p.m. would be included under 1400 hours military time).

Table 3

Hour of Day (local time)	Number of Occurrences
0100	1
0200	1
0300	0
0400	0
0500	0
0600	1
0700	0
0800	0
0900	3
1000	1
1100	4
1200 (noon)	0
1300	5 ^k
1400	2
1500	9 ^k
1600	6
1700	7
1800	3
1900	4
2000	2
2100	4
2200	0
2300	0
2400 (midnight)	1
54 segments	

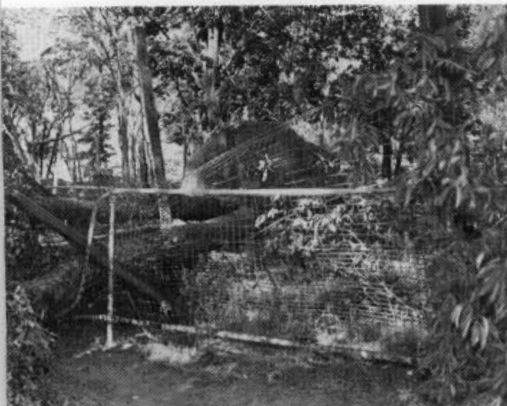
As expected, most of our tornadoes have occurred in the warmer hours of the day. Three o'clock is the commonest time. Notable exceptions are there to see, however. We have had them at midnight and at one or two o'clock a.m. The two killers struck at one and at three p.m., respectively.

Once the funnel has touched down, how far can we expect it to travel along the earth? The computer data include path lengths for all but four segments. (As you may expect, these types of events are rare and they happen very fast; obtaining a complete set of information is difficult at best.) Known path lengths are listed in Table 4.

Table 4

Path Length, Statute Miles	Number of Occurrences (segments)
0-0.5	17
0.6-1.0	5
1.1-1.5	3
1.6-2.0	5
2.1-2.5	1
2.6-3.0	3
3.1-3.5	0
3.6-4.0	0
4.1-4.5	1
4.6-5.0	2
5.1-5.5	1
5.6-6.0	1
greater than 10	11
missing values	4
54	

Continued on page 26



Damage to wolf pen



Mr Soucy shows off "Lady", the barn owl (*Tyto alba*) that he raised from an egg.

STUDY OF OWL PELLETS:

A Motivational Technique in Environmental Education

STEPHEN J. ZIPKO

"How much does your pellet weigh? ... Are you finished taking yours apart yet? ... I found two shrew skulls and six ribs in mine ... Jack found a lower jaw, two upper arm bones and a pelvis in his!"

Such exuberance is music to a science educator's ears. This is especially true when the subject being investigated is considered repugnant by most people. Students of every age should be exposed to such study to help rid our society of the "ugh" complex which pervades our thinking toward some animals.

There is another reason for studying owl pellets. As I have stated in previous *New Jersey Outdoors* articles, one is hard put to find examples of active environmental instruction in our state these days. This can be partially attributed to reactions of teachers to "basic-skills" pressure. Many teachers who exemplified the "let's try something new" attitude of the 1960s have retreated back to their classrooms. They are now teaching from textbooks which have been modified to stress reading and math. Along with this has developed a declining attitude toward science instruction by the public for budgetary reasons.

My contention is simple. Society will suffer so long as other disciplines, including environmental education, are not given their due attention by the public and the schools. The need for such education is acute as more people who become interested in outdoor recreation don't realize the dangers of human pressure on ecosystems.

There is no reason why science, particularly environmental science,

cannot be incorporated into the basic-skills curriculum. True, money is tight. But this fact just mandates more creative innovative ideas by educators—ideas designed to motivate as well as educate, and at a sensible cost. I'm not advocating that teachers abandon their classrooms; nor should they and their students remain jailed within them.

Seventh-graders in my classes at Randolph Intermediate School have always successfully bridged the supposed gap separating environmental education and the basic skills. One way they have done this is through a study of owl pellets combining the elements of field trips, guest speakers, live animals, measurement and dissection of pellets in the classroom, anatomical instruction about and reconstruction of the pellet contents, ecological concepts

of food webs and carrying capacity, and submission of written reports of the results.

This type of investigation is perfect during the winter months when pellets are abundant and easier to locate. It's also an excellent example of the various advantages to be found in multidisciplinary instruction. During the study, youngsters are expected to demonstrate different levels of proficiency in ecology, English, writing, math, anatomy, and art.

The pellet study is divided into three phases: the guest speaker, pellet dissection, and pellet analysis.

Guest Speaker

Leonard Soucy, former head of the New Jersey Raptor Association, operates a bird rehabilitation center for injured hawks and owls at his home near Great Swamp Refuge. I take student volunteers, parent chaperones, and members of the New Jersey Audubon Society there on a Saturday morning, usually in late fall.

During a three-hour session, Soucy explains the biology and ecology of raptors, using the convalescing birds to illustrate his points. Prior to the trip, students are given a worksheet with several questions (see Figure 1). This helps them to better focus their note-taking toward questions while they listen more effectively to him. They are allowed to ask him questions, but not those on the worksheet. He is

OWLS AND THEIR PELLETS

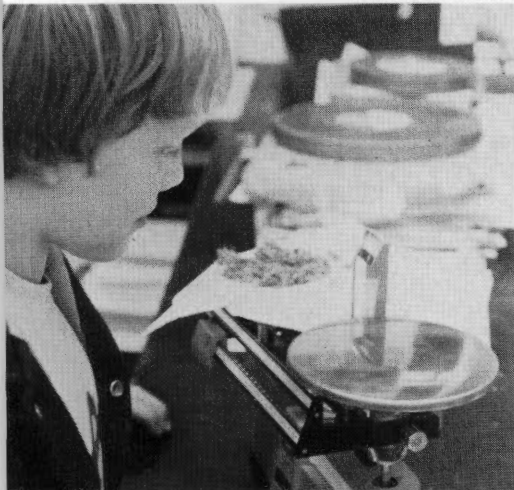
1. State three adaptations all owls have for efficient predation.
2. Explain how the facial disc of a Barn Owl functions.
3. What is a pellet and how is it formed? Why is it formed?
4. How is the owl eye structured to enable such extreme sensitivity to low light?
5. What other types of birds also form pellets? Why don't most birds do it?
6. Where do owls nest? How many eggs do they lay? Why do they nest so early in the year?
7. Why are owl pellets analyzed?
8. What relationship is there between the size of an owl and the size of its pellets? Explain your answer.
9. What animal remains may be found in Barn Owl pellets in winter? spring? summer? fall?
10. How does pellet production aid owl survival?
11. What do pellets tell us about owl populations? about prey populations?
12. Why are so many leg bones found in pellets and so few skulls?
13. What adaptations would a predator of owls require to hunt and catch them?
14. Give examples from ancient history in which owls were looked upon as gods.
15. How did the modern idea of owls as symbols of wisdom develop?
16. What do many humans find so "cute" about owls? Why do other humans feel that they have to exterminate them?
17. Of what benefit are owls to us?

Figure 1—Worksheet provided for students hearing guest speaker's talk.



Pellets are first soaked in warm water; then fingers or forceps tease their contents apart.

PHOTOS BY AUTHOR



After separation of bones from fur according to prey species, each is weighed to establish relative proportions.

sent a copy of this before the trip to allow him to make certain those questions are covered. This likewise gives him an idea of how complex he should make the talk. Notice that the questions cover everything from our love affair with owl life and lore, to their adaptations for survival, to their unnatural history at the mercy of thoughtless humans.

Soucy excels at all these aspects in his talk, but he is unfortunately most familiar with the last one. For years he has responded to reports of raptors shot through the wing or eye, found in traps, or suffering injuries not caused by humans. He travels great distances to rescue these animals, and is federally licensed to band birds of prey. His back yard is

a maze of wooden cages and enclosures the size of human bedrooms to house the birds. At any given time, these animals may include American Kestrels, Saw-whet Owls, Screech Owls, Red-tailed Hawks, Great Horned Owls, Barred Owls, and Barn Owls. The Great Horned Owl is especially fascinating to youngsters owing to its size, large talons and its yellow eyes.

Since most raptors require living or recently killed food, Soucy requires a constant supply of mice and rats. The funds to operate the program come entirely from public donations. He will gladly come to your school or nature center with slides and live animals, or welcome your group to his home. He accepts no payment, but requests a donation payable to the New Jersey Raptor Association to maintain its bird rehabilitation efforts. You can contact him at (201) 647-2353.

Shortly after our visit to his home, Soucy presents his talk for my classes. The talk is illustrated with slides and whatever animals he feels are able to travel. To our school he usually brings a Barn Owl and Red-tailed Hawk. But in this talk he emphasizes owl pellets—how and why they are formed, the factors affecting the rate of their formation and what scientists can infer through careful scrutiny of them.

What are pellets and how are they formed? Birds of prey generally must regurgitate the indigestible remnants of their food. These include bones, hair, feathers and teeth. Their stomach muscles are so weak that they can't crush even fragile ribs.

Owls and other raptors, therefore, swallow their food whole if it is small enough. A pellet forms seven hours later. Generally, larger owls form larger pellets. Two pellets are formed each day. Barn Owl pellets are the easiest to find by searching around open barns or on the ground beneath trees known to harbor roosting owls. These birds prefer to roost in stands of evergreens that are isolated within a larger hardwood forest or that are near an open field. Other owls are known to roost (and drop pellets) in nest boxes you may provide.

Len Soucy will provide Barn Owl pellets for your class if requested. It is much more fun, however, to take

students outdoors to collect their own. An especially good time for this is during your stay at Soucy's home. With enough advance notice, he could scout the woodlands adjacent to Great Swamp for pellets before your group arrives. Less time would be wasted (especially in the cold of winter) by students searching in vain for pellets. They, not he, would do the collecting, but in a general area where he knows that pellets exist.

Pellet Dissection

During his all-day school visit, Soucy helps me get the youngsters over the psychological hurdles of opening pellets. And quite a hurdle it is! We provide dishes of warm water for students to soak and soften their pellets sufficiently before tearing apart by hand. They then must separate hair or feathers from bones with forceps or by hand. Each person either works alone or with a partner, depending on pellet availability and class size. Every bone fragment is separated and placed in one dry dish while the fur or feathers remain in the other.

Pellet Analysis

Pupils now weigh the dishes of fur and bones separately. This is done to determine the percentages of each substance per pellet and for all pellets in the class. It is also a good exercise in applying math and science skills.

After this the bones are sorted, identified, and counted as per skulls (how many different kinds in each pellet, and from what prey), lower jaws, teeth, upper and lower forelegs, upper and lower hind legs, vertebrae, scapula, pelvis, and ribs.

A large full-color 16" x 21" poster is available to help students identify bones and distinguish prey based on skull shape. These posters can be ordered from the National Science Teachers Association, 1742 Connecticut Avenue, N.W., Washington, D.C. 20009. Another poster (Wanted—Alive) which you may want to distribute or hang in your classroom or nature center, is available from the N.J. Raptor Assoc., by calling (201) 228-0996. This one is especially useful to help stimulate students before their exposure to Mr. Soucy.

Why is the number of bones recorded for each species? Owls can be good samplers of the rodent pop-

Continued on page 31

HUNTER EDUCATION... Does It Work?

By Charles C. Drawbaugh and Roger R. Locandro

PHOTOS SUPPLIED BY AUTHORS



Participants represent a wide range of ages, backgrounds, and experiences, but all share the desire to qualify for a New Jersey hunting license.

Each year, some 15,000 persons wish to purchase a New Jersey hunting license for the first time. Before a first hunting license can be issued, however, a New Jersey resident must attend an eight-hour Hunter Education Program developed by the Division of Fish, Game and Wildlife and taught by some 600 volunteer instructors. During the course, such topics as history and tradition of hunting, gun handling and safety, hunter ethics and responsibility, conservation of wild-

life, and game laws are reviewed and discussed. Experience in the handling and use of firearms is also provided under field conditions. The general intent of the course is to help the beginning hunter gain a basic understanding of and a wholesome attitude toward the sport of hunting. A worthwhile goal, certainly, and one which, if achieved, could increase the safety and enjoyment of all hunters and improve relationships between hunters and nonhunters. But, do students know more



A parent often attends classroom and outdoor instruction with a son or daughter. Hunting is an activity which fosters closer relationships in many families.



Instructors check the condition and cleanliness of firearms which participants use during the course. Desirable attitudes are communicated by both the words and the behavior of instructors.



Demonstrating the safe way to cross a simulated fence when hunting alone.

about hunting and have more desirable attitudes about hunting after they have taken the course? To find out, the Division, in cooperation with Rutgers University, attempted to evaluate the effectiveness of the Hunter Education Program. The same evaluation program sought to determine how certain characteristics of the students' backgrounds (such as age, sex, and number of hunters in the home) were related to both their pre-instruction knowledge and attitude about hunting and to their responsiveness to the course content.

Twelve hunter education classes from 11 urban and rural counties in New Jersey participated in the evaluation project on a voluntary basis; complete or partial data were obtained from 247 students. Before instruction began, students took two "pretests"—a 40-question test about their knowledge of hunting, and a 50-item "attitude inventory" requesting their opinions about various aspects of hunting. They also completed a research questionnaire, which asked for the following items of background information which would later be related to students' response to the course: (1) age; (2) sex; (3) whether the student had ever held a juvenile hunting license; (4) whether the student had ever held a regular hunting license; (5) number of hunters in the student's home; and (6) number of wildlife magazines received in the home.

After the research team gathered this pre-instructional information at the first session of each class, the county instructional team proceeded to teach the course as usual. The eight hours of instruction, usually divided into three sessions over a three-week period, were based on the NRA Hunter Safety and Education Program, but also included other instructional resources which varied from county to county. The instructors, who had previously attended seminars at

Rutgers University on teaching methods, were free to emphasize those aspects of the subject matter and to use those approaches to teaching which they felt to be most appropriate.

After students had completed the Hunter Education course, the research team again administered the same knowledge test and attitude inventory, so that the scores achieved by the students before receiving instruction could be compared with those achieved after exposure to the course. The students were not aware that they would be asked to take these tests a second time, as "post-tests."

All tests, inventories, and questionnaires were analyzed by computer at Rutgers University. Using such techniques, researchers can both determine how students' knowledge and attitudes change as a result of the Hunter Education course, and can also relate the background characteristics of students to both their pre- and post-instruction scores. Knowing whether men or women respond more positively to the course, or whether persons in different age groups learn more or less than others would help the Division design course structure and content to be as effective as possible.

General background characteristics of students who completed the course were as follows: Half were between 13 and 21 years of age; one-quarter were younger than this, and one-quarter, older. Ninety-four percent were men. Most of the participants (80%) had held no previous license. Seventy-two percent reported one or more hunters in the home, and 57% received at least one wildlife magazine.

Knowledge About Hunters. The highest possible knowledge score a participant could achieve was 40, the number of questions on the test. The scores re-

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HUNTER EDUCATION

vealed that prior to instruction some classes were more knowledgeable about hunting than others, and that some classes gained more knowledge than others as a result of instruction in hunter education. The Division was particularly gratified by the fact that all classes were shown to be significantly more knowledgeable about hunting after receiving instruction.

When test scores were related to students' background characteristics, a number of interesting patterns became evident: (1) Prior to receiving instruction, the oldest participants (those 22 and over) were most knowledgeable about hunting, the 13-to-21 age group was next, and those aged 12 or younger knew the least. After attending the course, all three groups were significantly more knowledgeable about hunting. (2) Men and women scored about equally on the pretest knowledge test, and likewise gained the same amount of knowledge from the course. (3) Participants who had previously held hunting licenses made significantly higher pretest scores than those with no previous hunting license, but they did not make significant gains in knowledge as a result of the instruction; all other groups did. (4) Neither the number of hunters in the home nor the number of wildlife magazines received had any effect on the pretest scores of participants nor on how much their scores increased from pretest to post-test. Whether or not there were hunters in the home, the participants improved their knowledge about hunting significantly as a result of attending the hunter education course.

