January/February 1979

New Jersey OUTDOORS

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New Jersey OUTDOORS

from the editor

What Ever Happened to the Conservation Ethic?

About a month or so ago I read in one of the Sunday newspaper supplements that 85% of the American driving public drove at an average speed of 59.6 MPH on major highways and interstate roads. My experience in driving a number of New Jersey roads had left me with the impression that the average speed was somewhat higher. In any event, I decided to do an unscientific, seat-of-the-pants tongue-in-cheek survey of highway speeds to determine if my perceptions were faulty.

The roads I used for this survey were: routes 295, 130, 1, 287, the New Jersey Turnpike, and the Garden State Parkway. When traveling on these roads this past month I increased my speed to about 59.6 miles per hour and kept a count of the vehicles that passed me, and the vehicles that I passed at these speeds. I selected portions of these roads that were not congested thus allowing the drivers to drive at their own speeds.

The ratios (vehicles passing me vs. vehicles passed) ranged from 4 to 1 up to 10 to 1—meaning that for every vehicle I passed, from 4 to 10 passed me. On one trip 31 vehicles passed me and I passed 0.

I made some other observations while conducting this survey. We all know that young men under 25 usually pay the highest automobile insurance premiums. I would presume that this high rate is the result of insurance statistics which show that young men under 25 are a greater risk to the insurance company. Some of the reasons are that they drive faster, they drive and drink, and other peer pressures.

The point is we don't seem to be communicating with these young drivers (male and female) on the importance of slowing down to conserve energy and save lives. It seems to me that during the first year or so after the 55-MPH speed limit became the law of the highway, most drivers were observing the new limit. Now, a few years later, most people have forgotten why the law was passed in the first place. And the tens of thousands of new teenage drivers entering our highways each year—are they being made aware of the reasons for this law? Or, in the absence of a meaningful highway driving program which would explain the national goals of these oil conservation measures, are they adopting the driving habits of their parents or their peers?

And what ever happened to the conservation ethic? Maybe we need a national natural resource program to remind us *why?*

IN THIS ISSUE. . .

A new author, Theodore Chando, writes about *Winter Canoeing in the Pine Barrens.* This article is a segment of a book (in progress) on the Pine Barrens by the author. Photographs in the book and this article are provided by Pete Evensen.

The Pine Creek Railroad by author/photographer Bob McDonnell is loaded with atmosphere and nostalgia. This railroad is run with TLC (tender loving care) by volunteer railroaders and can be boarded at Allaire State Park in season.

You Don't Have to Live in Vermont to be able to make your own genuine maple syrup and enjoy the real thing on your pancakes. So says author Anne Galli, *naturalist with the Morris County Park Commission.*

Our series, *Wildlife in New Jersey—The River Otter,* is back in this issue. The article was written by wildlife biologist Bruce Hawkinson and the illustration was provided by Robert Pierro. This article is introduced by the illustration by Carol Decker on the inside of the back cover.

The photograph on the front cover by Roy E. Decker introduces *Turkey Talk in the Sussex Hills* by wildlife biologist Bob Eriksen. Two years after the release of 22 wild turkeys from Vermont and New York, over 200 are now thriving in the Sussex Hills.

WARNING: Feeding Wildlife is Dangerous to their Health by another new author, Dr. Douglas E. Roscoe, a pathologist with the Division of Fish, Game, and Shellfisheries, explodes a few myths and treads on some toes. The author says, "Feeding of wildlife has, on occasion, proven unhealthy for humans as well as wildlife. A man at Greenwood Lake was in the habit of feeding black bears in his backyard. When he went away on vacation the brazen, semi-domesticated bears ripped the door off his kitchen and fed themselves."

Young Bruce Litton says *Ice Fishing for Pickerel Yields Big Dividends.* Author Litton is 18 years old, in his senior year at high school and has been fishing trout, pickerel, and large and smallmouth bass for four years. He joined the Mercer County Bassmasters last year and has been fishing bass tournaments. Bruce says he'd like a writing career after finishing college.

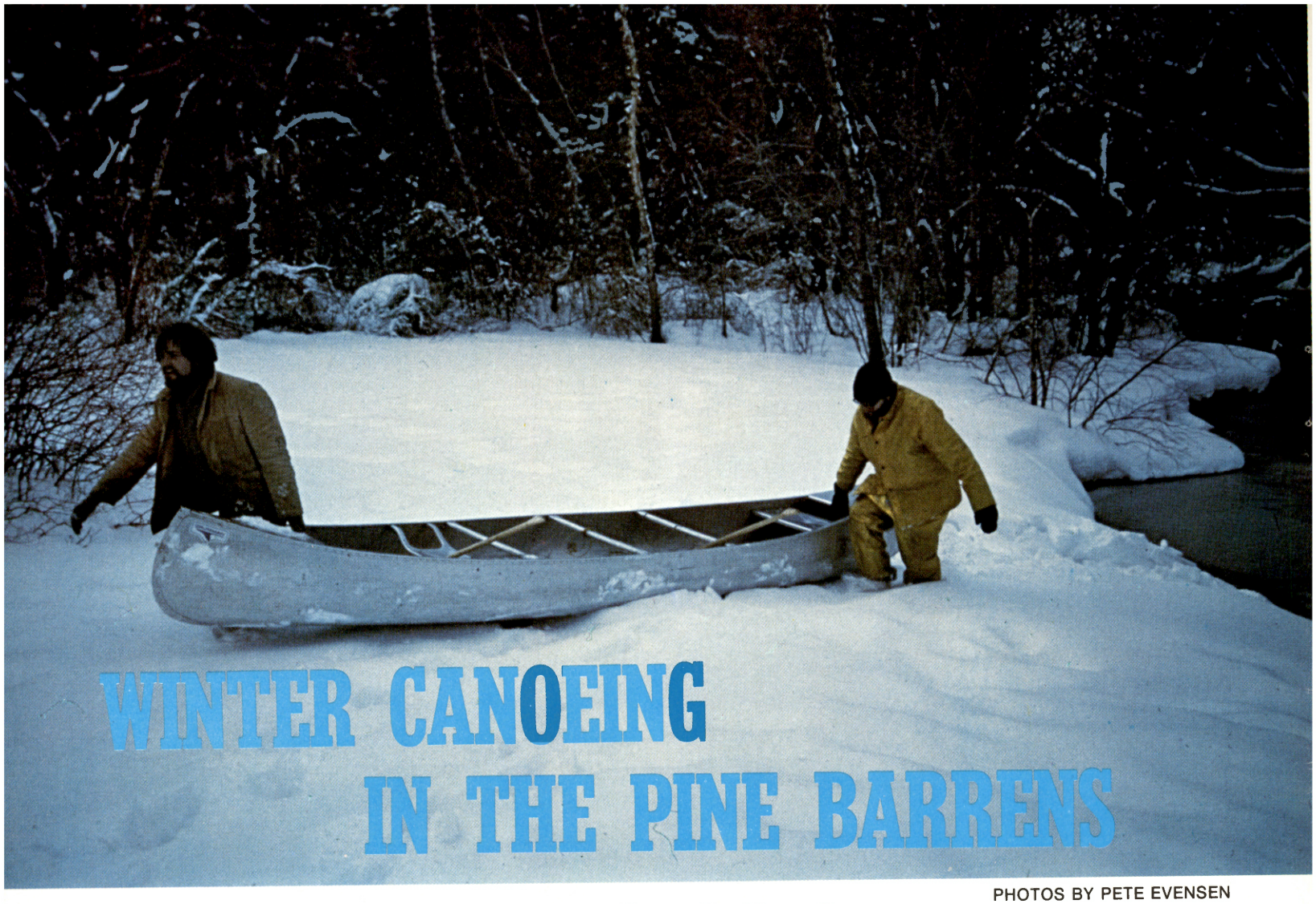
In *Snowbird/Winter Sport for New Jersey Hunters,* author Art Weiler tells us about his favorite outdoor recreation —hunting grouse in the snow-covered New Jersey hills.