Attitudes About Hunting. The highest possible score that a participant could make on the attitude inventory was 250. The inventory was composed of 50 statements, each of which was scored from 1 to 5 depending upon the opinion given by the participant. Analyses of the "pre-attitude" (before instruction) scores indicated that prior to instruction some classes had better attitudes than others about hunting. Comparison with "post-attitude" (after instruction) scores showed that the attitudes of some classes were changed more than those of others as a result of instruction. All classes but one had significantly better attitudes about hunting after receiving instruction.

As on the knowledge test, participants 22 and over had the best attitudes about hunting, those 13 to 21 the next best, and those 12 years and younger the poorest. The difference was similar for all three age groups, and after receiving instruction, all had significantly better attitudes about hunting. Pre-attitude scores were the same for men and women, and both sexes had significantly better attitudes after instruction. However, the attitude scores of women increased as a result of instruction significantly more than those of men. Participants who had previously held hunting licenses made significantly higher pre-attitude scores than those who had not. Both groups had better attitudes about hunting after instruction. Pre-attitude scores, like pretest scores, were not influenced by either the number of hunters in the home or the number of wildlife maga-



Individual instruction by the teams of volunteer instructors is common practice in classroom and firing range settings.

zines received. Whether or not there were hunters in the home or wildlife magazines received in the home, the participants improved their attitudes about hunting as a result of the hunter education course.

Overall, knowledge and attitude about the sport of hunting were interrelated—if participants made good knowledge scores they made good attitude scores, and vice versa.

The evaluations made of the New Jersey Hunter Education Program as a result of this testing program can be summarized as follows.

First, the New Jersey Hunter Education Program has helped aspiring hunters improve significantly their knowledge and attitudes about the sport of hunting. The program has had a positive effect on hunters throughout the state.

Second, it was found that knowledge and attitude were influenced more by age of student participants than by any of the other background characteristics. The youngest age group (age 12 or less) ranked lowest in both categories throughout the course. Separate classes might be designed to meet the special needs of these younger persons who want to qualify for a hunting license.

Third, it was quite evident that knowledge and attitude about the sport of hunting are interrelated. Further inquiry might clarify the factors which contribute to this relationship and thereby enable the course instructors to teach even more effectively. □

**75th Anniversary of the
English Setter Club of America
CONSERVATION AND
RECREATION DAY—
JULY 12**

**Held at the English Setter
Club Grounds, Medford, N.J.**

The Horse Events . . .



Awards Tent



Military Drill



**The
Dogs . . .**

Udibar Rambling Pete



Debbie Adams on Blue Rapidan



Bit O'Honey



**DEP Commissioner Jerry
English receives
Conservation and
Recreation Award from
ESCA President John M.
Rosenburg.**



Dare

DEP DOES IT IN THE PINES

Earlier this year on Saturday, May 2, Carol Nash of the Department of Environmental Protection's Fish, Game, and Wildlife Division organized a DEP and Friends canoeing safari in the Pine Barrens. After all, it's only logical that the state environmental agency should be drawn to the sandy banks of the Wading River amidst one of the most serene and pristine environments in the state. Serene? Three inches of cold, driving rain had fallen the night before, and the river was anything but serene. Bill Bell of Bel Haven warned the group that the current would be treacherous. Nevertheless, 21 canoes filled with hardy men and women shoved off on that damp, overcast day for the first annual DEP canoe trip.

Before the day was over, seven canoes had tipped (one of them twice). Despite warnings to leave wallets and other valuables in the car, Steve Picco fell in and lost his wallet along with some money and credit cards. Barbara Ackermann and her husband, Randy, went over within the first ten minutes. She lost her eyeglasses to the roaring current and retired early. When we stopped for lunch, we dressed shivering Greg Vida (now everyone knows who fell in twice) in a dry wool sweater and a fashionable green garbage bag (see person on far right in group picture). DEP Commissioner Jerry English's husband, Alan, and son, Eric, came through in grand style—completely dry. And for anyone who thinks Charles Nash, in the kayak,

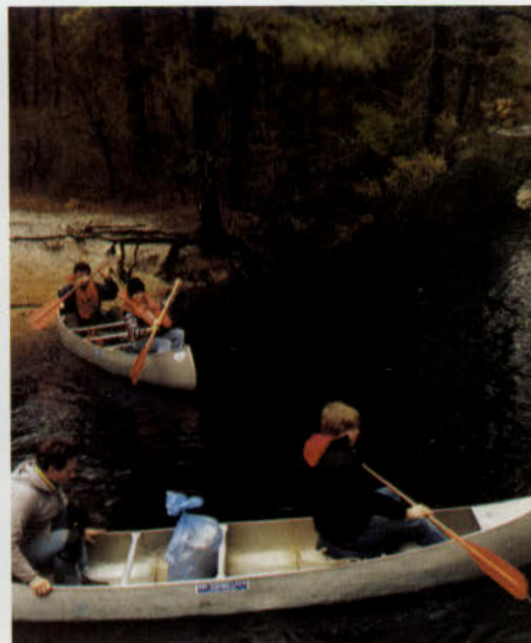
had the best seat in the house, you're only partially right. The current didn't bother him, but he soon left his leaky kayak for his wife's spot in a canoe with the NJO editor. So what happened to his wife, Carol? Rumor has it that fighting the current wore her out. Oh well, Carol, you'll get another chance next year when the DEP has their second annual Pine Barrens canoe trip.

Canoes were rented from Bel Haven Lake Canoe Rentals in Green Bank, N.J. They rent canoes and provide transportation year round on four Pine Barrens rivers: the Mullica, the Batsto, the Oswego, and the Wading River. For a listing of Pine Barren canoe rentals, send for "Canoeing in New Jersey" from the Department of Community Affairs, 363 W. State Street, Trenton, N.J. 08625.

S. PERRONE



S. PERRONE



CAROL NASH



CAROL NASH





A Sybarite's Guide to Hawkwatching

RUTH CLARK

Upon discovering that I am a birdwatcher, people often ask me if it is a strenuous sport. My response: that depends on the watcher. For many people I know, it is strenuous and fiercely competitive. Some of my friends think nothing of roaming the frigid beaches of New England in February in search of Snowy Owls and eider ducks. Others climb the peaks of the Rockies for the Blue Grouse and rosy finches. Still others struggle up the furnace-hot canyons of Arizona in June for rare warblers and hummingbirds. Even locally, birdwatchers are known to cheerfully slog through swamps, bounce across mattresses in dumps, and wade through pollen-infested fields in search of their quarry.

But for those of us who are lazy, I have found the ideal type of birdwatching—the fall hawk migration. My favorite spot for this inactivity is my own backyard. On a suitable day I set up my reclining lawn chair in a sunny spot facing north. On a

small table beside me repose my binoculars, hawk literature, a refreshing drink, and some snacks. Then I lie back, relax, and wait for the hawks to appear over the roof of my house. The best time for this pleasure is a pleasant day between Sept. 10 and Oct. 15, with a brisk northwest breeze and lots of fat white clouds in a Delft-blue sky.

Watch these clouds as they drift toward you and pretty soon you will see birds spiraling into them or streaming out of them. These "kettles," as they are called, are usually made up of Broad-winged Hawks. Small and lightweight, they ride the thermal updrafts like any glider pilot. Often a larger Osprey can be seen with the broad-wings. Your binoculars will bring the birds in close enough to heighten the detail. Small, long-tailed birds flapping and soaring downwind are usually Sharp-shinned Hawks. Tiny American Kestrels, or sparrow hawks, and Merlins, or pigeon hawks, will zoom

over at treetop height. If luck is with you, you might see a rare Peregrine Falcon or Bald Eagle. In my own yard on one red-letter day, without moving from my lounge, I saw 400 hawks in one afternoon, including 257 broad-wings, 38 "sharpies," 3 ospreys, 3 kestrels, and 1 Cooper's Hawk. Truly exhilarating!

To enhance lulls between hawk flights, there should be hawk literature on your table. A hawk silhouette chart is a must and can be obtained from the National Audubon Society, the New Jersey Raptor Association, or the Hawk Mountain Sanctuary in Pennsylvania. The State of New Jersey puts out "The Hawks of New Jersey," by Donald Heintzelman, and Hawk Mountain has "Feathers in the Wind," by James J. Brett. Read Witmer Stone's account of the hawk migrations at Cape May in his "Bird Studies at Old Cape May." This is obtainable in a two-volume Dover reprint.

If feasting the eyes is part of your sybaritic delight, go to Hawk Mountain, Kempton, PA, on a delicious October day. The view is breathtaking: acres of colored trees in a vista of rolling hills and lush valleys, brighter than any patchwork quilt. Take a chair or thick pad to sit on, as those rocks at the lookout are not conducive to ease. The staff at Hawk Mountain are present all during the fall season and call out the birds as they approach. All you have to do is point your binoculars to the area indicated and pick up your bird, already identified by the experts. A liberal education for the minimal entrance fee to the sanctuary. Don't expect scads of birds, though, if the wind's not right. Just relax and enjoy the view. Hawk Mountain is less than two hours' drive from Plainfield via Rt. 22. Turn right at Lenhartsville a bit past Allentown and left at the sign to Hawk Mountain. It's an easy day's trip, or stay overnight at Lenhartsville and enjoy some Pennsylvania Dutch cooking for dinner. Nice.

I'll warn you, though, hawkwatching can be addictive. Beware of the desire to go out late in October or early in November to catch that rare raptor. It will be fiercely cold at the lookouts and you'll find you're no longer among the lazy birdwatchers! □



Wildlife in New Jersey

BY BARBARA FORD

In some parts of New Jersey, it's getting hard to find a pond that doesn't have a honking contingent of Canada geese on it. The big waterbirds—some weigh over 20 pounds—have established themselves on farms, park land, golf courses, church property and the front yards of private residences. The best estimate of the Division of Fish, Game and Wildlife is that there are about 50,000 Canadas in the state, even though some 15,000 are removed by hunters each year. Herring gulls, a species of bird that sometimes reaches two feet in length, are plentiful in the state, too, and not just in their usual haunts along the shore. I've seen them in ponds in Clinton and Morristown lately, as well as in the parking lot at the Rockaway Townsquare Mall near Dover. The mall gulls were searching for garbage, their favorite food.

Birds aren't the only sizeable wild creatures that manage to thrive in New Jersey in 1981. Raccoons, opossums, and woodchucks are common in rural and suburban areas and the red fox still exists in fairly large numbers in rural counties. The largest of these species, the raccoon, sometimes reaches 30 pounds, the smallest, the fox, 14 pounds. None of these mammals could really be considered large but one large mammal is doing well, too—the white-tailed deer. There are about 100,000 in the state, enough to allow up to 16,000 to be removed each year in the state's brief deer hunting season. The 100,000 figure may be more deer than existed in the state in colonial days.

How can so many good-sized animals survive in the nation's most crowded state?

One reason is that New Jersey has more land suitable for wildlife than might be apparent to the casual eye. There are still extensive tracts of private land within the state, plus some 400,000 acres of public land. Most of our successful animals, however, don't really need large amounts of room if their basic needs for food and shelter are satisfied. Another reason for the success of some wild creatures in the midst of a large human population is that these animals can live in close proximity to man. Unlike many wild creatures, they do not demand seclusion. A third reason is that we furnish these species with help, both direct and indirect. They actually profit from man's presence.

New Jersey's 50,000 Canada geese—five times the number there were just a half dozen years ago—are thriving for all

these reasons. First of all, they demand little in the way of habitat. Provide a modest pond and an adjoining field or lawn for foraging and the geese will probably settle in, often for the entire year. The presence of people doesn't seem to bother them. Canadas at our local golf course waddle calmly around a pond, ignoring golfers swinging just behind them. At a local park, the geese are even bolder, approaching visitors to beg for food. New Jersey Canadas also got a big boost from man recently when most of the state's farm crops were switched from fruits and garden vegetables to grain. The switch has led to problems for farmers, however, who claim the geese are eating part of their proceeds.

Canadas get direct help from us, too. When geese numbers were low in the 1960's, Brigantine National Wildlife Refuge above Atlantic City and other northern refuges began encouraging the birds to breed on the refuges. They also planted grain to feed them. As a result, Canadas are now breeding, not only on northern refuges, but all over the northern United States. New Jersey has breeding Canadas in every part of the state, according to Fred Ferrigno of the Division of Fish, Game and Wildlife. Canadas get additional help from national legislation, particularly the Migratory Bird Hunting Stamp Act of 1934, which provides funds to maintain the national wildlife refuge system. The system was set up particularly to aid waterfowl (geese, ducks and swans) and uses the Canada goose as its symbol.

The herring gull isn't a game animal but it gets just as much help from us as the Canada goose. It's hard to believe now, but in the latter part of the nineteenth century, the herring gull, along with a number of other large waterbirds, was in danger of extinction because of the fad of placing the feathers of wild birds (and sometimes whole birds) on women's hats. A law made this practice illegal at the turn of the century and not long afterward another law gave all migratory bird species protection throughout their range. The herring gull responded with a population boom that is still going on. It once nested only in Canada but it has expanded its nesting range steadily southward and westward in this century, reaching New Jersey about 20 years ago. Today the herring gull is crowding smaller gulls like the laughing gull out of nesting sites in the salt marsh along the New Jersey shore, according to Dr. Joanna Burger of the Rutgers University.

Herring gulls are well protected by legislation today but they also get important indirect help from man. When I lived in New York, I used to see herring gulls circling over storm sewer outlets on the East River, searching for garbage. Now I see the same species flying above a large sanitary disposal site outside Hoboken when I take the Erie Lackawanna train to New York. Garbage plays a big role in the herring gull's success. Since the birds do not have to expend much energy to obtain garbage, they can raise more young and thus increase the herring gull population. The species' lack of fear of man helps it in its garbage hunt. Herring gulls will come close to man to obtain food and some birds learn to beg as effectively as pigeons.

Garbage also plays a surprisingly big role in the success of some of the state's mammals, particularly the raccoon and the opossum. Omnivorous is a term coined for these hungry creatures; they'll eat just about anything. They den during the day, often in one of man's dwellings, and emerge at night to feed on garbage and other food. A storm sewer or other man-made structure often serves as a passageway between the den and a food source. Thanks to the ready availability of garbage and other food wherever man is found, raccoons and opossums have increased both their range and numbers in the past few centuries. There's some evidence that raccoons are more plentiful in areas where man himself is plentiful. Dr. Dennis Slate of Stockton State College did graduate research at Rutgers University recently that shows

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Environmental News

22 sites on priority list

STATE SUBMITS TOXIC DUMP RANKINGS FOR SUPERFUND GRANTS

DEP Commissioner Jerry Fitzgerald English on July 21 announced the rankings of those toxic waste sites in the state that were submitted to the federal Environmental Protection Agency (EPA) in preparation for application and possible granting of "Superfund" monies for clean-up. The "Superfund" results from the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 and sets a \$1.6 billion federal fund for toxic waste site clean-up nationally.

"With these applications, we are that much closer toward removing these sites and their potential consequences from our state," stated Commissioner English. "We are hoping that New Jersey will receive its fair share of clean-up funds and can utilize our expertise in removing these blights from our communities."

According to George J. Tyler, DEP Assistant Commissioner for Environmental Management and Control, 22 of the state's worst toxic waste sites, of which there are more than 300 currently known and evaluated by the DEP, were ranked in three categories for Superfund application purposes. Tyler stated an overall ranking, covering the general environmental condition of the site with respect to groundwater, surface water, and air quality, and relative to the surrounding population, was performed and the results are attached. Each rating was performed in accordance with the federal EPA ranking model developed by the MITRE Corporation, a consultant to the EPA.

Even though DEP does not thoroughly concur with the ranking model being used because it does not give proper emphasis to the most hazardous environmental pathways at each site, Commissioner English noted that, "this shows what we've been saying all along, that based on our own DEP ranking process we have 10 to 15 sites which need attention now."

The Commissioner also noted that the state had "already begun to take

action at most of the worst sites on its own using state Spill Fund resources. The top eleven sites on our list have all received some attention utilizing either the state's Spill Fund, the federal 311 (k) fund from the Clean Water Act, or federal Resource Conservation and Recovery Act funding. This is positive proof of the value of our state Spill Fund and underscores the absolute essential need for voter support for the \$100 million dollar hazardous waste site clean-up issue."

A list of the 22 ranked sites follows. The MITRE ranking evaluates sites on a weighted formula of 0 to 100, with 100 representing the worst possible immediate hazard. Heading this list were the Price's Landfill in Atlantic County with a ranking of 87, Burnt Fly Bog in Marlboro Township (Twp.), Monmouth County, with 86, and three sites in Plumsted Twp., Ocean County,—Spence Farm with 81, the Goose Farm with 74, and the Pijak Farm with 74.

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Old Wharf Park

Once a blighted area . . . now a beautiful park. (See Commissioner's Spotlight, page 16B) Old Wharf Park in the Borough of Oceanport (Monmouth County) is an excellent example of what is being accomplished through the Green Acres Local Grant Program to provide outdoor recreation areas in communities, large and small, throughout the state. Before development, the 2.4-acre site consisted of a row of deteriorating stores on Oceanport Avenue along the overgrown shoreline of Oceanport Creek. After development, Old Wharf Park, a passive recreation area, contains a rehabilitated shoreline, two bocci courts, two shuffleboard courts, a picnic area, a boardwalk and a platform on the creekside guarded by a gate. The platform provides access to the creek for fishing in summer and skating in winter. The park is easily accessible to the residents of the borough's six-story senior citizen highrise located about 600 feet from the park on Main Street. The cost of the project, \$352,000, was shared equally by the state and the borough—each contributed \$176,000. (Photo courtesy of T & M Associates, planners and engineers for the project.)



Green Acres Local Grants Program

There are hundreds of parks now in existence in hundreds of communities throughout the state providing outdoor recreational opportunities to thousands of New Jerseyans—thanks to the financial assistance local governments have received through the Green Acres Local Grants Program.

From the beginning, the New Jersey Green Acres Program has had two parts—one for state projects and one for local projects. The entire Green Acres program is administered by DEP's Office of Green Acres, located at 1301 Parkside Avenue, Trenton 08638.



Dennis Davidson, chief, Green Acres Local Grants Program, in the article below, discusses the program and explains how any municipality or county is capable of participating.

Certainly, one of the key reasons of the continued success and support by the public of the Green Acres Program is the visibility it receives through the hundreds of parks throughout the state that were made possible through the Local Grants part of the program. The 50/50 matching grants have been awarded in every county in the state and to over 300 municipalities. Millions of New Jerseyans now have the opportunity for outdoor recreation at parks located within a short walk, bike ride or drive of their homes. Spanning twenty years, almost 900 projects have been approved under terms of the four Green Acres bond issue acts.

The Green Acres Grant Program serves as the "wallet" for matching grants for open space projects on the county and municipal level. Basically, there are two kinds of grants; funds to acquire land for outdoor recreation and funds to construct outdoor facilities.

The local development program is the newest side of the program, beginning with the third bond issue referendum approved in 1974. It is really easier to describe what is not eligible for assistance than what is eligible. Basically, amusements, commercial or indoor recreation cannot be funded. Almost anything else which increases the use of public park sites can be eligible.

The smallest grant of \$6,000 was awarded to Hamilton Township (Atlantic County) for construction of a softball field and a tot lot in the Harding Lakes Neighborhood. The largest project to date is Camden County Waterfront Park which is being supported by \$4 million in state grant funds. The Waterfront Park is a comprehensively formulated effort utilizing water-based recreation along the Delaware River in an attempt to lure new housing and commercial construction into downtown Camden.

Given the diversities involved, it is difficult to exactly describe the "average" project. In general, most communities opt for a project that provides both active and passive recreational opportunities to accommodate all age groups. The "average" park plans include a tot lot, ballfields, tennis and basketball courts, walking trails, picnic areas, landscaping, parking area. Price tag: Roughly \$250,000.

Other commonly funded individual facilities include fishing and boating docks, ice rinks, bike trails, swimming pools, and environmental education centers. In any event, each project assumes a special significance to the community and its citizens and in many cases has become the center for community events.

The local acquisition program has been a part of Green Acres since the first bond issue in 1961. Nearly 40,000 acres of land have been acquired with projects ranging in size from less than an acre to over 1,600 acres.

A project in this program can be the acquisition of a single parcel of land or several parcels that form a contiguous recreation or conservation site. There are no minimum acreage restrictions on lands to be acquired.

Acquisitions have included natural areas such as a Blue Heron rookery in Lafayette Township, beachfront land in every coastal county, over 50 lakes, historic sites such as the Smithville Mansion in Burlington County, and hundreds of urban neighborhood and community recreation areas.

The major effort by the staff in the Bureau of Grants for the past several years has been water-related projects, especially urban waterfronts. Parks along our rivers, not only make good environmental sense from a flood plain and water quality protection standpoint, but are also those most enjoyed by people. New Jersey rivers have often become the "wrong side of town" but more and more communities are working to give them back to their citizens to enjoy. The Camden project described earlier is an example of such a Riverlands Renaissance project. **Every municipality and county has the capability of being involved in the Green Acres Program.**

The general steps to follow in the application process are:

1. Local unit notifies Green Acres annually by March 31 of its intent to apply for funds.
2. Green Acres acknowledges receipt and sets up pre-application meeting and site inspection.
3. Local unit holds public hearing.
4. Local unit submits formal application.
5. Project is ranked by DEP. If it meets minimum state requirements, the project is approved and may be placed into construction or acquired.

Obviously, this is just a capsule summary—the staff of the Green Acres Program assists on all funding details.

HARBORFRONT CLEAN-UP FUNDS RELEASED

Governor Byrne on May 27 signed Assembly Bill No. 178 which appropriates \$5 million from the Beaches and Harbor Fund for the removal and disposal of derelict vessels, deteriorated shore structures and loose drift material along the New Jersey shoreline of New York Harbor. The money will be used to provide the 33 1/3 percent state share of the U.S. Army Corps of Engineers New York Harbor Collection and Removal of Drift Project. The \$5 million will bring \$10 million in federal funds from the Corps. The areas to be cleaned up include the shorelines of Elizabeth, Hoboken, Weehawken, West New York, Guttenberg, North Bergen, Edgewater and Palisades Interstate Park. (The Beaches and Harbor Fund was created under the Beaches and Harbors Bond Act of 1977.)

TRAILS PLAN

The draft New Jersey Trails Plan—one component of the state's comprehensive outdoor recreation planning effort—was released for public review in June. The plan summarizes the inventory of existing, proposed and potential trail resources, and describes the needs of six major trail use categories—foot, water, horse, bicycle, snow and motorized.

The plan was prepared by the New Jersey Trails Council (a citizens advisory board assigned responsibility for the plan by the state legislature) with staff assistance from DEP's Office of Green Acres. The council has scheduled three public meetings on the plan—September 14, 15 and 21 at Rutgers University, Stockton State College and the Parsippany Branch of the Public Library, respectively. Deadline for written comments on the plan is September 25, 1981. Comments should be addressed to the New Jersey Trails Council, c/o Office of Green Acres, 1301 Parkside Avenue, Trenton 08638. □

AN INVESTMENT IN NEW JERSEY'S NATURAL RESOURCES

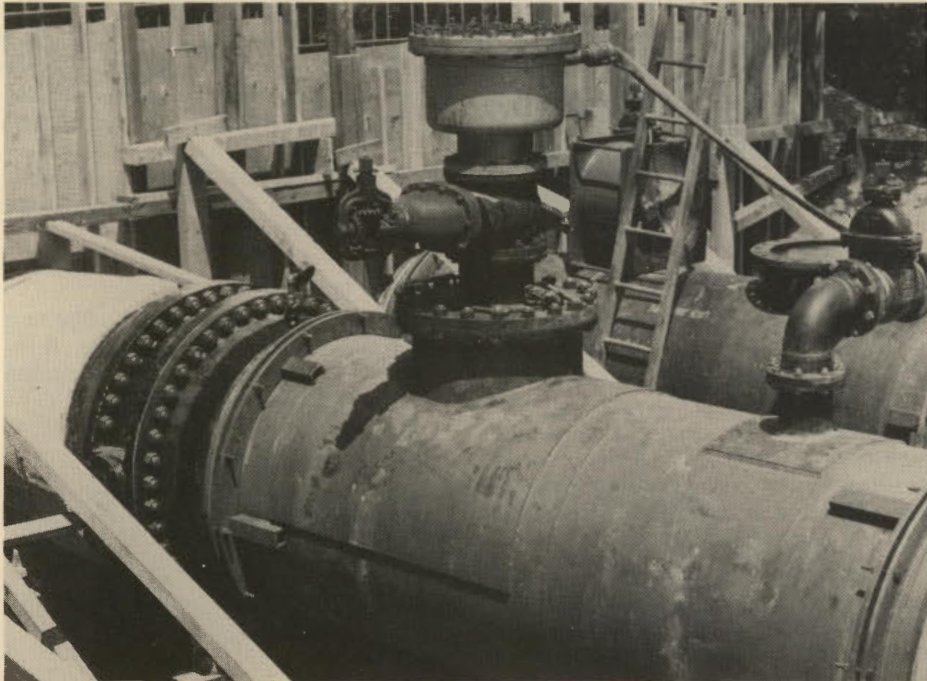
State of New Jersey
Brendan Byrne,
Governor



- Water Supply Bond Issue
- Hazardous Waste Bond Issue



Department of
Environmental Protection
Jerry Fitzgerald English,
Commissioner



Water Supply Bond money will replace old, inefficient water system pipes with new ones.

WATER SUPPLY BOND ISSUE

By Joe Kuhn

*Don't it always seem to go that you
don't know what you got til it's gone—
Joni Mitchell*

*You'll never miss the water til the well
runs dry—Brendan Byrne*

In these words songstress Joni Mitchell and Governor Brendan Byrne have captured a chronic human failing: our tendency to ignore, abuse, and underestimate the importance of some of our essential resources until major inconvenience or outright loss makes us open our eyes. Many New Jerseyans' eyes were opened this year when a drought made a simple trip to the bathroom carry with it significant consequences to our water supply. However, this November New Jerseyans will have an opportunity to reduce the chance of such future rude awakenings by ensuring a safe, adequate, and reliable supply of water for themselves and for their children.

The opportunity to improve our state's water supply and ease future water crises will come in the form of a public

question on this year's ballot entitled the "Water Supply Bond Issue." If approved by the voters, the "Water Supply Bond Issue" will authorize a \$350 million investment in state and private projects designed to rehabilitate old water supply facilities and construct new ones. In addition to these millions in capital improvements, the bond issue will also create approximately 25,000 jobs for New Jersey.

The Water Supply Bond Issue will fund a two-fold approach towards improving New Jersey's water supply.

Some bonds will be issued to provide loans for local projects for the "rehabilitation, repair or consolidation of antiquated, damaged or inadequately operating water supply facilities."

Many of the water supply systems in our older cities are outdated, with some having pipes in the ground dating from the nineteenth century. These systems often have water losses which can rise to 30 percent or more. Part of the money

(Continued on page 3)

Master Plan

The New Jersey Statewide Water Supply Master Plan, the first to be completed by any state, is a dynamic document which will undergo constant modernization to keep it abreast of changing water supply, quality and demand factors throughout the state.

New Jersey has enough potable water within its boundaries to fulfill all the state's needs until after the year 2000. But the problem with which the Plan must cope is the fact that at present the water isn't necessarily where it's needed. This became apparent during the past year of drought conditions, which necessitated water rationing in the densely populated and industrialized northeast and other water use restrictions in much of the rest of the state.

Therefore the plan contains recommendations for immediate projects, such as pipelines, reservoir systems, leak repairs, and interconnections between water systems to avoid further emergencies when rainfall lags. It also contains recommendations for the feasibility study of other projects five or 10 years down the road in order to begin the selection process now.

The Plan's formal adoption was due at about the time of publication of this issue of *New Jersey Outdoors*. When this was written, the Plan was undergoing a critical part of its final shaping, the gathering of comments from the general public in a series of six hearings. They were to be followed by assessment of public viewpoints and possible revisions to the Plan.

Such a pioneering and complex project cannot happen overnight. It was ordered by Governor Brendan Byrne, who recognized that New Jersey has been living on borrowed time from the standpoint of adequate water supplies. Work began in late 1976, by a group of five major consultants looking at all aspects of water supply delivery. Their report, published in 1980 was, after review and discussion, used as a basis for the Department's draft Water Supply Master Plan released for public hearing in June of this year. This document will form the basis for future water supply decisions including those on the expenditure of bond issue funds.

Research for the plan included analysis of many of the state's more than 600 public and private water purveyors, interviews with public officials and with major users of water.

The master plan divides New Jersey into six major water supply areas. Each of those regions was studied separately to learn current water supply and demand statistics, and then projections of future demands were made, along with needed facilities, such as

(Continued on page 4)



The Hazardous Discharge Bond Act will raise \$100 million to identify and cleanup hazardous waste dumps like this one.

HAZARDOUS WASTE BOND ISSUE

By Joe Kuhn

For many New Jersey residents this year's water supply problems were mainly attributable to low rainfall and reservoir levels, but for other less fortunate New Jerseyans their water problems were attributable to a much more dangerous and insidious source: groundwaters contaminated by hazardous wastes. These residents received their tap water from public or private wells contaminated with toxic chemicals from dump sites, industrial facilities or from illegal disposal. The wastes are toxic to humans having the potential to cause severe skin rashes, liver and kidney disorders and some are known carcinogens. Consequently, these homeowners had their wells closed down and, in some cases, were forced to go to emergency water tanks with plastic containers and buckets in their hands for their daily supply of water.

These New Jerseyans were victims of the hazardous waste problem, a threat that goes well beyond state boundaries and is clearly the most serious environmental issue facing our nation in the 80's.

But, just as it surpasses state boundaries, the dangers of hazardous wastes surpass just groundwater contamination. Children may play in fields and trailers filled with barrels of poisonous chemicals. A spark can ignite a poorly supervised waste dump and set thousands of barrels ablaze in seconds. Such was the case in April 1980, when a spectacular fire broke out at the Chemical Control Corporation in Elizabeth, New Jersey, threatening the city and neighboring towns with noxious gases.

Fortunately New Jerseyans can do something to combat this environmental monster. This November the "Hazardous

Discharge Bond Act" will be on the ballot, and, if approved, it would create a \$100 million bond issue for the identification and cleanup of chemical dumps in New Jersey. The money raised would supplement the state's Spill Fund to cleanup sites or to pay the state share of federally funded cleanups under national Superfund legislation.

Presently, in New Jersey there are over 300 dump sites suspected of contaminating lagoons, landfills, abandoned trailers, and old factories with harmful, illegal wastes. Even Liberty State Park has been polluted with barrels of toxic chemicals.

Since January 1980, \$35 million has been spent on cleanups of chemical dumps in New Jersey. At Chemical Control alone the nearly completed cleanup will total \$27.5 million. These figures, however, only represent full or partial cleanup of about two dozen sites. Over nine-tenths of New Jersey's sites remain to be rid of hazardous wastes. It has been estimated that \$1 billion or more is necessary for this task.

The money from the bond issue plus money from the recently passed federal "Superfund" legislation would provide much needed funding for statewide cleanup projects and mark a major step towards the total eradication of illegal chemical dumps and groundwater contamination problems.

The "Hazardous Discharge Bond Issue" is an opportunity for New Jerseyans to cleanse their environment of hazardous wastes. It is a chance for us to make our tap water safer to drink and to make sure our children can play in their backyards safe from the unseen poisoning of toxic chemicals. Let's not miss this chance. □

How Does it Work? The ABC's of Bond Issues

Bonds and capital budgets, credit ratings and longterm financing may all seem complex and beyond the understanding of many people. Yet almost every year voters are asked to vote on public questions involving these concepts and resulting in major fiscal or legislative programs. Here is a brief explanation of this basic planning and financing process.