A picture story. *New Jersey in '78 . . .* seasons, landscapes, wildlife and people.

New Jersey's Marine Scientists: How They Serve Us All describes the work of the New Jersey Marine Consortium scientists on marine research sponsored by the New Jersey Sea Grant Program. "Not long ago, the Consortium's achievements were recognized in the Congressional Record by New Jersey Congressman William J. Hughes. He hailed it and the Sea Grant Program for '. . . creating jobs, putting additional money in the pockets of our constituents who make their living from the sea and bringing into being now, more useful or less costly products for use in commerce and medicine.' " The article was written by William L. Wilson, a former Vice President of CIT Financial Corporation; an author of a book on the history of Consumer Installment Credit published by Random House, and a former Philadelphia newspaper reporter.

The city of Camden was the first city on the east coast to stop ocean dumping of sewage sludge. In response to the new federal regulations, the city of Camden and the Camden County Municipal Utilities Authority have embarked on a sludge treatment demonstration program. *Sludge Composting —An Answer to a Major Problem,* by Aldo Cevallos, Principal Engineer, CCMUA and Ed Lempicki, Utilization/Marketing Specialist, New Jersey Bureau of Forestry, discusses this program which uses wood chips as a bulking agent.

In the November/December 1978 issue I stated on page 26 that the Reader Survey could "be cut from the magazine without damage to the reading matter." Many readers reminded me that this was not true—and they were right. Because of the addition of new material, I was forced to change the magazine layout which placed the continuation of the article *A Question of Values* on the backup page 25. My apologies for allowing that statement to remain in the Survey writeup.



WINTER CANOEING IN THE PINE BARRENS

PHOTOS BY PETE EVENSEN

by Theodore J. Chando

Winter comes in the barrens after the quiet months of fall. Past the crimson starlike brillance of the sweetgums, when the flaming red maples lining the cedar streams no longer blaze scarlet, when the quieter oaks —pine oak, chestnut, bear and blackjack—which provide the yellows, oranges and maroons of this color tapestry have faded, when the red rugs of the dwarf blueberry and other understory plants lie dormant, and the scarlet floating carpets of the cranberry bogs are only harvested memories, my thoughts turn to canoeing in the pines.

After the colder winds have spiraled down from the north and shaken the other leaves off the trees, the oaks' linger curled, colorless, clinging to their branches. My sympathy is with them for I too remain. When the hordes of summer canoeists have long since shunned these small twisting streams in the pines, I too, much like the northern ducks or an occasional robin and redwinged blackbird, overwinter.

In a memory lapse I mention to friends that I am going camping and canoeing. Inevitably they look at me with disbelief, with that "you must be crazy" look in their eyes. Comments follow, such as "If you're crack-brained enough to go camping in 20 degree weather, it's only natural you should canoe also" or "But there's snow on the ground!"—as if that could impede my progress paddling through the rivers.

Most do not ask me where I am going. Their icy looks and frosty dispositions display their lack of interest. However, occasionally an inquisitive friend will ask my destination. "Oh, the Pine Barrens, aren't they in South Carolina?" is a frequent reply; "Never heard of them, is there a lot of whitewater?" may be another response.

"But you only live an hour away and you pass through them going to the New Jersey shore every summer," I stutter in disbelief, "and you still don't know about them!"

There are distinct advantages to canoeing and camping in winter that these people overlook. The absence of mosquitoes and blackflies makes that ubiquitous bottle of Cutter insect spray excess baggage. Your campsite is apt to be free from the frenzied racing of little children on bicycles or the wilderness blaring of radios; gone too are those groups of a hundred Boy Scouts who decided to canoe the same stream as you. While other rivers are drab and colorless this time of year, those in the

Barrens abound with green from the Atlantic white cedar, American holly, and pitch pine. Some species of birds overwinter along these waterways and are easier to see after the leaves have fallen. Wildlife such as beaver and white-tailed deer are also more likely to be seen now that summer canoeists are gone. My neighbors are glad to see me remove that neighborhood eyesore, my resting canoe, from my backyard even if only for a weekend. Just as important, the cold air keeps one's beer refrigerated effortlessly.

Many people assume that if you go camping in winter you need a great deal of exotic gear to be comfortable. Personally I do not have two sets of camping gear—one light for summer, the other heavy and warm for winter. My all-year-round pup tent is a three-pound nylon backpacker's tent. My sleeping bag is not one of those exotic and expensive down-filled bags but rather a modestly priced one filled with Dacron 88. While you can forget about that air mattress in summer, in winter it's needed to keep you off the cold tent floor.

For sleeping out on cold nights extra layers of clothing must be brought along. Since I do not have any warm down clothing I start off by putting on long underwear with three pairs of socks. Next come the other layers of clothing such as a sweater, wool shirt, a fall hooded jacket, and a couple of pairs of pants. On my head go earwarmers, a cap, and finally a hood. Over my hands are one pair of gloves. I am awfully bulky but still comfortable and able to sleep out in my pup tent down to temperatures of 10°F.

I have camped out in weather so cold that after I finished my breakfast cereal, relaxed over coffee, and went to clean the bowl, the milk was frozen solid. I'm extra careful with my camera equipment in such weather, since it is not meant to operate at extremely low temperatures. At five degrees Fahrenheit or lower the oil in a camera gums up and the metal parts become more brittle. Professional photographers have their cameras acclimatized before shooting pictures in frigid conditions.

The winter weather does pose problems for canoeists. Warm wool clothing and adequate raingear are necessities. Keeping one's head warm is extremely important since a considerable percentage of body heat is lost through the head. Knowing this I wear an earband to keep my ears warm, a cap to cover the top of my head, and finally a hooded jacket. By removing the hood or other headgear I am able to regulate my body heat and minimize sweating or chilling. I carry waterproof plastic bags containing a change of clothing to protect me from the dangers of hypothermia in case of accidentally capsizing. While I have not capsized in the last four years of canoeing on these streams, this can be dangerous and even fatal on a cold winter day.

All experienced cold-weather canoeists know about hypothermia. The first signs are shivering and a numbness of hands and feet. Next the lack of blood to the head can cause dizziness and impair judgement. This is the body's effort to conserve heat by restricting the blood supply to the torso. Surprisingly, people experiencing these symptoms are apt to say that they are all right when exactly the opposite is the case; now the potential victim needs help, such as hot fluids, to elevate his body temperature.

After painting this bleak picture of exposure, I should state that these rivers are easy to paddle and excellent beginner streams. Although all of them are narrow and twist and turn a great deal, the only danger present is accidentally capsizing from collision with a submerged log. Rapids are nonexistent since the land is so flat that sharp gradients do not occur. In winter the Cohansey aquifer, believed to be the largest unpolluted watershed in the nation and estimated at over 17 trillion gallons, feeds all the small streams, its constant temperature keeping them open in all but the coldest weather. It also helps maintain water levels even in dry months. For example in 1976, the coldest winter in memory, I was able to canoe all season except for a period of four to five weeks in January and February.