Q. What is a bond issue?

A. A bond issue is a question placed on the ballot for voters to decide. It involves authorizing the sale of bonds to fund a specific program.

Q. How do the bonds get sold?

A. As appropriations of bond issue monies are approved by the Legislature and Governor for specific projects, the treasurer authorizes the sale of bonds sufficient to cover the expenditures.

Q. Is this a good way to raise money?

A. Funding capital programs through bond sales makes sense because it provides longterm financing at low interest rates, much like a mortgage on a house. Some fiscal needs, like salaries and current operating expenses are funded through the annual budget process.

Q. How was previous bond issue money used?

A. DEP has taken action on all the programs approved by voters in 1980. This includes resource recovery, sewer grants, harbor cleanup, dam restoration and water supply projects. By the end of 1981 it is expected that close to \$100 million of the \$145 authorized in the 1980 Bond Act will be appropriated.

Previous years bond allocations are almost completely appropriated. The 1969 water conservation bonds, which have been appropriated, cannot be sold with the six percent interest ceiling placed on them by the original legislation. This year a ballot question seeks to eliminate that interest ceiling, allowing the bonds to be sold at current rates.

Continued on page 4

Continued from page 1

WATER SUPPLY BOND ISSUE

from the bond issue will be used to identify leaks in outdated systems and repair them. This water-saving move will be of direct benefit to all consumers by insuring a stable and efficient supply of water.

Bond issue funds will also be used to interconnect existing water systems so that transfers can be made during droughts and time of emergency. In addition, new water supply projects and conveyance systems will be constructed to supply additional water to areas where deficiencies exist. This will assure adequate supplies during periods of rainfall shortage and provide the capability to meet future needs.

The "Water Supply Bond Issue" first proposed by Governor Brendan Byrne as part of a major legislation package to improve the states water supply system, was approved by the State Commission on Capital Budgeting and Planning, which includes members from the legislature, the government, and the private sector.

One recommendation of the Capital Budgeting and Planning Commission was that the projects selected for the bond funding be included in the New Jersey Statewide Water Supply Master Plan.

The water supply master plan is based on an intensive three-year study of New Jersey's entire water system by private consultants and state officials. The plan provides a framework for the management of our water resources and recommends specific projects as vital to the state's present and future water supply needs.

Another recommendation of the Budgeting and Planning Commission and adopted by the Legislature was that water companies benefitting from the new state funded projects repay the state over time, for an appropriate share of the projects' costs.

After approval by the Commission, the Legislature appointed a combined Senate and Assembly Committee chaired by Senator Frank Dodd and Assemblyman Robert Hollenbeck to consider including the Bond Issue, which after additional hearings and debate was approved on the recommendations of the Committee in June.

At the time of this writing the bill was awaiting signature by Governor Byrne.

The endorsement of these elected officials, the nearly \$400 million in capital improvements, plus the generation of approximately 25,000 new jobs signify the importance of the bond issue in improving the quality of life in New Jersey. □

HEADED FOR THE NOVEMBER BALLOT

These Bond Acts, at the time NJO went to press, had been acted upon favorably by both houses of the State Legislature.

WATER SUPPLY BOND ISSUE

Should the "Water Supply Bond Act of 1981," which authorizes the State to issue bonds in the amount of \$350 million for the purpose of rehabilitating, repairing or consolidating antiquated, damaged or inadequately operating water supply facilities, and for the planning, design, acquisition and construction of water supply facilities, all as recommended by the New Jersey Statewide Water Supply Plan, and providing the ways and means to pay and discharge the principal thereof, be approved?

HAZARDOUS DISCHARGES BOND ACT

Shall the act entitled "Hazardous Discharge Bond Act," which authorizes the State to issue bonds in the amount of \$100 million for the identification of and the efficient clean-up and prompt removal of hazardous discharges, and which provides ways and means to pay and discharge the principal and to pay the interest on the debt created by the sale of said bonds, be approved?

WATER CONSERVATION BOND INTEREST RATE CEILING ELIMINATION ACT

Approval of this act will enable the State Treasurer to sell 1969 Water Conservation Bonds at interest rates exceeding the six percent originally authorized, thereby making it easier to sell bonds at current rates.

FARMLAND PRESERVATION BOND ACT

Shall the act entitled "Farmland Preservation Bond Act" which authorizes the State to issue bonds in the amount of \$50 million to fund up to 50 percent of the cost of acquisition of development easements on farmland and for soil and water conservation projects on land devoted to farmland preservation under programs established by law, and which provides ways and means to pay the interest on the debt by the sale of said bonds, be approved?

The following bond issue has been passed by the Senate and is awaiting an Assembly vote.

COMMUNITY DEVELOPMENT BOND ISSUE

Should the "Community Development Bond Act of 1981," which authorizes the State to issue bonds in the amount of \$85 million to assist in the development of communities of this State by (1) capitalizing at \$45 million the New Jersey Local Development Financing Fund, which will assist industrial and commercial enterprises which encourage economic development within municipalities (2) financing \$30 million of loans and grants to local governments and other entities to revitalize distressed urban areas and promote the economic and social development of older central commercial districts in rural and developing communities, and (3) financing \$10 million of financial assistance for the creation and development of urban industrial parks, be approved.

ALSO ON THE BALLOT

RIPARIAN LANDS: Voter approval of this question would amend the Constitution by specifying that only those coastal lands which have been tidal flowed within the last 40 years should be deemed riparian land and subject to State claims. State claims to such lands must be asserted by law within one year. Presently, the State may claim land washed by tides without regard to a time limitation. Revenues from such lands are constitutionally earmarked for the State School Fund.

CASINO REVENUES: An amendment proposed to the Constitution to use State revenues derived from Atlantic City gambling, if enacted, to fund additional or expand health and transportation services or benefits to eligible senior citizens and disabled residents beyond those provided on January 1, 1981.

LEGISLATIVE PROCESS: A proposed Constitutional amendment, requiring that, upon passage, legislative bills passed by both houses be presented to the Governor and would become law within a fixed time period unless the Governor has taken action. Similarly the legislature has a specified time period to reconsider a gubernatorial veto.

GAMES OF CHANCE: An amendment to the 1959 "Amusement Games Licensing Law," authorizing the State Amusement Games Control Commissioner to set the maximum entry or participant fee for an amusement game and the maximum retail value of any prize offered. (This referendum has passed both houses of the legislature). □

Master Plan

reservoirs, necessary to meet those demands. Overall research was divided into 10 categories, with one or more detailed reports completed on each.

Water supply systems, whether owned by agencies of government or corporations, were appraised by consultants for operating efficiency during times of normal and drought conditions. An overriding consultant recommendation is that leaking pipes, many over a century old, in many distribution systems, must be replaced to cut down on water losses. In addition, protection of existing watershed and aquifer recharge areas is essential to the long term maintenance and purity of the existing water supplies.

Something which the recent water shortages in New Jersey have taught many people is also a strong consultant recommendation: Save water. Learn new lifestyles which, without imposing inconvenience, can make for a more equitable use of the available water anywhere, anytime. Water has long been regarded, mistakenly, as a resource available in unlimited quantities at the mere turn of a faucet. Conservation is a recommended new way of life for everyone. □

Continued from page 2

THE ABC'S

Here are some environmental accomplishments that resulted from bond sales:

- Preservation of open space and park development: Liberty State Park, Round Valley Recreation Area, Wharton Tract, Ringwood State Park, Pinelands, etc.
- Development of safe, clean surface and ground water through sewer grants to municipalities and water quality planning programs.
- Shore protection and harbor clean up: New Jersey-New York Harbor and Camden Area Harbor programs and the construction of facilities to protect New Jersey's coast.
- Flood control: development of comprehensive flood control plans and maintenance of flood control facilities.
- Resource Recovery Plants: support for facilities that will end reliance on garbage dumps and make use of the garbage for energy and steam production.

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The Drought --

In June the Governor's Citizens' Advisory Task Force on the Water Management Emergency recommended the nonessential water use ban be amended to permit the use of automatic sprinklers on any kind of vegetation between 7 p.m. and 9 p.m. The amended regulation was signed on June 19 by Donald T. Graham, deputy to State Drought Coordinator Paul H. Arbesman. The change is reflected in the Revised Water Use Chart given below.

WATER USE CHART

While the following chart shows permitted uses of fresh water (including private wells), conservation should be promoted and practiced at all times.

Penalties for non-compliance may include imprisonment for a term not exceeding one year, or a fine not exceeding \$175.00, or both. (N.J.S.A. App. A:9-49).

Revised: June 19, 1981

	PROHIBITED	NOT RESTRICTED	HAND-HELD HOSE (MUST HAVE AUTOMATIC SHUT OFF DEVICE)	CONTAINERS (BUCKETS, PAILS, ETC.)	RESTRICTED SPRINKLERS	COMMENTS
A. Homeowners						
1. Lawns			X	X	X	Sprinklers restricted to hours between 7-9 p.m.
2. Newly installed sod			X	X	X	
3. Shrubs			X	X	X	
4. Gardens			X	X	X	Trickle irrigation prohibited
5. Automobile washing			X	X		
6. Driveway, sidewalk washing	X					
7. Swimming Pools		X				
B. Commercial/Industrial						
1. Nursery Industry (stock)			X	X	X	Sprinklers restricted to hours between 7-9 p.m.
2. Landscaping			X	X	X	
3. Newly installed sod			X	X	X	
4. Vehicle Washing			X	X		On site automatic washers allowed.
5. Driveways & grounds washing	X					
6. Restaurants						Water to be served only upon request
7. Air Conditioning		X				
C. Recreational Facilities						
1. Golf Courses			X	X	X	May syringe during stress period
(a) self-supplied			X	X	X	Sprinklers allowed 9-12 p.m. & 4-6 a.m.
(b) publicly supplied			X	X	X	Sprinklers allowed 9-11 p.m.
2. Tennis Courts			X	X	X	10 minutes/day with sprinklers
3. Swimming Pools		X				
4. Athletic Fields			X	X	X	Sprinklers restricted to hours between 9-11 p.m.
D. Municipal or Governmental						
1. Fire drills		X				Discretion advised
2. Hydrant & sewer flushing		X				Discretion advised
3. Street washing	X					
4. Street sweeping		X				Minimum required
5. Landscaping			X	X	X	Sprinklers restricted to hours between 7-9 p.m.
6. Newly installed sod			X	X	X	

COASTAL FIELD OFFICE MOVED

The South Shore Region office of the Bureau of Coastal Enforcement and Field Services, a unit within DEP's Division of Coastal Resources, has been relocated from Atlantic City to the Solar Energy House on the Stockton State College Campus in Galloway Township (Atlantic County). The move was designed to provide easier access to the office especially for residents of Atlantic, Cape May, Cumberland and Salem counties. The office is located within minutes of either the Garden State Parkway or Route 30 on main county roads. The physical site of the Solar Energy House is on Duerer Road, Route 561 in the township. The field office's mailing address is P.O. Box 188, Pomona 08240 and its phone numbers are 609-652-0004 and 609-652-0008.

The bureau is responsible for dealing with violations of the Coastal Area Facility Review Act (CAFRA), Wetlands Act, Waterfront Development and Tidelands statutes. The bureau also conducts compliance inspections for approved permits concerning these laws. One of its most important activities is to advise individuals of the need for coastal permits and to assist them in planning projects and completing the necessary forms. □

NEW PESTICIDES LAB GOING UP ON SCHEDULE

The building of a new DEP Pesticide and Toxic Substances Enforcement Complex on Scotch Road in Ewing Township (Mercer County) has progressed in a timely manner and completion of this "first in the nation" facility is expected by the end of 1981. The federal Environmental Protection Agency (EPA) selected New Jersey as the site of the country's first such complex because of its position as a heavily industrialized state with substantial agriculture, and its solid pesticides control program. An EPA grant of \$2.7 million is paying for 95 percent of the cost and \$200,000 from the State of New Jersey is making up the remaining 5 percent. The facility will provide quarters for administrative, laboratory, training, and enforcement activities principally in the area of pesticide control. George Beyer, chief of DEP's Office of Pesticide Control since its inception in 1971, is heading up the development of the complex. □

PINELANDS

The state's program to purchase tracts identified by planning studies as critical to the preservation of the Pinelands ecosystem has resulted in the acquisition of 11,696 acres in the unique Pine Barrens between July 1979 and July 1981, through DEP's Pinelands Acquisition Program. □

WILLIAM WHIPPLE HEADS WATER UNIT



Brigadier General William Whipple (ret'd), of Princeton, has been named Administrator, Water Supply and Watershed Administration, a new unit within DEP's Division of Water Resources. General Whipple's responsibilities include developing plans and resources necessary for the division to better respond to water supply and watershed protection problems; developing and implementing a storm water management program for New Jersey; and all functions of the Passaic River Basin Office of Public Participation. He reports directly to the Division Director.

For 15 years prior to joining DEP, Whipple served with the Water Resources Institute at Rutgers University, the last year and a half of this service as consultant to the D & R Canal Commission. While at Rutgers, he served as chairman of the university's Council on Water Resources, chairman of the Urban Water Resources Research Council of the American Society of Engineers, and president of the American Water Resources Association. Gen. Whipple was an advisor and consultant for the New Jersey Water Supply Master Plan. The major part of his career was with the U.S. Army Corps of Engineers from which he retired with the rank of Brigadier General. □

Update

PARKS SAVED FROM CLOSURE

Eleven state parks slated for closure because of the lack of operating and maintenance funds, remained open because the Joint Appropriations Committee of the New Jersey Senate and Assembly, by special resolution on June 18, placed an additional \$2 million into the proposed DEP budget for the new fiscal year (July 1, 1981—June 30, 1982). The resolution earmarked the money solely for State Park Service operations. Commissioner English expressed appreciation for extremely strong citizen support and the responsible support of elected officials and legislators to restore critical funding which, if not available would have caused the closing of the parks and severe curtailment of other park operations and maintenance this summer. (See NJO, July/August.) □

WILDLIFE TAX "CHECK OFF" OK'D

Senate bill No. 1360 which provides for a check-off on State Income Tax forms for a portion of taxpayers refund to be applied to an "Endangered and Non-Game Species of Wildlife Conservation Fund" was signed into law by Governor Byrne on June 19. Effective January 1, 1982—the beginning of the new tax year—a taxpayer entitled to a refund can indicate on his return a desire to have \$2, \$5, or \$10 deducted from his refund as a contribution to the fund. This money will be appropriated to DEP to enforce the 1973 Endangered and Non-Game Species Act. The money will be used for a comprehensive program of wildlife protection.

This tax "check-off" will provide the funding necessary to conduct research, management and protection programs in three areas: programs designed to manage and protect the 52 endangered and threatened species in the state; programs to manage over 500 other non-game species; and for regulation of exotic, non-native, and usually captive species of wildlife brought into the state.

DEP Commissioner English, who witnessed the signing, explained that the 1973 Endangered and Non-Game Species Act called for an annual appropriation of \$100,000 to protect endangered and non-game species, but the program has never been funded more than 80 percent. The greatest contribution to the fund from the state was \$48,000 in 1978. "With the remainder of the monies being federal funds, the program was in itself becoming an endangered species," said the Commissioner. "The Division of Fish, Game and Wildlife as well as naturalists, conservationists, and sportsmen in the state are very pleased the "check-off" measure became law. It will ensure the continuation of the Endangered and Non-Game Species program," she said.

A 'FIRST' FOR DEP FORESTER

Otto W. Kunkel, principal forester with DEP's Bureau of Forestry Management, is the first state forester in the country to receive the Bronze Tree Farm Hat award from the American Forest Institute under its National Tree Farm Inspector Award Program. The institute presents "hard hat" awards to inspecting foresters who have accomplished at least 25 new Tree Farm inspections. Kunkel, who inspected his first tree farm in 1959, currently has credit for 28 inspections. Forester Kunkel, who joined the Bureau of Forestry Management in 1949, is now responsible for the bureau's Nursery and Tree Improvement programs. An alumnus of Rutgers University, Kunkel did graduate work in the forestry school of Yale University. □

Update: ROLLINS REOPENS ON PROBATION FOR 60 DAYS

DEP Commissioner English announced on July 23 that the department had signed an Administrative Consent Order with Rollins Environmental Services of Logan Township (Gloucester County), allowing the hazardous waste facility to resume full incineration operations for a period of 60 days, after the company agreed to the two remaining issues that had been under negotiation.

According to Jack Stanton, director of DEP's Division of Environmental Quality, in order to obtain this authorization for operation, Rollins, although already meeting air quality standards, signed a binding order to upgrade its waste incinerator at a cost estimated in excess of \$1.5 million over a two-year period.

Stanton said that Rollins also committed to complete the proper closure of the now terminated on-site basins over a three-year period and to establish a permanent trust fund for the long-term maintenance and upkeep of the closed basins. Estimates of the cost for this long-term care program are now being developed.

"Over the next 60 days," Stanton stated, "the department will evaluate operations at Rollins to determine whether a full year Temporary Operating Authorization (TOA) should be issued if the company successfully meets the standards for safe operations during this probationary period." Towards that end, we are preparing a draft TOA, to be reviewed and commented on by DEP, Rollins, Logan Township, Gloucester County, and the state department of the Public Advocate. "We intend to make sure," he added, "that the hazardous waste management industry in New Jersey develops a track record of safety and responsibility second to none."

Background: DEP had suspended the firm's permit following an explosion which damaged its incinerator on May 4 (See NJO, July/August). Under terms of a consent agreement signed June 18 Rollins was permitted to resume limited operations—to accept, store and incinerate only liquid and gaseous wastes—for 30 days, through July 15. DEP extended this authorization another seven days to give Rollins time to prepare DEP-required revisions to its plan for safe closure of basins containing land-filled incinerator ash and provide time for the signing of a consent order between DEP and Rollins specifying operating rules and upgrade requirements for the rotary kiln incinerator damaged by the explosion. □

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Continued from page 16A

TOXIC DUMP RANKINGS

A second ranking was performed in which only fire and explosion hazards were considered and this list was headed by the Chemical Control site in Elizabeth with an 81 and the Goose Farm with a 71. Both of these sites have been the target of substantial state and federal cleanup efforts in the past year. At both of these sites, the only remaining activities involve disposal of waste material which was delayed, due to a lack of available state or federal funds. The DEP estimates that with Superfund, full disposal of remaining material could take place at the Goose Farm and Chemical Control for \$2.2 million and \$0.6 million respectively, which would remove both of these sites from the overall site ranking lists. Commissioner English stated, "With under \$3 million of immediate Superfund money, we could completely eliminate the remaining hazards in a matter of months at these two sites, which have been two of the state's biggest toxic atrocities. Over \$30 million has already been spent on these two sites in the past 18 months, effectively removing them from the top of our overall list."

Tyler stated the third ranking category, which covers direct human contact, was headed by the Chemical Control site with a 97, and followed closely by six other sites, (the Price site, Pijak site in Plumsted Twp., the Motel Dennis site in Hamilton Twp., the Bridgeport Rental site in Logan Twp., the Li Pari site in Pitman, and the Newark Stamp and Die site in Newark) scoring an 88 each. The Williams Property site in Middle Twp. and the Lone Pine site in Freehold also received very high rankings in several of the categories.

THE SITES

Here's a list of the 22 ranked sites. MITRE ratings run from 0 to 100, with 100 representing the worst possible immediate hazard.

	Overall	Fire and Explosion	Direct Contact
Price's Landfill Egg Harbor Twp./ Pleasantville Atlantic Co.	87(A)	53	88(B)
Burnt Fly Bog Marlboro Twp. Monmouth Co.	86	28	75
Spence Farm Plumsted Twp. Ocean Co.	81(C)	22	73
Goose Farm Plumsted Twp. Ocean Co.	74	71	21(D)
Pijak Farm Plumsted Twp. Ocean Co.	74	5	88
Lone Pine Freehold Monmouth Co.	73	25	75
Upper Freehold Monmouth Co.	66	0	75

Williams Property Middle Twp. Cape May Co.	66	0	79
Motel Dennis Hamilton Twp. Atlantic Co.	63	46	88
Bridgeport Rental Logan Twp. Gloucester Co.	61	26	88
Li Pari, Pittman Gloucester Co.	56	61	88
Chemical Control Elizabeth Union Co.	56	81	97
Bog Creek Farm Howell Monmouth Co.	55(E)		
Krysovaty Farm Hillsborough Somerset Co.	44	0	50
Kin Buc Edison Middlesex Co.	41	63	19
King of Prussia Winslow Twp. Camden Co.	35(E)		
North Bergen Drum Dump North Bergen Twp. Hudson Co.	13	0	81
200 Pacific St. Jersey City Hudson Co.	1	0	31
Barczewski St. Dump, Kearny Hudson Co.	1	0	81
Newark Stamp and Die Newark Essex Co.	1	14	88
466 Wilson Avenue Newark Essex Co.	0	0(F)	0(F)
Gordon Services Jersey City Hudson Co.	0	0	54

- Reflects ground and surface water impact on drinking water reservoir—without this pathway ranking is 66.
- Reflects documentation of existing health effects—without this point ranking is 29.
- Reflects impact on New Egypt city well—without this ranking is 71.
- Reflects 24-hour guard service, provided by State—without this ranking would be much higher.
- Tentative ranking based on preliminary data—EPA Region II will handle the final ranking.
- Data on exact chemicals involved is being analyzed—when data is available a higher ranking can be expected.

KEEP OLD HUNTING LICENSES

With the fall hunting season approaching, DEP's Division of Fish, Game and Wildlife reminds New Jersey hunters to save their old firearm or bow hunting licenses to avoid being required to take, or repeat, a hunter education course. State law mandates that both adults and juveniles applying for firearm or bow and arrow hunting licenses must present their previous licenses (any state, any year) or a properly signed certificate showing that the applicant has satisfactorily completed the appropriate hunter education course. □

Wildlife in New Jersey



suburban raccoons in New Jersey outnumber their rural cousins four to five times. Their density is about four per acre.

Slate believes suburban raccoons do better because they take full advantage of human surroundings. He found one group living in the false ceiling of a department store in a shopping mall. At night they raided the candy storeroom. Most suburban raccoons also have little to fear from hunters, Slate points out.

The woodchuck and the red fox have also profited from man's alteration of the landscape, although not in the same way as the raccoon and opossum. Neither the 'chuck or fox eat much garbage but the cutting down of the pre-Colonial woods in New Jersey and other eastern states made more open land and thus more food available for these species—vegetation in the case of the woodchuck and small rodents in the case of the red fox. Both are more plentiful today than they were before the settlers arrived and the red fox has increased its range enormously in the United States. In New Jersey, woodchucks now live in both rural and suburban areas, eating garden and farm crops as well as wild vegetation. The red fox is mainly a rural creature, although some are found in semi-rural suburbs like my own. The red fox got at least one other form of indirect help from man; the importation of the European red fox. It bred with the rare native red fox and helped the hybrid species increase its numbers.

We don't give much direct help to any of these medium-sized creatures and we don't have to; they are very successful on their own. The white-tailed deer, however, receives major help from man. Without it, it could not survive in modern America. At the turn of the century, the white-tailed deer was almost extinct in New Jersey and many other eastern states, largely as a result of a thriving market in venison. Commercial hunters killed white-tailed and other wild game the year round to supply the market. Legislation banning commercial hunting for wild game and the rise of the new science of game management came along just in time to save the white-tail. By 1909, there were enough white-tails in New Jersey again to hold a sport hunting season. Almost five hundred deer were killed.

Since then, the New Jersey white-tail has enjoyed a steady rise in numbers to its present population of about 100,000. David Burke, head of the New Jersey Deer Project, within DEP's Division of Fish, Game and Wildlife, sees no reason why the white-tail cannot continue to make its home in New Jersey in large numbers for the near future. The state, he points out, still has some 3,300,000 acres of open land suitable for white-tails, most of it in the northern third of the state where farming is a major activity. The deer density in Hunterdon County is as high as 100 per square mile, a higher

density than in most states. Like most smaller New Jersey mammals, white-tails do best, not in dense woods, but in a mixture of open land and woods that offers maximum food. A thriving population of white-tails even manages to exist in suburbs like my own, which retain some open land and patches of woods. One characteristic that helps white-tails in a crowded state like New Jersey is their comparatively modest need for space. Studies of tagged New Jersey deer show most of them travel only a mile or less from where they are tagged.

New Jersey land is changing rapidly, however, and these changes will affect today's successful wildlife. When I look out my back window, I can see a new housing development going up on land where we used to see white-tails feeding in the evening. Just down the road, a much larger development is being considered for land that now has about 30 deer. The New Jersey Department of Environmental Protection recently estimated that 7000 acres of wildlife habitat in the state are lost to development each year. The creature that will be most affected by these land changes is the white-tailed deer, which needs just the mixture of farmland and woods that will be much scarcer in the New Jersey of the future. Public land will help the deer, of course, but our 400,000 acres will be too little to stabilize the white-tail's population at the present level. A hundred years from today, the white-tail may exist only as a small remnant population in areas like Great Swamp National Wildlife Refuge.

The other common mammal that will probably decline in the New Jersey of the distant future is the red fox. Like the deer, this species will suffer from the conversion of farmland to houses, shopping malls and highways.

But there are considerably better prospects for the other sizeable creatures that are thriving in the New Jersey of 1981. All the Canada goose needs is a pond and a field or two, requirements that should be met even in a more developed New Jersey. The multiplication of corporate headquarters, many with ponds and extensive lawns, may mean the big goose will do even better tomorrow than it is today. More people means more garbage, of course, and this is a phenomenon that should help the herring gull in New Jersey and other states. The expansion of its breeding range into the southern states is already being predicted. As for the raccoon, the opossum and the woodchuck, they have already proved that they can flourish in the suburbs and the more extensive suburbs of the future may mean more of all of these adaptable beasts.

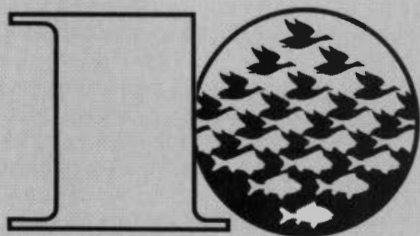
All in all, it's a fairly bright picture for most of the creatures that have attained success in the nation's most crowded state. But the even more crowded New Jersey of the future may not have enough room for its only large animal, the white-tailed deer. □

Fungus Fest '81—A Wild Mushroom Fair

MYCOLOGY IS MUSHROOMING. MUSHROOMS ARE FUNGI. The New Jersey Mycological Association presents an all day "Fungus Fair" as an educational experience in mushrooms for the general public at the Somerset County Park Commission's Environmental Education Center on Lord Stirling Road in Basking Ridge, N.J. on Sunday, October 11, 1981, from 11:00 AM to 5:00 PM.

For any additional information, call either the Center at 201-766-2489 or the New Jersey Mycological Association at 201-359-5373.

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Super Trees Invade New Jersey

By Donald Knezick

For years, foresters in the Northeast have been searching for a tree that would combine fast growth, good form, and high quality wood with the ability to grow in colder climates on poorer soils. That dream is now approaching reality, primarily due to the hard work and farsighted thinking of Dr. Silas Little. Dr. Little, a recently retired research scientist with the United States Forest Service (and a New Jersey resident), initiated the search for a "super tree" in 1963. Working in cooperation with various State, Federal, and private forestry agencies, Dr. Little was able to create a hybrid of exceptional growth, form, and wood characteristics, which grows in the colder and less fertile areas of the Northeast.

Years ago, Dr. Little observed natural hybrids of pitch pine and loblolly pine growing near loblolly plantations within the N.J. Pine Barrens. Loblolly pine is a fast-growing tree with good form. It is one of the most important tree species used for pulpwood and timber production in the Southeast. Unfortunately, it only grows naturally in the southernmost sections of New Jersey. Pitch pine, on the other hand, generally grows slowly and has poor form, but it does have many of the same wood properties of loblolly and the ability to grow on less fertile sites. The range of pitch pine is primarily at low elevations north of South Jersey and at higher elevations west and south of New Jersey in the Appalachian Mountains. Having seen some well-formed and relatively fast-growing natural hybrids of pitch pine and loblolly pine, Dr. Little saw the possibility for a hybridization

project that could create a superior tree for the colder and less fertile areas of New Jersey and the Northeast.

Operating out of the Lebanon State Forest branch of the Northeastern Forest Experiment Station (a division of the U.S Forest Service), Dr. Little and his cooperators collected branch tip cutting (scions) from the best pitch pines in the Northeast and the best loblolly pines in Maryland and Delaware. These cuttings were grafted to rootstock and planted at the Lebanon Experiment Station. After five years, when the grafted trees started to produce cone flowers (conelets) and pollen, cross pollination experiments were initiated.

To create hybrids, pollination bags are placed over developing pitch pine conelets. When the conelets are receptive, loblolly pollen is injected into the bags. Because the only pollen in the bags is loblolly, all fertilized seed in the developing cones are hybrids. Pitch pine pollen is also used to pollinate loblolly conelets using the same technique. When the cones mature after two summers, they are harvested and the seed is sown in the nursery. After one year in the nursery bed, the hybrid seedlings are set out into plantations. Since the first planting in 1971, 52 hybrid plantations have been established in 12 Northeastern states. To date, many hybrid families have proven to be hardy enough to survive in areas too cold for loblolly pine, while exhibiting rapid growth and good form.

Pitch x loblolly hybrids have drawn considerable attention. Many state forestry departments, forestry companies, and even several foreign countries have expressed interest in the project. They feel that the hybrids have the potential to be a valuable crop on thousands of acres of land previously thought to be of low productivity. Growing hybrids on this land could increase the opportunities of the forest industry in several sections of the



Silas Little, 3rd from left, leads New Jersey, Korean, U.S. Forest Service, and Westvaco foresters on tour of Lebanon Forest Experiment Station.

Northeast. Foresters in the south are also interested. A severe disease (fusiform rust) has prevented the planting of loblolly pine on thousands of acres of prime forest land in the deep south. Initial tests show the hybrid to be very resistant to fusiform. Pitch x loblolly hybrids appear to be one solution to this problem.

The importance of this breakthrough has been recognized by New Jersey officials as well. The New Jersey Bureau of Forest Management has been a primary cooperator in the project since its inception. The state's future role in the project has been assured by the signing of a cooperative agreement with the U.S. Forest Service in 1979.

There are still many questions that must be answered before pitch x loblolly hybrids will be available for mass planting. The most important of which is how to mass produce the hybrid economically. Since controlled pollination is done by hand, it is very time consuming and costly. A number of experiments are now being conducted to alleviate this problem. Several potential

Inspecting seedlings in nursery bed.



PHOTOS BY AUTHOR

Seven year old hybrids growing in the mountains of West Virginia.

solutions include: mistblowing of pollen, self-fertilizing hybrid orchards, and vegetative propagation.

Despite the challenges which face the project, everyone involved is optimistic that an answer will be found. Considering

Protection of grafted trees in orchard.



Conelets enclosed in a pollination bag.

the benefits to be gained, all of the time and hard work will be well worth the effort. When mass production techniques are developed it will mean not only more productive forests, but a greener New Jersey as well. □

Rooted hybrid cuttings in greenhouse.



"OPERATION GREENDIKE"

by Deborah A. Boerner

PHOTOGRAPHS BY CHIP HOEVER

With summertime still on our minds, it's easy to assess the importance of the Jersey shore. Besides being economically important as a summer tourist attraction, the beach has a special hold on people the year round. Whether it be a vacationer sunbathing, an angler fishing, or a least tern trying to find a place to lay her eggs, the shore is an important part of everyone's ecosystem.