"Alright," you say, "you've convinced me that canoeing these streams in the middle of winter isn't unheard of. But which are the best waterways for my winter excursions?"

Streams like the Batsto, Mullica, Toms, Oswego, Rancocas and Great Egg Harbor have all been described in James and Margaret Cawley's canoeing guide "Exploring the Little Rivers of New Jersey." The best way to evaluate these rivers for winter boating is to paddle them in the warmer parts of the year looking for *four* criteria. The first to look for is color. Is the stream lined with Atlantic white cedar? Along the higher banks the pitch pine should also add to the greenery. Those streams bordered by a preponderance of deciduous trees will be drab in winter and best left for summer or fall. Secondly, how wild is the stream? My enjoyment declines proportionally to the number of houses I see along the way. Thirdly, are there any obstacles present either on the river or in

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The Pine Creek Railroad

by Robert J. McDonnell

Engine #26 as it rests in winter.

PHOTOS BY AUTHOR

Locomotives stood as if asleep under their newly acquired blanket of winter white. The stationhouse, locked tight with snowdrifts halfway up its door, was expecting no passengers. A semaphore signal appeared confused as its red and green lamps simultaneously flashed a reflection of the morning sun. The air was filled with a chilling silence. And, from the caboose, one expected the conductor to emerge announcing that this was a trip into the Twilight Zone. Such was the scene on a cold winter's morning at the Pine Creek Railroad, Allaire State Park, Farmingdale.

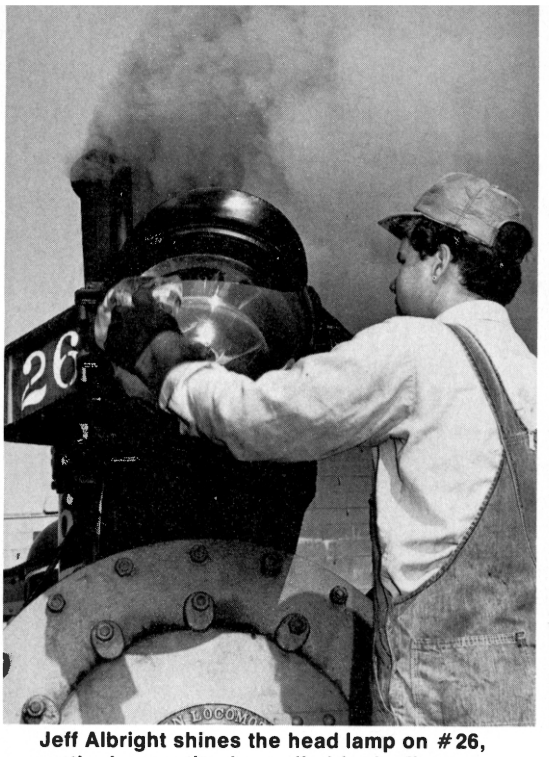
Pine Creek is an historic railroad run by the New Jersey Museum of Transportation—a nonprofit museum corporation under contract with the state to provide train service in Allaire. The museum, in no way connected with any state agency and receiving no state financial aid, obtains all operating funds from memberships, donations, and train fares. Monies collected allow the museum to run steam trains on weekends and holidays from April through October. Diesel trains are operated weekdays in July and August.

History is very evident at Pine Creek. Locomotives obtained from as far away as Ireland bear "builder's plates" with the dates 1887, 1920, 1923, 1927, and 1942. A caboose, built in 1874, once ran on the Central Railroad of New Jersey. And my favorite—flat car #400—came from Oahu, Hawaii, where it was used at a Naval Ammunition Depot. The flat car, since converted to an excursion car, is rumored to have carried the first atomic bombs. Now it carries vacationers and sightseers instead!

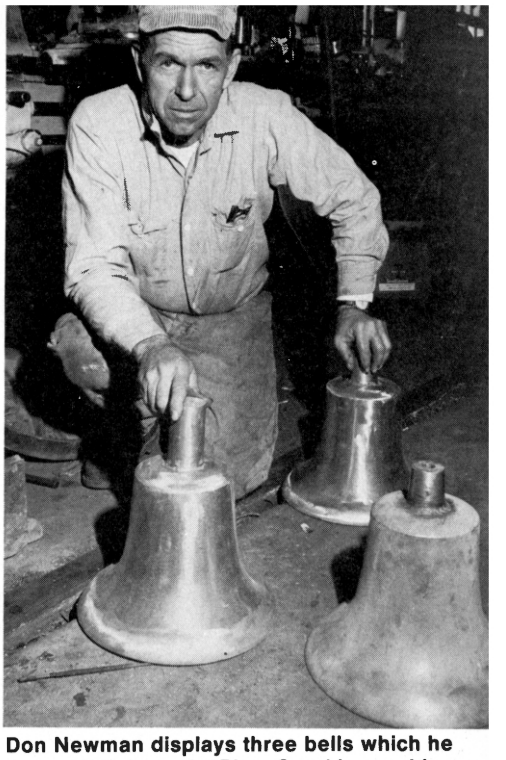
In addition to the history, nostalgic feelings are also a part of Pine Creek, with the stationhouse as the focal point. Outside, trunks and other baggage are carefully placed upon wagons. Weather-beaten benches stand empty. Inside, a pot-bellied stove commands the room's center. In a back room is a shelf filled with dusty conductors' hats and one old lantern. A clock on the wall above is stopped at a little past 3:00.

But history and nostalgia are only a small part of the story. The real story at the Pine Creek Railroad is its people—those who keep the railroad in top running condition. These folks are all volunteers who contribute thousands of hours per year to restore and maintain tracks and equipment. Their work is not trivial, either. What happens when a part belonging to a 1887 locomotive fails? One can't simply run to the nearest auto parts store to buy a replacement, so usually the part must be made at Pine Creek. Volunteers are up to the task—relying heavily upon a well-

Bob Morris repacks bearings on "Lady Edith," a steam locomotive dating back to 1887. Lady Edith was imported from Ireland, where it ran until the 1950's on the Cavan and Leitram Railroad.



Jeff Albright shines the head lamp on #26, as the locomotive is readied for its first run of spring.



Don Newman displays three bells which he helped fabricate in Pine Creek's machine shop.

equipped machine shop.

A good example of work performed by volunteers involves the making of bells. It seems that when the railroad purchases a "new" locomotive, it may arrive minus the all-important bell. (Bells are collectors' items, hence they sometimes "disappear.") Replacement bells are made in the machine shop after some outside help from a cooperative foundry. The bells are true-sounding, too—containing the proper mix of copper and tin required to produce the resonant clang.