The most important function of the beach and barrier islands, however, is that they buffer the mainland against summer hurricanes and winter storms. During these storms, the waves carry away some of the beach sand. After each storm, there's a little less beach, and in time, the beach becomes noticeably narrower. Sandy Hook, losing 80 feet of beachfront in five years, is close to being cut off from the mainland and made into an island. The ocean now laps up under the boardwalk in the northernmost parts of Atlantic City and Ocean City. Wildwood has lost more than 1000 feet of beachfront since 1952. In Sea Bright, erosion was so severe that a seawall had to be built to keep the sea from swallowing homes that were built some fifteen years earlier behind what was then a wide beachfront. Today, no beach exists there.

Most beach communities have built jetties to guard against such erosion. When a storm is predicted, straw or hay bales are sometimes used to help hold the beaches. On Long Beach Island, a somewhat different approach has been taken. Each year, the Long Beach Island Conservation Society sponsors the planting of dune grass on the island in a program called "Operation Greendike". Dunes are the beach's own natural protection against erosion, so the purpose of "Operation Greendike" is to help the dunes do their job a little better. The borough's concern in preventing beach erosion is evident in its tough dune protection ordinance; there is a \$200 fine for walking on the dunes.

"Operation Greendike" was started in 1960, but it wasn't until two years later, after the storm of 1962, that it developed into the full-scale operation it is today. Throughout the years, Boy Scout troops and local residents have volunteered to participate in the program. Boy Scout Troop 10 of Lower Makefield, Pennsylvania has been involved in "Operation Greendike" for the past nineteen years. In the Spring of 1980, the troop was awarded the Hornaday Award by the National Council for its continuing efforts in conservation.

Last October, Troop 10 planted approximately 2000 plants in Barnegat Light in the vicinity of 27th Street; Troop 20 from New Brunswick, N.J. helped with the planting last year. In all, more than 29,000 plants were distributed and planted at that time, the other 27,000 or so plants being sold to residents who wished to plant them on their own dunes. The Conservation Society supplied the plants to the Scouts, as it has for the last five years. Residents bought their plants for about \$9.00 per 100 plants.

This year, "Operation Greendike" will take place on the weekend of October 10th and 11th. For more information, contact Jerome Walnut, President of the Long Beach Island Conservation Society, at P.O. Box 245, Barnegat Light, N.J. 08006 or call him on a weekend at (609) 494-2096. □

Assembled on the beach near the work area, Jerry Walnut, (in red shirt) of the Long Beach Island Conservation Society, explains that the new grass must be planted 10-12 inches down in the sand in order for it to take root.



Assistant Scoutmaster Thomas E. Russell keeps a watchful eye on the troop as they plant grass on the dunes.





Before the troop started out to the plant dune grass, the events of the day were outlined and planting procedures were explained.



A new plant.



Bill Amadio opens bundle of dune grass plants.



*53rd Annual Memorial Service
for the late Emilio Carranza
on Saturday, July 11*

Carranza Memorial Park

(deep in the Pine Barrens)

The memorial service is held every year on the Saturday closest to July 14th, which was the date in 1928 that Captain Emilio Carranza crashed. Captain Carranza was making the return trip to Mexico after a goodwill flight to Washington, D.C.

PHOTOS BY CAROL NASH



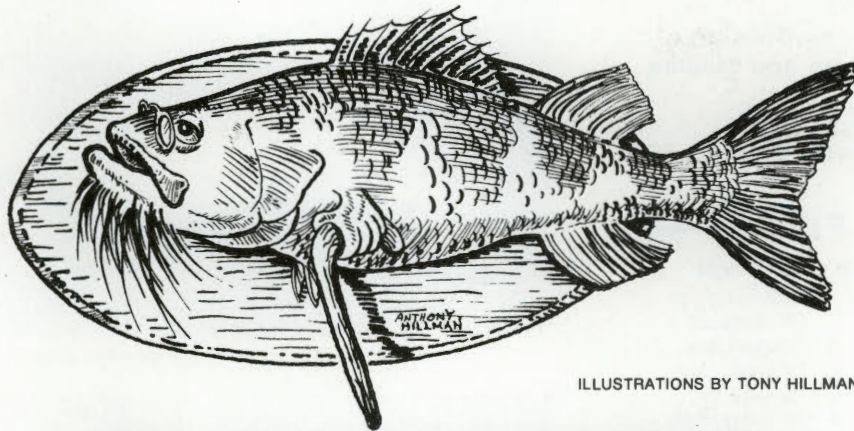
From left to right in white,
Patricia Medina, Mirta
Duran, and Jacqueline
Medina



The Color Guard



Juanita Garcia



ILLUSTRATIONS BY TONY HILLMAN

THE 116 YEAR-OLD PERCH

WAYNE HEINZE

Ready for a short quiz? Okay, here goes: the category is all-tackle world-record fishes. Question One: Which state claims the oldest freshwater world's record? Question Two: Which is the only state that has yielded two current world-record catfish? Question Three: What state had its world-record fish eclipsed by a mere three ounces, but had previously produced a specimen three pounds heavier? Well, in case you haven't guessed, the answer to all three questions is *New Jersey*.

The Garden State is known throughout the angling community primarily for its outstanding saltwater fishing. And indeed, several current and past all-tackle, line class, and fly rod world records have come from our coastal waters. But New Jersey's place in the annals of freshwater fishing is often obscured. We have a long and proud heritage of freshwater fishing in our state, some of which is reflected in our contributions to the list of all-time, all-tackle world's records. For more than half a century these freshwater records were maintained by *Field & Stream* magazine. However in 1978 *Field & Stream* turned their records over to the International Game Fish Association, the perennial keeper of saltwater records. The same year saw IGFA absorb the records of the Salt Water Fly Rodders and the International Spin Fishing Association, to make IGFA the repository for all angling records.

Let's look now at some of these records that have come from the Garden State. (Refer to the N.J. Record Fish List on page 24 & 25.) The year 1865 conjures up memories of the Civil War and Abraham Lincoln, and it was in that era that the oldest

freshwater record was set. In May of that year, Dr. Charles C. Abbott caught a yellow perch (*Perca flavescens*) from Crosswicks Creek that tipped the scales at 4 lb 4 oz. As a result of that catch, Crosswicks Creek, lying along the border of Mercer and Burlington County, holds the distinction of having produced a fish that has endured as a world record for 116 years! Yellow perch, particularly stream fish, do not grow very large. Dr. Abbott must have guessed he'd hooked a bass or pickerel when he first felt the fish. Yellow perch average only a pound to a pound and a half over most of their range, a two-pounder is a good fish, and anything over three, rare. The natural range of the yellow perch is the eastern half of Canada and the U.S., through the mid-South. If Dr. Abbott's record is to be broken, it will probably happen in the Great Lakes region, where perch from three to four pounds are occasionally reported. Lake Erie in particular has good perch habitat, but 116 years is a long time, and no one has topped Dr. Abbott's "raccoon perch" yet.

When a person thinks of catfish, he thinks of the South, the Mississippi River, Santee-Cooper, or hushpuppies. But New Jersey is the only state to currently claim two world-record catfish. The largest white catfish and brown bullhead ever caught, were caught in New Jersey. In June of 1976, Lewis Lomerson was fishing in the Raritan River when he caught a white catfish (*Ictalurus catus*) which weighed in at 10 lb 5 oz, a new state and world record. It was a fitting tribute to one of our state's most underutilized resources. The bullheads are traditionally

popular with anglers from toddlers to senior citizens. And the glamour fish of the clan, the channel catfish, is even stocked in some waters by the state. The white catfish fills a niche between these two species, being less nocturnal than the bullheads and more omnivorous than the channel cat. And obviously, in New Jersey waters it grows to record size.

For many years, no white catfish record was listed in the books for New Jersey. For whatever reason, no one entered a white catfish for consideration, although the fish is plentiful and several large specimens must have been caught. Besides the Raritan River, white catfish are abundant in the Delaware River, Delaware-Raritan Canal, and Lake Hopatcong. The white catfish is a fair-sized fish over most of its range, averaging perhaps two pounds, with fish in the five- to six-pound range considered very big. A renewed interest in spotfishing for catfish is developing in the South, and that is the region that will most likely produce a fish to threaten our record. But until then, Jersey anglers know that Rutgers isn't the only thing found along the banks of the old Raritan—there are some pretty big white catfish flopping around there too.

The other world-record catfish from New Jersey, the brown bullhead (*Ictalurus nebulosus*) was caught by Robert Dorf in Spring Lake, Monmouth County in 1966. For sheer size in terms of the species, this is probably the most remarkable record fish of all time. Dorf's lunker weighed 22 lb 15 oz, a good catfish anywhere regardless of the species. But this fish was a brown bullhead, a fish that seldom exceeds three or four pounds, and is much more common at a pound or less. While the IGFA unfortunately does not list the brown bullhead in its records, it does have a category for black bullhead, an almost identical fish. The largest black ever caught weighed only 8 lb, so our bullhead is almost three times larger than the next largest specimen ever verified. To get even better perspective, the occurrence of this fish would be similar to a 60-lb plus largemouth bass. This leviathan from Spring Lake may be the most difficult of all records to beat. The percentage of any fish that grow to record size is small, and one that exceeds the normal growth parameters, as did this brown bullhead, must be extremely rare. The brown bullhead is widely distributed throughout the

Continued on page 32

NEW JERSEY RECORD

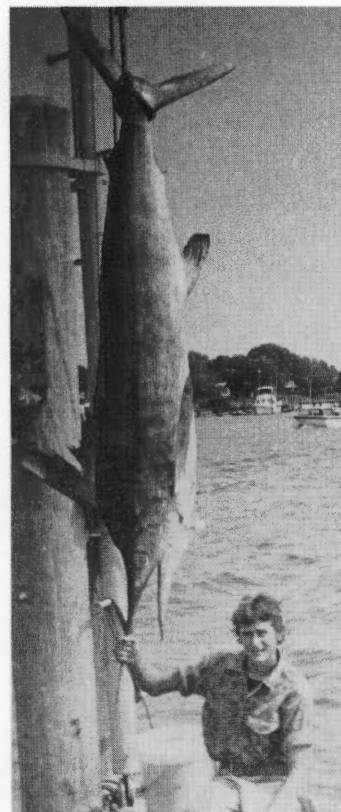
May, 1981
New Jersey Division of
Fish, Game and Wildlife
CN 400
Trenton, NJ 08625
Telephone: (609) 984-6293

SALTWATER SPORT FISH

Species	Angler	Year	Lb.	Oz.	Where Caught
Albacore	Walter Citimm	1961	69	1	Hudson Canyon
Amberjack, greater	Russell M. Smith	1979	39	0	Off Wildwood
Bass, black sea	C.N. Davis, III	1973	6	4	Delaware Bay
Bass, striped	Donald Zboyan	1970	68	0	Off Sandy Hook
Bluefish	William Di Santo	1971	23	14	Off Cape May
Bonito, Atlantic	Frank G. Lykes, Sr.	1945	13	8	Off Sandy Hook
Cobia	Eli P. Hitchner	1972	45	2	Delaware Bay
Cod	Joseph Chesla	1967	81	0	Off Brielle
Croaker, Atlantic	Charles Kricher	1979	4	5	Delaware Bay
Dolphin	W. Scott Smith, Jr.	1974	63	3	Baltimore Canyon
Drum, black	John R. Tumbelty	1980	102	12	Delaware Bay
Drum, red	Bud K. Whitley	1978	51	9	Delaware Bay
Fluke	Walter B. Lubin	1953	19	12	Off Cape May
Flounder, winter	Anna Kelleman	1981	3	4	Great Egg Harbor
Mackerel, Atlantic	John Lucadema	1978	3	6	Off Barnegat Inlet
Marlin, blue	George Prestosh	1980	715	0	Hudson Canyon
Marlin, white	Michael Marchell	1980	137	8	Hudson Canyon
Pollack	Phillip Barlow	1964	43	0	Off Brielle
Porgy	Victor F. Rone	1976	5	14	Delaware Bay
Seatrout, spotted	Bert Harper	1974	11	2	Holgate, surf
Shad, American	Rodger G. West	1967	7	0	Great Bay
Shark, blue	Bill Tybor	1978	241	0	Off Brielle
Shark, hammerhead	James J. Campbell	1980	134	8	Hendrickson Canyon
Shark, shortfin mako	F.F. Glockner	1979	483	0	Off Point Pleasant
Shark, thresher	Michael S. Tevis, Jr.	1980	583	0	Mud Hole
Shark, tiger	Jacob Garey, Jr.	1977	791	0	Off Brielle
Shark, white	Dr. Joseph J. Rabb	1980	345	0	Off Point Pleasant
Spearfish, longbill	Arthur W. Ponzio, Jr	1980	16	0	Spencer Canyon
Swordfish	Edmund Levitt	1964	530	0	Wilmington Canyon
Tarpon	Erich K. Cornely	1980	52	8	Off Long Branch
Tautog	R.N. Sheaffer	1954	21	6	Off Cape May
Tuna, bigeye	Frank W. Janiec	1978	350	0	Hudson Canyon
Tuna, bluefin	Allan J. Ristori	1980	1022	0	Mud Hole
Tuna, yellowfin	Wayne Brinkerhoff	1980	290	0	Hudson Canyon
Tunny, Little	Mark A. Niemczyk	1977	24	15	Off Sea Bright
Wahoo	Charles Dooner	1976	114	0	Off Atlantic City
Weakfish	A. Weisbecker, Jr.	1952	17	8	Mullica River



Muskellunge—35 lbs. 2 oz.—Ben Ribaudo



White Marlin—137 lbs. 8 oz.
Michael Marchell



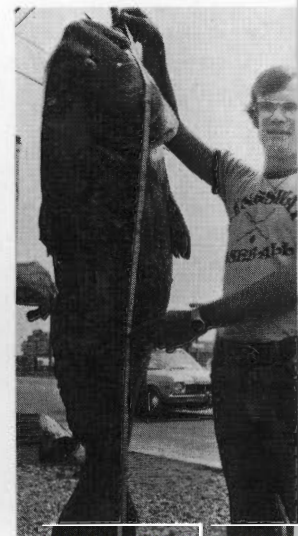
Hammerhead Shark—134 lbs.
James J. Campbell

FRESHWATER SPORTS FISH

Species	Angler	Year	Lb.	Oz.	Where Caught
Bass, largemouth	Robert A. Eisele	1980	10	14	Menantico Pond
Bass, rock	R.E. Mahler, Sr.	1979	1	3	Lake Hopatcong
Bass, smallmouth	Earl H. Trumppore	1957	6	4	Delaware River
Bass, striped	Elwood W. Bernat	1978	27	12	Union Lake
Bluegill	Mike Ayers	1974	2	1	Farm pond, Sussex
Bowfin	Alfred A. Hughes	1979	4	3	Big Flat Brook
Bullhead, brown	Robert Dorf	1966	22	15	Spring Lake
Carp	John A. Pisa	1971	41	2	Delaware River
Catfish, channel	William Otten	1918	28	0	Greenwood Lake
Catfish, white	Lewis Lomerson	1976	10	5	Raritan River
Crappie, black	James A. Blackburn	1980	3	8	Bass Lake
Crappie, white	James A. Blackburn	1980	1	9	Forans Lake
Muskellunge	Ben Ribaudo	1980	35	2	Delaware River
Muskie, tiger	Frederick W. Rehm	1980	14	8	Delaware-Raritan Canal
Perch, white	Robert Huber	1950	2	8	Lake Hopatcong
Perch, yellow	Charles C. Abbott	1865	4	4	Crosswicks Creek
Pickereel, chain	Frank McGovern	1957	9	3	Lower Aetna Lake
Pike, northern	Herb Hepler	1977	30	2	Spruce Run Reservoir
Salmon, Atlantic	John A. Mount	1951	8	0	New Wawayanda Lake
Shad, American	J. Edward Whitman	1978	9	4	Delaware River
Trout, brook	George J. Hornung	1956	6	8	Lake Hopatcong
Trout, brown	Howard Devore	1964	16	11	Greenwood Lake
Trout, rainbow	Joel Rosenstein	1979	8	13	Round Valley Reservoir
Walleye	Stanley Norman	1934	12	13	Delaware River



Winter Flounder—3 lb. 4 oz.
Anna R. Kelleman



Black Drum—102 lbs. 12 oz.
John B. Tunney

THE FISH THAT DIDN'T GET AWAY

by Deborah A. Boerner

Remember the fish that got away. The more you think about it, the bigger you seem to think that fish was. Well, for some, the big one didn't get away and the Division of Fish, Game, and Wildlife has the records to prove it.