Although bell-making provides a good example of workers' expertise,

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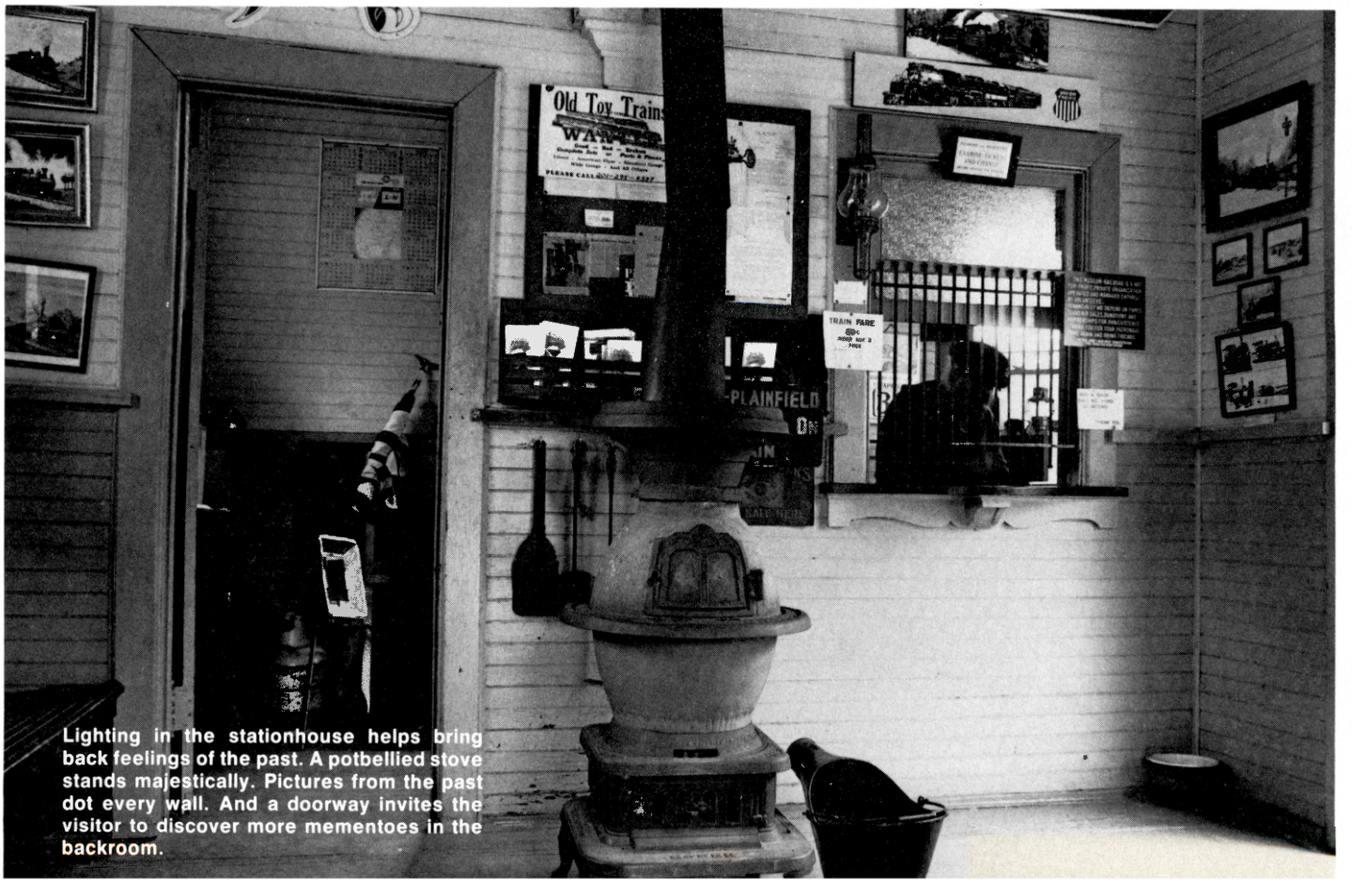

Lighting in the stationhouse helps bring back feelings of the past. A potbellied stove stands majestically. Pictures from the past dot every wall. And a doorway invites the visitor to discover more mementoes in the backroom.

You Don't Have To Live in Vermont

by Anne Galli

Anxious for a taste sensation a youngster at the Great Swamp Outdoor Education Center catches a drop of sap on her tongue. JOSEPH HOVANCE

Boiling down the sap. JOAN GALLI

When was the last time you sat down to a breakfast of golden pancakes smothered with butter and maple syrup? I mean *real* maple syrup, not the artificially colored and flavored corn syrup you find on every grocer's shelf. At the current price of the real syrup, it has probably been some time! This winter, however, you may be in for a treat because you don't have to live in Vermont to be able to make your maple syrup.

"Sugaring off," or maple sugar making, is a native American process. Prior to the arrival of Europeans, the American Indians were producing and consuming maple sugar and syrup. Written accounts of early European explorers detail the methods used by the Indians.

Settlers were quick to adopt and refine the sugaring process. By the 1800's, new methods had evolved which afforded greater protection for the trees. The use of augers for boring holes in the trees for the placement of spiles (spouts) to direct sap flow into wooden buckets had replaced the Indian method of removing the bark and allowing the sap to run down the trunk into wooden troughs. Eventually, all the wooden containers used in sugar making were replaced by metal ones. Today, miles of interconnecting plastic tubing conveys the sap from the trees to a collecting tank, eliminating the expensive hand collecting step. Vacuum pumps, trucks, and evaporating plants have replaced the oxen-drawn sled and the sugar shack in the commerical production of maple sugar.

For the home production of maple syrup, you will need some maple trees, the correct weather, and a few pieces of equipment easily scrounged from kitchen or basement. Now, don't expect to be able to go into commercial production

of maple syrup. Be realistic. To produce enough syrup for just your family will require time and energy. However, when you are finished, you will appreciate the amount of work required by our forefathers to produce their food. You will also have learned to identify maple trees, had some fun and some good eating, and will have convinced your children that not all food comes from plastic bottles, tin cans, or cardboard packages.

In order to avoid a long discussion on tree identification, suffice it to say that the surest and easiest procedure is to take a good-sized twig to your nearest nature center or Extension Service for identification. Although sugar maples produce the most sap with the highest sugar concentration, other large maple species can also be used. I have successfully tapped sugar maples in Bergen and Morris Counties and Norway maples in Cape May. To be usable for tapping, a tree should be at least 10 inches in diameter when measured at a point 4 1/2 feet above the ground.

After you have located the maples, collect your equipment. You will need a brace and 7/16" bit, some spiles (a peg or plug of wood, one used as a spigot for conducting sap) and an equal number of buckets or containers to hold the sap, a hammer, a pan for boiling, and the correct weather.

Sap flow and the weather

The relationship between sap flow and the weather is a close one. Following hard on the heels of the winter freeze comes a period of freezing and thawing. According to John Burroughs, the sugaring season starts, "the moment the contest between the sun and the frost fairly begins." Sap flow depends on temperature extremes between night and day. In general, nighttime temperatures should be in the twenties, with midday temperatures ranging between 32 and 40°F. Cloud cover, precipitation, and wind direction will also influence sap flow. A tree may flow for several days, or only part of a day, then shut down until the weather is right.

The sugaring season ends when the temperature stays above 40°F and the tree buds begin to swell. At this time the sap changes in color and flavor. "Bud" sap does not result in quality syrup. With the advent of consistently warm weather, microorganisms developing in the spouts and buckets cause the sap to ferment and sour. At this time the wise sugar maker will take down his buckets.

At the end of the sugaring season wooden dowels can be placed into spile holes. Then seal the holes with "Wound Sealer." The same tapholes are not used in subsequent years.

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The end result. JOSEPH LOMAX

Anticipation lights the face of a youngster about to taste some homemade maple sugar candy.

JOSEPH LOMAX

WILDLIFE IN NEW JERSEY

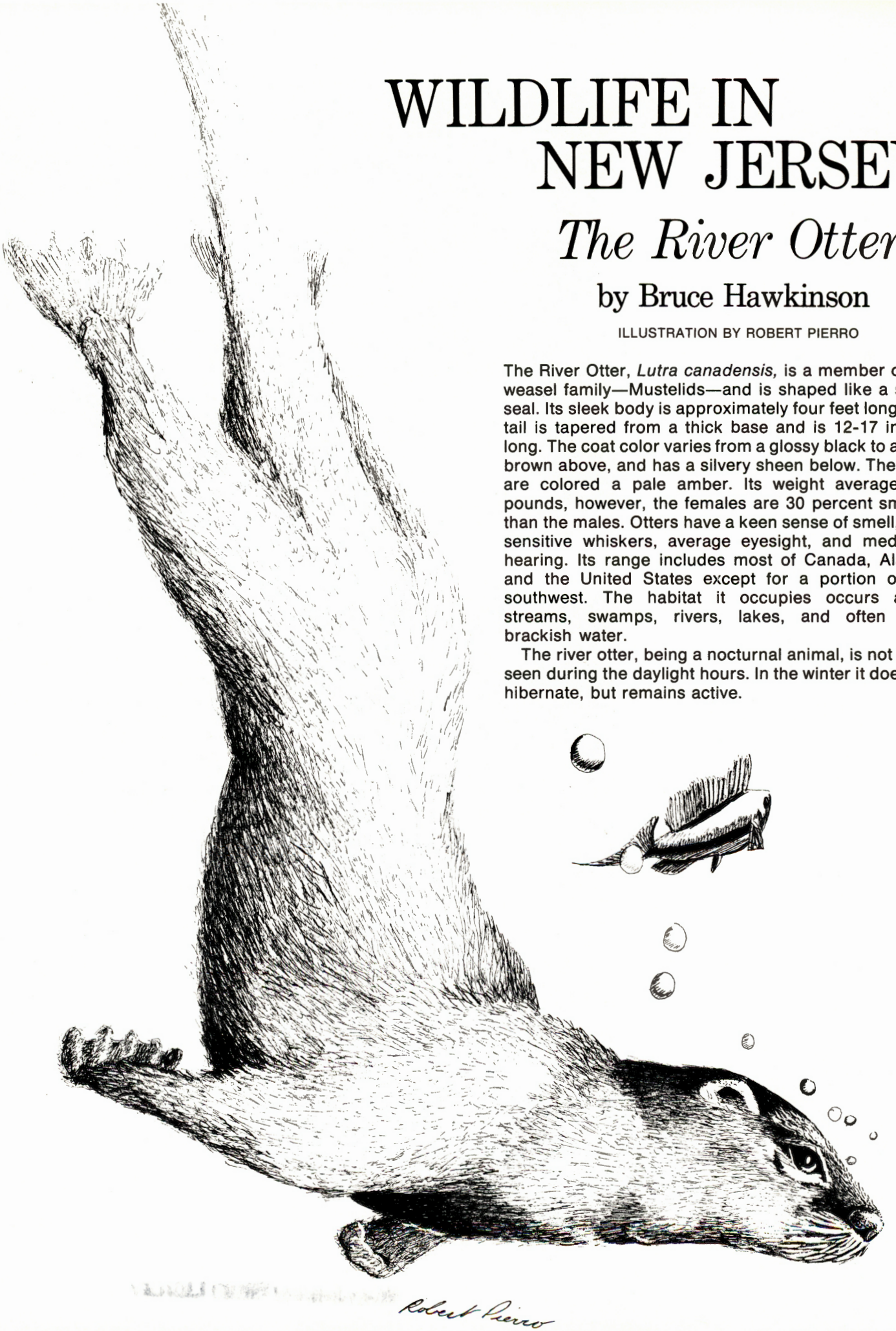
The River Otter

by Bruce Hawkinson

ILLUSTRATION BY ROBERT PIERRO

The River Otter, *Lutra canadensis,* is a member of the weasel family—Mustelids—and is shaped like a small seal. Its sleek body is approximately four feet long. The tail is tapered from a thick base and is 12-17 inches long. The coat color varies from a glossy black to a light brown above, and has a silvery sheen below. The eyes are colored a pale amber. Its weight averages 15 pounds, however, the females are 30 percent smaller than the males. Otters have a keen sense of smell, very sensitive whiskers, average eyesight, and mediocre hearing. Its range includes most of Canada, Alaska, and the United States except for a portion of the southwest. The habitat it occupies occurs along streams, swamps, rivers, lakes, and often near brackish water.

The river otter, being a nocturnal animal, is not often seen during the daylight hours. In the winter it does not hibernate, but remains active.



Being a semi-aquatic mammal, it is obviously an excellent swimmer. The otter has the evolutionary adaptation of a broad flat head and webbed feet for this purpose. Remarkably, it can stay under water for a quarter of a mile without air. It maintains its body temperature in cold water with the aid of a layer of fat just under the skin and also with its coat of short, thick underfur, interspersed with the long guard hairs.

Otters move through the water using a combination of leg power and by twisting and writhing the body and tail. Its maximum speed is 6 or 7 m.p.h. In the winter, air bubbles beneath the ice are a source of oxygen for extensive underwater ventures. Both the ears and nostrils can be closed when the animal is submerged.

The river otter travels mainly by water, consequently, his short legs are not conducive to land roving. However, when necessary it can run extremely fast and will travel extensive distances searching for new territory or, in winter, ice-free water. In all types of weather the otter will conclude a swim by shaking vigorously and rolling on the ground.

Otters make their homes in bank burrows, abandoned muskrat or beaver dens or in the base of a hollow tree or fallen trunk. Root tangles also supply sites for den construction. If the den is located near the water's edge, there will usually be two entrances at one time or another. In the winter an entrance will be below the ice cover and in the summer an entrance will be above the water level. The den will be either a simple hole or a series of tunnels. The floor may be bare or covered with some vegetation.

There is some question whether river otters are polygamous or mate for life. Whichever it is, males will fight over one female during the mating period which is usually in late winter or early spring. Breeding takes place either in the water, on land, or both. The mating act occurs with both animals lying on their sides. The male clasps the female by the scruff of the neck with his mouth and also will hold her with his forlegs around the abdomen.

Birth of the pups does not occur until approximately eleven months later. The pups or kits, numbering from one to five are born around April. Females may breed again soon after the litters are born. Otter pups are "attricial"—naked and helpless at birth. Kits may be raised by one or two females, or a mother-father combination. They are guarded jealously and danger is signaled by a warning grunt or cough. At approximately three months the kits are forced into the water for the first time. They must be taught to swim and feed and the mother will carry the young on her back until they can swim alone. The young venture out on their own, at age one just prior to the arrival of the litter. Otters do not become sexually mature until two years old.

A wide variety of aquatic life is consumed by the river otter. Its diet includes snails, clams and other freshwater shellfish, crayfish, insects, mudpuppies, frogs and snakes. At times, extreme hunger will force this carnivore to kill and consume muskrats and birds. Although his favorite foods are the freshwater fishes, he has no preference for game fish over rough fish. In fact, he is best described as an opportunist because he will take the most readily available species. Other foods include salamanders, turtles, ducks, grebes and earthworms. At times otters will capture their prey only to play with them.

Otters are, of course, cunning fishermen and have interesting methods of gathering their food. Pairs of otters will herd schools of fish before them into a shallow area to increase the odds of a good meal. They will also dig for bottom dwelling animals by standing on their heads while rooting in mud and detritus with only the tails showing at the surface of the water.

After capture they will eat the fish-heads first but have no use for the tail. An otter cleans up by wiping his fur on the grass or snow.

Otters will mark out their home range with drops of scent from their anal glands. This is also useful as an attractant during mating season. Otters have been known to travel from 50-60 miles in a given year.

Being an intelligent animal, the otter has interesting behavioral traits. He is very playful and his use of mud and snow slides is legendary. Otters can also be described as being shy, gregarious, and mischievous. His language consists of chuckles, churps, purring grunts, growls, barks and screams.