The state record lists as of May 1981 for saltwater and freshwater sport fish appear here. Eleven new state record saltwater sport fish have been recognized and added to the list since early 1980. They are:

A black drum weighing 102 pounds and 12 ounces caught by John B. Tumbelty in Delaware Bay on May 25, 1980.

A winter flounder weighing 3 pounds and 4 ounces caught by Anna R. Kelleman in Great Egg Harbor on April 1, 1981.

A blue marlin weighing 715 pounds caught by George Prestosh over Hudson Canyon on September 6, 1980.

A white marlin weighing 137 pounds and 8 ounces caught by Michael Marchell over Hudson Canyon on August 30, 1980.

A hammerhead shark weighing 134 pounds and 8 ounces caught by James J. Campbell over Hendrickson Canyon, July 12, 1980.

A thresher shark weighing 583 pounds caught by Michael S. Tevis, Jr. at the Mud Hole on October 4, 1980.

A white shark weighing 345 pounds caught by Dr. Joseph J. Rabb off Point Pleasant on June 28, 1980.

A longbill spearfish weighing 16 pounds caught by Arthur W. Ponzio, Jr. over Spencer Canyon on August 1, 1980.

A tarpon weighing 52 pounds and 8 ounces caught by Erich K. Cornely off Long Branch on August 9, 1980.

A bluefin tuna weighing 1022 pounds caught by Allan J. Ristori at the Mud Hole on September 11, 1980.

A yellowfin tuna weighing 290 pounds caught by Wayne Brinkeroff over the Hudson Canyon on August 23, 1980.

The five newest record freshwater sport fish recognized by the New Jersey Division of Fish, Game, and Wildlife are as follows:

A largemouth bass weighing 10 pounds and 14 ounces caught by Robert A. Eisele in Menantico Pond on June 5, 1980.

A black crappie weighing 3 pounds and 8 ounces caught by James A. Blackburn in Bass Lake on May 26, 1980.

A white crappie weighing 1 pound and 9 ounces, also caught by James A. Blackburn in Forans Lake on May 22, 1980.

A muskellunge weighing 35 pounds and 2 ounces caught by Ben Ribaldo in the Delaware River on October 17, 1980.

A tiger muskie weighing 14 pounds and 8 ounces caught by Frederick W. Rehm in the Delaware-Raritan Canal on April 18, 1980.

For more information about the New Jersey state record fish program and application forms, send a stamped, self-addressed Number 10 envelope to: Record Fish, New Jersey Division of Fish, Game, and Wildlife, CN 400, Trenton, New Jersey 08625.



Blue Marlin—715 lbs.
George Prestosh



Thresher Shark—583 lbs.
Michael S. Tevis



Bluefin Tuna—1022 lbs.
Allan J. Ristori

Continued from page 7

Tornadoes in New Jersey?

Seventeen of our tornadoes traveled the very short distance of between zero and one-half mile. Overall, we can characterize our twisters as ones that travel six miles or less. Some do travel respectable distances, however, even as much as 70 miles!

Table 5 lists the 21 counties and the number of tornado segments that have occurred in each during the period 1951 to 1978, plus the two killers.

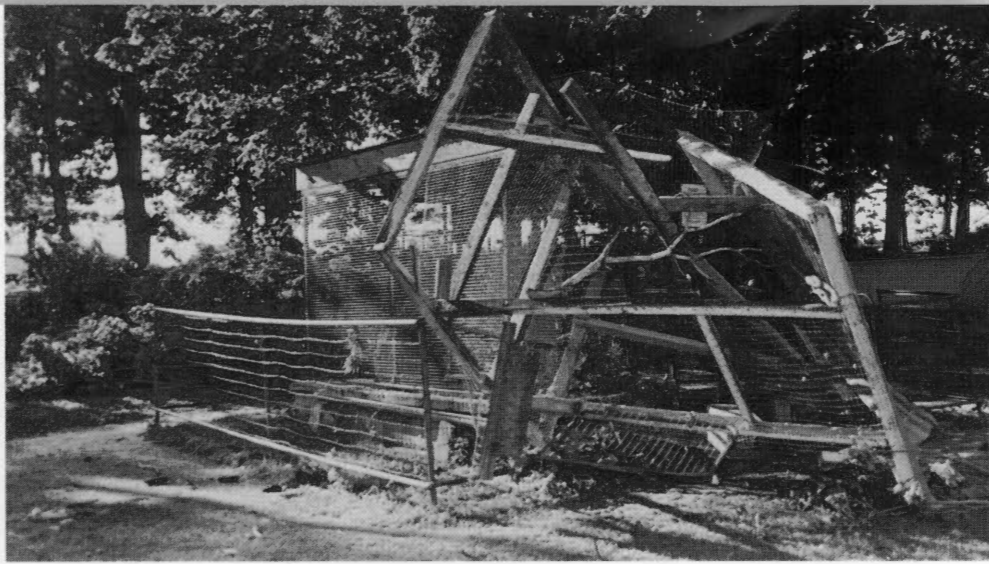
Table 5

Frequency For Each County

Atlantic	2x2
Bergen	5
Burlington	5s2
Camden	3s1
Cape May	2x1
Cumberland	3
Essex	1
Gloucester	3k
Hudson	1
Hunterdon	4
Mercer	4
Middlesex	0
Monmouth	5
Morris	4
Ocean	5
Passaic	0
Salem	2
Somerset	2
Sussex	0
Union	2
Warren	3k
	<hr/>
	56

(2 storms crossed county lines and so are counted twice)

Perusing the table one sees that the counties most likely to experience a twister are Monmouth, Ocean, Burlington, and Bergen. Hunterdon and Mercer are not too far behind. Notable is the absence of any tornadoes in Middlesex, Passaic, and Sussex counties. Political boundaries, of course, means nothing to Mother Nature and we have seen evidence of this in two events where the funnel traveled from one county to another. On July 14, 1958 a twister passed from Camden Co. (s1 in the table) to Burl-



Twisted bird cage 200 feet from location

ington Co. (s2). On August 27, 1971 one traveled from Cape May Co. (x1) to Atlantic Co. (x2 in the table).

Compared to the big brothers in the Midwest, damage, loss of life, and the number of injuries resulting from New Jersey tornadoes are low indeed. As far as my NSSFC tabulations shows, two funnels caused 12 and 25 injuries, respectively. Surprisingly, the "killer" of 1929 caused no injuries (but one death) and that of 1941 caused 25 injuries (and one death).

Property damage can be considerable of course. Of the 46 events (54 segments), 22 resulted in up to \$500,000 damage. Sixteen events damaged property in amounts up to \$50,000. One tornado and the weather that accompanied it, on July 13, 1975 in Cumberland County caused up to \$50 million in damages.

The Two Killers

The original newspaper accounts of these severe weather events are now in microfilm collections at most town, city, and college libraries. One can go back in time and live history all over again.

Our Warren County fatality occurred during a fierce twisting wind-storm that entered New Jersey from neighboring Pennsylvania on Tuesday, April 2, 1929. The storm itself was most furious along the Delaware River near Portland, Pa., and Columbia, N.J., just south of the Delaware Water Gap. During the storm's passage a Polkville, N.J., farmer took refuge in his farmhouse only to have the house collapse on top of him. This sad event also found two of his

cars twisted and blown 50 yards from the driveway. Houses and barns in the same vicinity were twisted and in some cases torn loose from their foundations.

"Violent Winds Rip Buildings; Cause Death" was the front-page headline in the *Evening Trenton Times* on Monday, August 25, 1941. After causing considerable flooding in Philadelphia, the violent winds crossed the Delaware River and hit Swedesboro. Even before it hit Pennsylvania, the storm smashed 11 airplanes beyond repair at the DuPont Airport in Wilmington, Delaware.

Moving into New Jersey in the early afternoon, the tornado toppled five smokestacks at the Edgar F. Hurff canning plant in Swedesboro, injuring many employees and killing a milk truck driver who was innocently driving by. Then, lifting off the ground, the twister traveled all the way to Woodbridge, causing considerable property damage in that area. Shortly afterwards, hospitals in Woodbury and Perth Amboy were crowded with people injured by the storm.

Benjamin Franklin once said that "everyone talks about the weather but no one does anything about it." Today, with modern weather instruments, radar, and weather satellites, the National Weather Service is able to alert people in advance when weather conditions are likely to produce tornadoes and related severe storms. Even in New Jersey, the awesome natural phenomenon of the tornado is not as-rare as most people think. □



Completely dunked

SPICE TO LIFE AT 60 PLUS

DORIS W. PELOSI

ILLUSTRATION BY TONY HILLMAN

"Darn it! I don't feel one day older today than yesterday, but that row of birthday cards—with all their color, dear verses, and some humorous comments—proclaims I've arrived at the milestone of 60 years. Well, this 'old' girl will not settle into a rocking chair!"

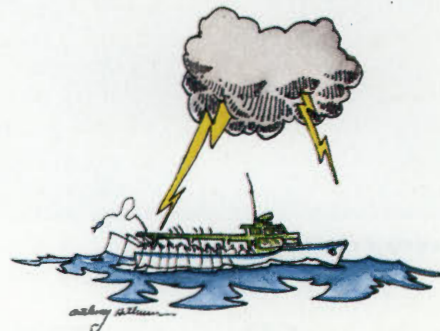
Those words, uttered on my birthday, stirred me into a conscious search for action, and *it has been fun!* With a friend, I found hiking through the New Jersey Pinelands to be an ever-changing delight. We have explored the roads and footpaths, and even deer trails. We have found the hollows of the old charcoal pits and the areas were the "bog-iron" ore was dug out in colonial days, foundations of old homes, and the bleached and twisted skeletons of ginko trees that were imported from England by early settlers to line their streets.

During our Pinelands hiking trips along the Wading River and the Oswego River, we watched with delight as canoeists paddled along. That led us to our own adventure. I had never been in a canoe but my partner claimed experience (later revealed to have been more than 30 years ago). We blithely rented an aluminum canoe and were trucked to the Oswego River, where it issues from Oswego Lake. From here we "shoved off" for a four-hour trip to Harrisville Lake. After some erratic experimental paddling, we soon found a rhythm and the knack of steering, and headed downstream, admiring the trees with branches sometimes meeting overhead, and enjoying the quiet beauty of the woods, with an occasional bird song, hum of a cicada, or splash of water from our paddles for contrast.

There were stubs of trees sticking out of the water, shallow places where the canoe bottom scraped over sand and pebbles, and low-hanging branches to catch the unwary. I had leaned forward and ducked under one such branch while my partner was, unknown to me, watching for deer along the banks of the river. An instinctive dodge sideways when he did see the branch tipped the canoe and we were suddenly standing in the shallow water. We laughingly dumped the water from the canoe and climbed back in with wet feet, only to repeat the performance later in deeper water while trying to free the canoe, which had wedged between two submerged logs. This time we were completely dunked, heels over heads. The water was only about four and a half feet deep, but the canoe had filled and settled to the water level. Some young people who had beached their canoe earlier saw our accident, and came to our aid. They dumped the water from the canoe and then held it while we scrambled aboard. A bit farther along we pulled up at a sandy slope and let the sun start drying our clothes while we ate the unsoaked portions of our lunch. We still had more than half the trip ahead of us and it was delightful, with no further untoward incidents. We arrived at our destination and were trucked back to the canoe rental base. I'm ready to go again!

The next week brought another "first"—an ocean fishing trip on the Paramount II, out of Brielle. The sky was rather dark when we started and before the afternoon was over the rain came pouring down, with considerable wind, but we continued to fish anyway. I caught my first and only fish, a bass, and my

companion had bass, a porgy, a ling, and a small sand shark. According to experienced fishermen aboard, this was a poor day, but I was content. It was fascinating to watch the waves, the clouds, the gulls, and to hear and see the excitement as men and women around us brought in their fish. My day included a lesson on cleaning the catch before we left the pier, and I have since learned several good ways to cook fish. As a landlubber whose previous contact was with the canned or frozen varieties, this has all been a thrilling eye-opener for me.



The sky was rather dark when we started

My other new activities include target practice at a range with an old-style muzzleloading Hawken rifle. Renewed target practice with my crossbow, a .22-caliber rifle, and a .357-caliber magnum, and trapshooting with a 12-gauge shotgun add more zip and bang to life.



Shooting the Hawken Rifle

Knowing days would come when cold or rainy weather would rule out some of these outdoor activities, I enrolled in a nightschool course in writing (hence this article), joined a speech-crafters group with the local branch of Toastmasters International, and made a trip to Egypt, Jordan and Israel. Future plans include a course in sewing, more travel, playing bridge, bowling, reading, and updating an existing but long-neglected stamp collection, and so on—and on—and on!

The spice of the new interests, activities, and friendships acquired these few months make me feel younger than before that direful number 60—and I'll need at least another 60 years to fulfill my projected plans! Happy days! □



PHOTOS BY AUTHOR

Taking a turn in the river.

Short Weekend On The Great Egg Harbor River

EMIL F. WILLIAMS

For those who enjoy canoeing and camping, but aren't able to travel any great distance, a weekend trip on the Great Egg Harbor River offers a lot of fun and enjoyment.

My companion, Bob Ard, and I began our canoe trip on a Saturday morning, at the teak dam located at Penny Pot on Route 322, commonly referred to as the Black Horse Pike.

Taking our time, enjoying the scenery, taking pictures and fishing, we arrived at Weymouth Furnace Park about noon. This is a good place to stop for lunch. Afterwards, it's interesting to walk about looking at the old ruins, trying to imagine what the iron furnace and forge must have looked like more than a hundred years ago.

We continued downstream after lunch, the river widening ever so slightly until we passed under the Route 322 bridge. From this point on, the river begins to narrow, with more twisting and turning; there are also blowdowns that may require a liftover depending on the water level. However, the river widens again about an hour downstream from Weymouth Furnace Park.

Although this trip from Penny Pot to Lake Lenape in Mays Landing can be

made in one day, it is better as an overnight expedition. After passing the Winding River Campground and the Girl Scout camp, we found a beautiful pine knoll on the upper bank to make camp for the night.

After pulling the canoe up on the shore and pitching the tent, it was nice to relax, watching the river flow by while we fixed dinner, and later to drift off to sleep watching the dying embers of our campfire and listening to the night sounds of the woods.

Early the next morning, after fixing breakfast, we broke camp, flooded our campfire, and raked and brushed the campsite so as to leave as little human impact on the area as possible. Gliding along in the canoe on quiet waters, still half hidden by a light fog, we were left in our own thoughts of what it must have been like for the Indians to have this beautiful stream all to themselves.

An hour later, the river became very broad with almost no current as we came closer to Lenape Lake. Another hour's paddling brought us in sight of the lake and the far shore. Entering the lake is so beautiful. The banks of the river become dotted with muskrat houses; little groups of mallards and



Bob Ard trying his luck for pickerel.

black ducks in twos and threes jump out of the water as we glide by, and dozens of red-winged blackbirds fly and land on the tall grass and cattails.

We met our pickup ride on the sandy beach at the end of Lenape Lake. Reluctant to leave, we loaded up and said good-bye, knowing we will return again for another enjoyable weekend on the Great Egg Harbor River. □

Haddonfield Develops Environmental Education for the 80s

RICHARD W. ZIMMERMANN, JR.