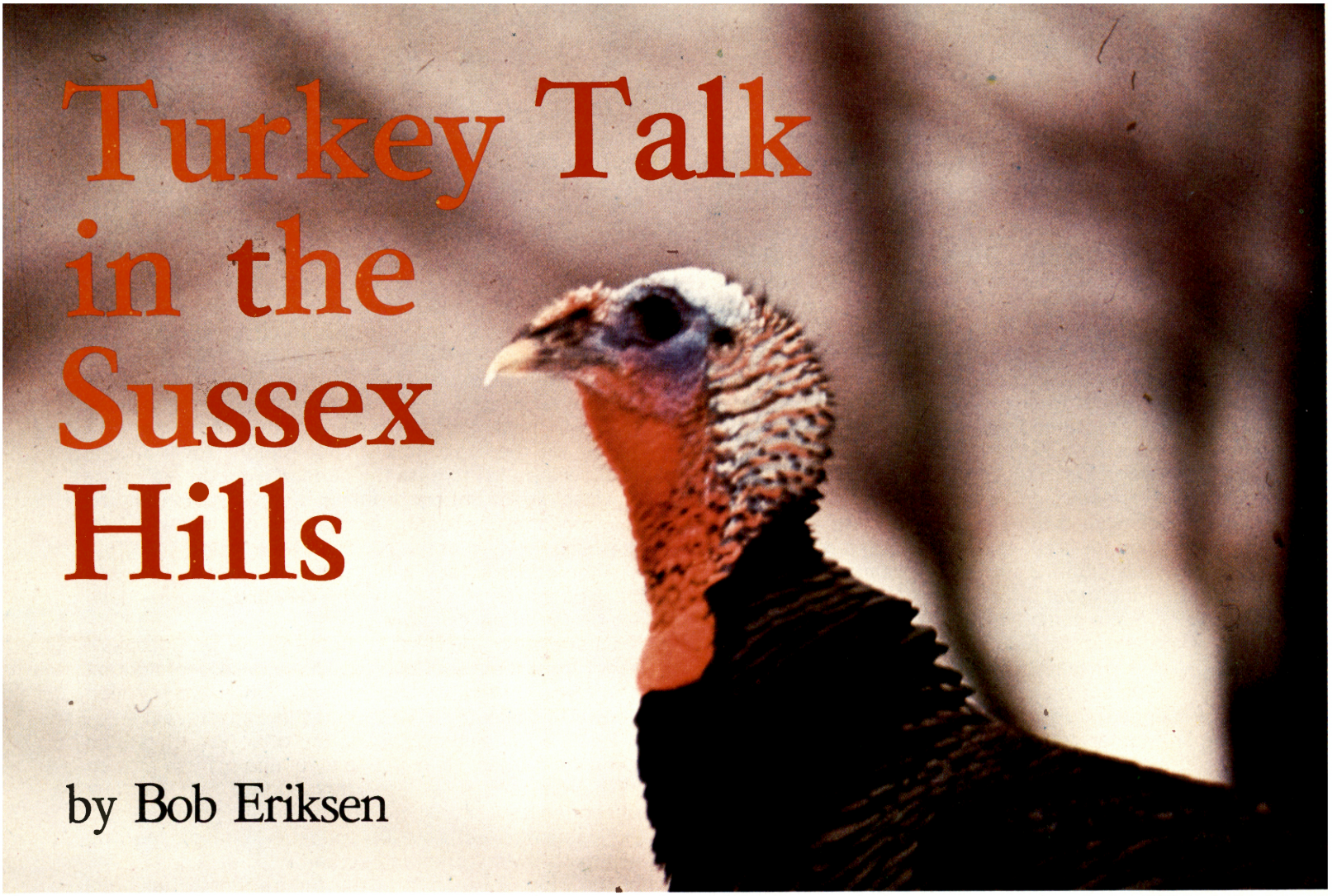
The hide is valuable to the fur trapper. Otter pelts from eastern Canada and the northeastern United States are the darkest and are valued the most. In New York State the number of people who reported the taking of otter has remained consistent over the past 20 years. Generally when the number of beaver trapped increases, so does the number of otter. Otter fur demands a high price because the animal is one of the largest furbearers and the pelt is very durable and water-resistant.

Researchers age otter by sectioning the canine teeth and counting the annual rings, similar to counting the rings on trees. Otters as old as ten years can occasionally be found in the wild.

The shy nature and nocturnal activity pattern of the otter make human sightings infrequent. This led to the mistaken belief by much of the public that the otter is either locally extinct or at best an infrequent visitor. This is especially true in New Jersey, where our primarily urban population has had little contact with the wild outdoors to say nothing of the subtleties of otter signs. True, one doesn't encounter our otter around every bend in the stream, but they are much more common than most people believe. Even in New Jersey, with its high human population and intensive land use, a healthy, self-sustaining otter population exists. However, if the otter is to survive in significant numbers in the Garden State, threats to its habitat such as erosion, channelization and pollution must be at least controlled and at best eliminated. □

Turkey Talk in the Sussex Hills

by Bob Eriksen



HARRY GROSCH

A new sound has been added to the myriad of bird songs heard in the Sussex Hills on a spring morning. The rolling gobble of the eastern wild turkey is back after an absence of perhaps one hundred years.

Last winter, one year after the release of 22 turkeys from Vermont and New York, census work was begun. Snow, which lay on the ground from early January until mid-March aided in the search for turkey flocks. More than 80 turkeys were located during the census period.

The four-fold increase in the population indicates that reproduction and survival were excellent in 1977. This is the result of good spring weather and the pure wild origin of the original turkeys.

New Jersey's wild turkeys wintered very well. Weights of live-trapped birds indicated that they were well-fed in spite of cold and heavy snow.

Spring arrived slightly later than usual. Winter turkey flocks broke up in late March and gobbling began in mid-April. A peak in gobbling activity occurred during the week of May 10, indicating that hens were incubating clutches and unavailable to love-lorn toms.

Good, dry weather in June and July resulted in good brood production once again. Census work carried out in August and September turned up more than twenty turkey broods. The estimated fall 1978 population is over 200 wild turkeys.

The success of the project thus far has reached beyond expectation. Still, the flock is new and vulnerable. By far, the worst threat is introduction of disease or inferior genetic traits through the release of game-farm turkeys. Such releases are illegal and turkey enthusiasts should work to prevent these liberations.

A trap and transfer program is planned for this winter. Live-trapped wild turkeys will be moved and released in Warren and Passaic Counties. From the transplanted flocks, turkey populations may be established in these two counties as well.

Sightings of wild turkeys are valuable tools in management of the species. Please report sightings to:

Turkey Restoration Project
Clinton WMA Box 409
Hampton, NJ 08827 (201) 735-8793

BOB ERIKSEN

ROY E. DECKER

HARRY GROSCI

In the winter of 1977, 22 wild turkeys from Vermont and New York were brought to New Jersey by DEP's Division of Fish, Game and Shellfisheries in the hope that they would flourish and once again become part of the state's "native" wildlife. (Loss of habitat and unrestricted hunting had almost done away with the wild turkey population by 1913 and the birds were put under protection of state law. It wasn't until the mid-1970's that money was available to embark on the program to bring the wild turkey back to New Jersey.) The transplanting of hen and tom turkeys in January and February of 1977 to Sussex County has proved very successful. The original 22 birds have multiplied and as of September 1978 an estimated 200-250 wild turkeys (three generations) are thriving in their new habitat.