The 70s was the decade of environmental regulation. Agencies were formed, laws written, and plans developed. The 80s must move from regulation to concentration on environmental education at all levels of society, for it is only through progressive education that long-term environmental gains can be made.

One of the most important areas of environmental concern is the education of our youth through a planned sequence of learning activities and related classroom instruction. Many schools still have not addressed environmental problems beyond a shallow exploration of newspaper headline issues; however, several years ago, the staff in Haddonfield School District set a course to meet the environmental challenges of the 80s.

The first large-scale environmental experience is the Mt. Misery trip scheduled for all fifth-graders. The students travel to the Pine Barrens for a three-day encampment at Mt. Misery, during which they observe the wildlife and study the Pine Barren ecology. A great deal of emphasis is placed on pond ecology. The students also visit various "forgotten sites" and learn about the cranberry industry.

In sixth-grade, the students move on to environmental units at the middle school. Here, the emphasis is on the suburban-urban environment. Day trips are taken to Crow's Woods, a nearby nature area. Since part of Crow's Woods was formerly a landfill, the students can see the effect a landfill has on the environment. Looking for signs of human and natural pollution, they conduct a study of the water at Crow's Woods. They examine the influence of water flow on life by noting the difference in populations along streams and in swamps. They catalog the flora and fauna and examine the role of food chains in nature.

During fall and spring, many students are involved in digging for artifacts in local stream bottoms. This activity has yielded a collection of interesting items from the community's early history. The active local historical society has provided our classrooms with speakers and with expertise in identification of artifacts. As a result, our students have developed a very positive relationship with the history-minded senior citizens of Haddonfield.

As the students move into the seventh grade, their environmental awareness is expanded through use of a greenhouse adjacent to the science classroom and an outdoor area reclaimed from a trash-filled storage area. Also, building on the Mt. Misery and Crow's Woods experiences, a trip is taken to the Whitesbog Conservation and Environmental Studies Center. This trip includes a study of cranberry culture and related vegetation. The students also get to see several ghost



Teacher George Young prepares to take a sample from a 127 year old cranberry bog at White's Bog.



Students prepare to make soil samples.

PHOTOS BY AUTHOR

towns and defunct industries.

In eighth grade, physical science is studied with an emphasis on environmental relationships. Students visit the Marine Sciences Consortium in Seaville, where they observe the wetlands and the influence of humans and nature there. They are made aware of the environmental problems related to the developing offshore oil industry and the renaissance of Atlantic City.

When the students graduate to high school, they may elect courses in oceanography and animal behavior. This completes the environmental sequence from elementary schools through middle school to the high school in the Haddonfield District. It is only through education that we can properly preserve our environment. Philosophically and practically, the staff at Haddonfield School District has given environmental studies a priority status at all levels. □

Continued from page 3

New Jersey's Rivers

River Areas present an array of recreational opportunities within a context of occasional intense community development. The Passaic River possesses such characteristics in many sections. It begins in the Great Swamp National Wildlife Refuge, now included in the National Registry of Natural Landmarks. Anyone traveling downstream from the Great Swamp will pass through the steeply sloped Millington Ravine, an enjoyable cool hemlock gorge with fast-flowing waters. Upon leaving the ravine, the Passaic meanders within its floodplain while passing farmlands and suburban communities. Within the floodplain of the Passaic and along its principal tributaries are many large swamps, such as Troy Meadows, also on the National Registry of Natural Landmarks; Hatfield Swamp; and Great Piece Meadows. Fishing, hiking, nature observation, and hunting are just some of the additional recreational activities that are popular in these low-lying areas. Both Little Falls and Great Falls are areas of scenic interest despite the industrial growth in this area. Besides being an area of scenic beauty and geologic interest, the falls area was the first manufacturing region in the United States, its textile mills being established in 1791. The Great Falls of Paterson have also been included on the National Registry of Natural Landmarks. From the Great Falls to Newark Bay the river becomes polluted and not suitable for canoeing but is suitable for boating, recreational fishing, and many other shoreline activities.

Recreational River Areas are further exemplified in the north by the Musconetong and Ramapo rivers, which are used frequently by fisherman as well as boaters. In the south there are tidal segments of the Mullica River and Rancocas Creek which are used for such activities as powerboating, fishing, water skiing, picnicking, and canoeing.

The fourth type of river experience was developed specifically for the New Jersey river system. **Developed Recreational River Areas** will be those river segments that flow through urban or industrial regions, yet still retain their recreational value. They are readily accessible and feature substantial de-



LOIS JOHNSON

Clinton Historical Museum, a registered State and National Historic Place on the South Branch of the Raritan River.

velopment along their shorelines. The Hudson River is an excellent example of this classification. New Jersey's Hudson River shoreline, even with abandoned piers, empty lots, polluted waters, and urban development, still offers varied boating opportunities, waterbird observation, and impressive scenic views of the New York skyline, historic landmarks, and natural features. Thousands of people are attracted each year to Liberty State Park, to enjoy the views of the Statue of Liberty and the twin towers of the World Trade Center. The well-known Palisades, an imposing geological formation of cliffs more than 300 feet high, are also an important attraction along the Hudson. The Palisades Interstate Park includes most of the shoreline from the NY—NJ border down to the George Washington Bridge, providing access to the river, picnicking, and park settings. Many types of ships, from large sailing vessels and yachts to ferries and canoes, can be seen at dockside along the length of the Hudson. Recreational fishing is another pleasant diversion for urban area residents. The mixing of salt and freshwater in the lower Hudson provides an ideal habitat for both fresh and saltwater species of fish.

Most developed recreational river areas are located in tidal areas at river mouths. Besides the Hudson River, other popular estuaries include the Passaic, Delaware, Hackensack, and Raritan rivers.

It is not the intent of the Wild and Scenic Rivers Act to include every river into the system; rather its intent is to choose those rivers which exemplify our state. Many of New Jersey's rivers possess outstanding scenic, recreational, geologic, fish and wildlife, floral, historic, and cultural features; these are the rivers the system seeks to

protect for future generations to enjoy. After a preliminary assessment and study in which every major river in the state was considered, 42 rivers were found to be eligible candidates for inclusion into the New Jersey Wild and Scenic Rivers System. Criteria taken into consideration in the study included free flow, shoreline development, recreation, and public interest and support.

Evaluating what is important, beautiful, enjoyable or, in other words, which rivers should be studied and protected, is an extremely difficult task, one which is now being undertaken by the Wild and Scenic River Program in the Office of Green Acres. The Department of Environmental Protection's river-planning efforts for the state system will be based on the findings of the preliminary assessment project. These findings have been used to rank the eligible rivers for future designation study reports. By means of continuous public involvement and review the results will continue to be refined. Designation studies will include a detailed inventory of the natural, cultural, and socioeconomic features and conditions of the river area and a plan for managing these features. The study for the Lower Atsion branch of the Mullica River has been completed and is now under public review. Cedar Creek, another river to be studied under the Act, is now undergoing a designation study.

For more information regarding the New Jersey Wild and Scenic River System, preliminary assessment project, ranking system, river classification guidelines, and regulations governing the management of designated river areas, contact the Office of Green Acres at CN404 Trenton, New Jersey 08625. Also available is a photo brochure entitled "Canoeing the Pinelands Rivers." □

Owl Pellets

ulations in their 60 to 80 acres of hunting territories. Indeed, studies of pellets over many years help ecologists keep track of possible changes in these populations. It is quite possible, therefore—sometimes even likely—that the question posed regarding 60 percent of the skulls is true. So long as all the pellets collected by class members come from the same area, the proportion of skulls of one species found in Barn Owls pellets can easily approximate the percent of that species relative to other small mammals in the habitat.

During the pellet analysis, youngsters are required to obtain the data from other students as well as their own pellets. Data are presented in tabular form as part of a lab report completed by each student within one week after the study. Bones are cleaned and bleached at home. They are then affixed with glue to cardboard for a bulletin-board display.

The lab report combines science, math, and English skills. It also mandates library research by students in order to answer some questions.

These questions are the same as those originally presented in the worksheet. Thus, if the pupils have correctly comprehended Soucy's talk, they should be able to answer quite a few questions from their own notes.

The lab report is divided into the purpose of the study, the materials used, the procedure followed, and the results obtained. Besides questions, the results also include charts showing the data on pellet weights and bone counts per species per pellet.

Educational Value and Lasting Significance

The pellet study is part of a minicourse on student attitudes toward wildlife described in the Sept.-Oct. 1978 issue of *New Jersey Outdoors*. This aspect of the minicourse takes from three to five days, depending on your ability to bring the students to Soucy's home, his ability to visit your school or center at the appropriate time, and student ability to dissect the pellets and gather data

about them. If you or your school can't afford the trip to his home, you can still concentrate on preparing for his visit. Moreover, Audubon groups and other conservation organizations can invite him to their meetings. Soucy's format includes living specimens, and if your organization is willing, the visit can include pellet dissection by the participants. This would be an excellent way to boost attendance.

Pellet study is applicable at any time of the year by any age group. We have done it primarily in late fall and early winter because pellets are more easily visible against the snow, and to correlate with hunting season when the public hears most about wildlife management principles. High school and college students in ecology courses can gain more sophisticated data regarding the relative nutritional value of each prey species in an owl's diet by applying conversion factors to calculate the percentage of individual prey species by weight in a group of pellets.

Pellets sometimes yield information about mammal behavior that is not easily observed directly. Barn Owl pellets, for example, frequently contain moles. This is especially enlightening in view of our tendency to think of moles as merely underground shovels. Apparently they visit the ground surface far more often than we realize during their nocturnal sojourns.

Besides providing a lesson in the ecology of predator-prey relationships, pellet investigations integrate this with prey anatomy. Seldom do other ecological studies have this inherent advantage. Students can experience the necessity of patience in scientific endeavors by reassembling skeletons from pellet contents. During this exercise they may refer to one of several field guides to small mammals, or other drawings of their skeletons provided by biological supply houses. These include Carolina Biological Supply Company, 2700 York Road, Burlington, North Carolina 27215. Other suppliers closer to home are: Connecticut Valley Biological Supply Company, Inc., Valley Road, Southampton, Massachusetts 01073; and Ward's Natural Science Establishment, Inc., P.O. Box 1712, Rochester, New York 14603.

Pellet study also provides a weap-



Student separates bones from furry pellet. These are then bleached and identified by species.

on against the "ugh" complex. It is interesting that, although people like owls, they detest pellets. This is possibly because humans equate pellets with feces. Whatever the reason, that type of attitude can lead to fear or hatred of other animals. And, in these times, animals need all the friends they can get! Of course, analysis of pellets alone won't cure people of this complex. But it's a good start, one that must be supplemented with other wildlife investigations.

Finally, this study of owls exemplifies how environmental science can and should be incorporated into the basic-skills curriculum at all grade levels with minimal cost. Such instruction is sorely needed to convince school administrators and the public that children don't live by English and math alone. The message we teachers get from school boards and legislatures is clear: don't teach youngsters how to think, just be certain they can get a period at the end of a sentence. We are now asked to conduct more drill work in the classroom. A certain amount of this is good, but not to the exclusion of outdoor and indoor experiences related to what children perceive in the real world.

For further information about this study and reprints of this and other environmental education articles, contact:

Dr. Stephen J. Zipko, Randolph Intermediate School, Millbrook Avenue, Randolph, New Jersey 07869

THE 116 YEAR-OLD PERCH



U.S., but a new record fish for this species really cannot be anticipated or expected.

Going back to the beginning, question number three concerns the eastern chain pickerel (*Esox niger*). If ever a finny creature deserved the title of state fish of New Jersey, it is the chain pickerel. The pickerel is a fish of our farm ponds and cranberry bogs, of our tidal rivers and upstate reservoirs, and it is a fish for all seasons. Trout and bass may get more publicity, but pickerel (known as pike in South Jersey counties) are close to the heart of any Garden State sweetwater angler. In fact, *New Jersey Outdoors* conducted a poll in 1955, and the chain pickerel was selected as our favorite fish at that time. Our current state record pickerel weighed 9 lb 3 oz, and was caught by Frank McGovern in 1957, while fishing in Lower Aetna Lake in the Pine Barrens. The fish not only topped Jersey's record, but established a new all-tackle world record. Fittingly, the state's favorite fish was also a world record. But alas, in 1961 a lucky angler in Georgia caught a 9 lb 6 oz specimen, topping our mark by three ounces.

Pickerel are abundant in New Jersey, particularly in the acid water of the Pine Barrens, and in the lake region centering around Lake Hopatcong. In other sections of the country, large pickerel have been reported from northern Georgia, Maine's Washington County, and the Pocono region of Pennsylvania. Many Garden State anglers think that our waters currently hold record pickerel, but ironically our best chance to establish an enduring mark may have gone up in smoke. The New Jersey Fisheries Survey Report #2, published in 1951, records the following story. Circa 1904-05, a certain Mr. William Kunz caught a monster chain pickerel in Orange Reservoir. The fish was said to have been weighed

at 12 lb 3 oz. The fish was positively identified at the time as a chain pickerel and not a northern pike, by the late Ken Lockwood, fishing columnist for the Newark *Evening News*. Lockwood was a famed fisherman/conservationist for whom the Lockwood Gorge on the South Branch of the Raritan was named. Unfortunately, the proper documentation was never made, so the world-record recognition was never accorded. The fish was mounted and displayed for years in a Lake Hopatcong hotel, but was later destroyed in a hotel fire.

So there you have the story of the world-record freshwater fish of New Jersey. Records are made to be broken, and in that respect 1980 was a good year, as five state freshwater marks were set. Some anglers yearn for the good old days, but the fact is that of the 24 freshwater records kept in New Jersey, 14 have been set in the last 10 years. Clearly, there are some worthwhile fish still cruising our waters. So keep your lines tight, and remember that the state-record fish you catch just might be a world-record too. It has happened before. □

1981 YOUNG WATERFOWLERS PROGRAM

This is the 7th year the NEW JERSEY WATERFOWLERS ASSOCIATION has sponsored a class and a hunting day for the young hunters of New Jersey.

October 11, 1981

Highlands Yacht Club, Highlands, N.J. 8:30 AM. Classes on Decoy Carving, Duck Hunting Methods, Duck Hunting Equipment and Boats, Waterfowl Identification, Hunter Ethics and Wetlands Conservation. Films will be shown and lunch served.

October 18, 1981

Wayside Skeet Club, Wayside, N.J. 10:00 AM. The Program students will be given a chance to fire their shotguns at clay birds, and get some practice in for the hunting season.

November 29, 1981

December 5, 1981

Each student will be assigned a seasoned Waterfowler as his personal instructor and taken hunting at the BRIGANTINE NATIONAL WILDLIFE REFUGE. A closed area of the Refuge has been set aside by Mr. Gaylord Inman, Federal Wildlife Service, Refuge Manager for the participants of the Young Waterfowlers Program. This is the best area in New Jersey for observing and taking waterfowl.

The Young Waterfowlers Program is open to any resident of New Jersey, ages 14 thru 17, who has completed the N.J. Hunter Safety (Shotgun) Course. He or she must have a valid N.J. Hunting License. Anyone interested in the course, should write Kurt Waltersdorf, Chairman, Young Waterfowlers Program, New Jersey Waterfowlers Association, P.O. Box 208, Monmouth Beach, N.J. 07750

APPLICATION—1981

NAME _____

AGE _____

ADDRESS _____

HUNTING LIC. NO. _____

DATE _____

TELEPHONE NUMBER _____

FRONT COVER

"Operation Greendike"—Photographed by Chip Hoever/Images (See article on page 20.)

INSIDE BACK COVER

Canada Geese—Illustration by Carol Decker (see article on page 16.)

BACK COVER

Eastern Gray Squirrel—Photographed by Breck P. Kent (see article on page 16.)



'81 © Carol Decker