Robert E. Eriksen, wildlife biologist at DEP's Clinton Wildlife Management Area and project director of the wild turkey programs said that some well-intentioned people have been releasing game farm turkeys thinking they are helping the program. This is not the case. Game farm birds have entirely different behavior and because they look the same as wild turkeys they could be counted as wild birds to the detriment of the program. "In fact," said Eriksen, "it is against the law to release game farm turkeys in the wild as they do not have the instinctive behavior to survive under such circumstances and will die."

EDI JOSEPH □

Warning:
FEEDING WILDLIFE IS DANGEROUS TO THEIR HEALTH

By Dr. Douglas E. Roscoe

The feeding of free-ranging or captive wild animals by the public is widespread and appears to be motivated by one of two desires; either the desire to attract wildlife for amusement or to "help" wildlife in their struggle for survival during periods of stress. ***What is not commonly realized is that we may be feeding our wildlife to death.***

Wildlife have evolved highly specialized nutritional requirements, which are seldom satisfied by offerings from the general public. In addition, feeding alters the habits of some wild animals and precipitates or enhances disease. During the first year of operation, DEP's Division of Fish, Game and Shellfisheries Pathology Unit has received numerous wildlife which have died directly or indirectly from inept or uninformed feeding practices.

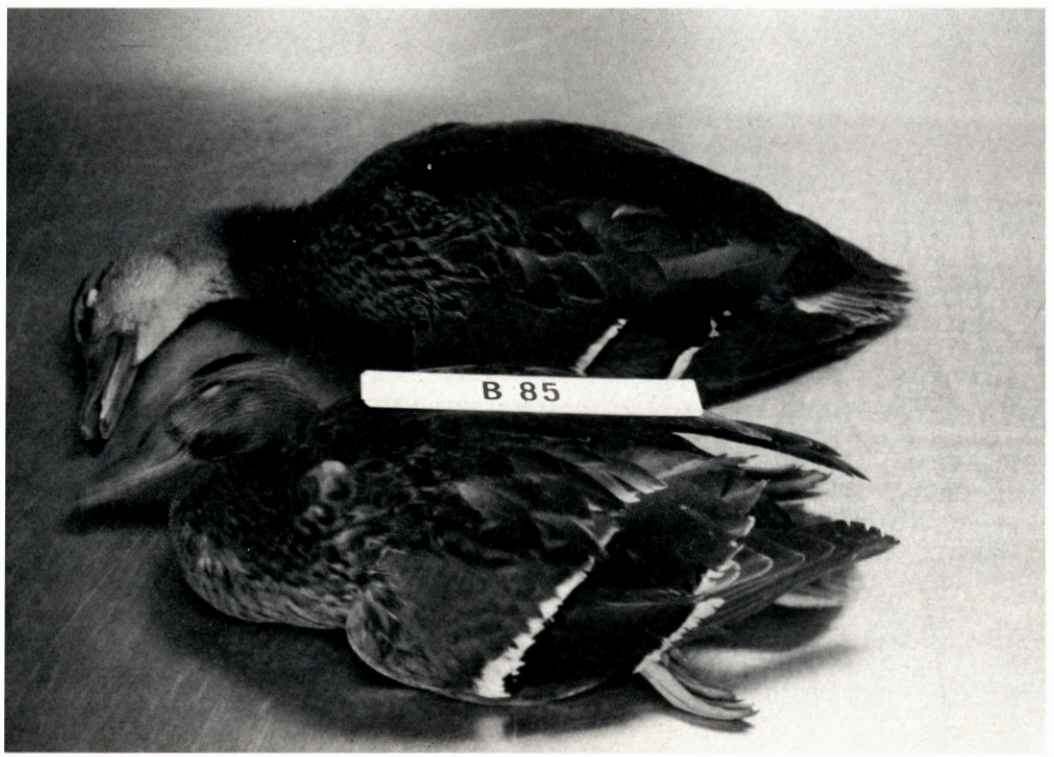
The most common form of wildlife feeding is that of the songbird feeder. Superficially, this appears to be a rather benign practice. However, the person who decides to feed songbirds takes on a big responsibility. If feeding is started during the fall migration some birds may be shortstopped. That is they may remain in what is normally too northerly a climate. Starvation is the result if feeding is not continued through winter without interruption.

Seeds and bird wastes at feeding stations provide a growth medium for Salmonella bacteria or Aspergillus moulds. These organisms together with their toxins kill unsuspecting birds which consume the contaminated seeds. This situation occurs most frequently when birds are fed during the spring and summer when warm damp weather facilitates microbial growth.

Mourning doves experience a fatal disease of the throat known as trichomoniasis. This condition is caused by a parasite which may be transmitted from females to young in regurgitated food. Another mechanism for transmission is on seeds at a bird feeder. ***This disease is also more common in the summer, when all bird feeding should cease.***

Nothing seems to trigger the human impulse to feed wildlife more than the observation or possession of what appears to be a distressed animal.

Last winter Lake Hopatcong residents began feeding waterfowl to help them through a period of extremely cold weather. A one-acre body of water was kept free of ice by the activity of about 100 ducks, geese and swans attracted to the handouts which consisted primarily of stale bread, rolls and corn. When the swans began dying various birding organizations were consulted concerning the cause of these deaths. The diagnoses ranged from bread clogging the digestive tract to starvation. The newspapers quoted these individuals and in no time there were letters stuffed with money



Mallard hens with botulism spasms and puffy eyes

to pay for corn to be distributed to the starving birds. Finally , the Pathology Unit of the Division of Fish, Game and Shellfisheries was notified and an investigation begun. Since only swans were dying and not all were emaciated, starvation was ruled out immediately and the individuals involved were asked to stop feeding the birds pending further investigations. One person was steadfast in his belief that food was the answer and continued feeding corn.

Autopsies were performed on the dead swans. One bird had apparently been force fed a sandwich, evidenced by the slice of salami and bread wedged in its gullet. The birds had fragments of lead sinkers in their stomachs. Toxicologic tests revealed high concentrations of lead in the liver tissue. The swans were dying of lead poisoning.

It has been shown experimentally that waterfowl on corn diets are much more susceptible to lead poisoning than birds on a more complete diet. The maintenance of a large number of birds on the area, through feeding, kept the water free of ice and thus enabled the swans with long necks to reach down in the sediments in search of corn. During this search they encountered fishing sinkers which they mistook for corn due to the similar size and texture. The other waterfowl were unaffected by lead poisoning since with their shorter necks or different feeding habits they did not reach the lead in the sediments.

Our diligent waterfowl feeder was most repentent when he discovered that he was playing a significant role in the swan deaths. When all feeding ceased the waterfowl began to disperse to more favorable natural feeding sites and the water iced over. No more swan mortalities were reported from the area.

Not only can feeding bait wildlife into potentially lethal situations, but it may actually function in bringing these conditions about.

Numerous waterfowl succumbed to botulism this past August in various park ponds and along the coastal marshes of New Jersey. The bacterium responsible for the disease is favored by warm sediments, rich in decomposing organic matter and low in oxygen content. The feeding of ducks with bread was a common practice at nearly every area affected. The bread tossed in the water brings the ducks together where their feces and bread contribute to the organic matter, which through decomposition robs the sediments of its oxygen. The botulism bacteria thrive in the oxygen depleted sediments. The puddling ducks such as mallards and pekins, feed in the shallows swallowing the bacteria, which release their lethal toxin. Man-made ponds at public and industrial parks are frequently the site of botulism outbreaks. This is not only due to the baiting of ducks with bread, but also the shallow, stagnant nature of these ill-conceived poison pits.

The dangers and complexities of feeding wildlife may be additionally illustrated by the experiences of the members of a bird rehabilitation center in southern New Jersey. A common and thick-billed Murre died after being received by the center. Autopsies revealed the death was caused by parasitic worms *(Eustrongylides ignotus)* burrowing through the stomach and into various organs. The worms were derived from infected killifish which had been fed to the birds during rehabilitation. Normally Murres feed well out to sea and have no occasion to eat killifish, which inhabit tidal waters. The problem was resolved by freezing the killifish prior to feeding. The freezing killed the infective parasites.

Deer provide a unique problem with respect to feeding. Deer are ruminants. Ruminants are mammals with what has been described as a four compartment stomach. Actually, there is only one stomach preceded by three outpouchings of the esophagus. They probably evolved in response to the deer's need to be constantly alert and aware of danger. The pouches facilitate the gulping of large quantities of vegetation to be regurgitated and chewed at leisure. In this way the deer need not have its head buried in the grass for prolonged periods. These pouches also function as chemical vats in which specific bacteria participate in fermenting and otherwise breaking down the grasses and woody materi-

Mallard head with botulism limber neck (paralysis)

als ingested. The type and quantity of bacteria present are dependent on the food being consumed. When the diet is suddenly changed the bacteria may die or be ineffective in digesting the new food stuffs.

These sudden disruptions of diet usually result in an enteritis which is characterized by diarrhea. The intestinal injury results in fluid loss and inability of the deer to derive nourishment from its food. This may result in death. Although this problem is most frequently encountered in deer which have been kept captive, it occasionally occurs in free-ranging deer.

The officials of a park in northern Bergen County undertook a deer feeding program last winter. Deer found dead at the feeding stations were autopsied. Park officials couldn't understand why these wild deer died with their stomachs full of grain, while the park's captive herds thrived on this ration. Winter feeding of these nutritionally deprived deer accomplished a fatal change in diet.

The distribution of supermarket refuse such as celery, lettuce, cucumbers, carrots and bread was commonly encountered by Division personnel during the past winter. These materials were intended for the starving deer. The vegetables

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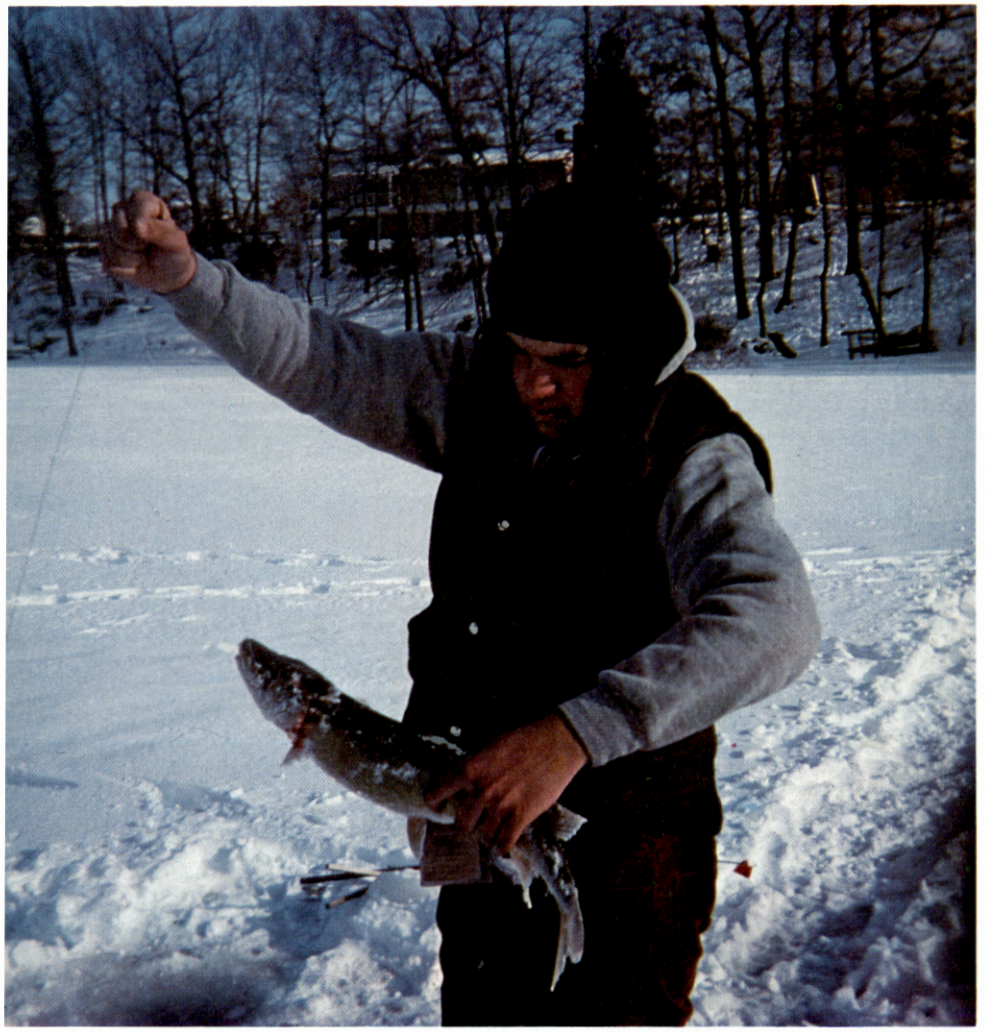


Steve Rosso admires a three-pound pickerel.

ICE FISHING for Pickerel Yields Big Dividends

By Bruce Litton

Would you like a special fishing treat this winter—a break in the "cabin fever" days? Ice fishing for pickerel can offer this escape as well as the biggest pickerel of the year. I have seen more big pickerel pulled through a hole in the ice of winter than I have seen landed during the warmer seasons.

Essential equipment includes tip-ups, an ice chisel or auger, a metal strainer to remove ice chips from the hole, terminal tackle such as size four to one hooks tied to 20-pound-test leader, sinkers up to 1/4 ounce, split shot, live minnows, and warm clothing. Fold-up chairs, a small stove or hibachi, and a jig rod and lures are luxuries that can make the trip more pleasant. A child's sled is handy for toting equipment to the fishing spot.

The tip-up is the device that stored braided Dacron line of 15- to 45-pound test to which the monofilament leader and hook is tied. The spool remains below the water surface in the ice hole, attached to the lower end of the tip-up (see diagram). When a fish strikes the live minnow on the hook a trigger mechanism is set off, springing up a red flag. The fish can pull line freely from the spool.

Upon seeing a sprung flag, the fisherman must hurry to the tip-up and remove it from the ice hole so the fish will not feel any resistance while pulling line from the spool. The fisherman can pull line from the spool and feed slack line to the fish as it runs with the bait.

Some spools do not turn as freely as others and none of them pivot to aim in whatever direction the fish is taking line. While ice fishing a shallow pond, a friend of mine once had the experience of losing pickerel, spool, line, leader, and hook all at the same time. Apparently a large pickerel entangled the line around the spool and violently yanked it out of the lower, wooden stem of the tip-up.

Almost invariably, pickerel run a short distance with the bait, then stop. By the time the fisherman arrives at the tip-up and removes it from the water, the pickerel has usually completed this first run. The line should now be pulled tight (after first run) in order to feel the pickerel swallowing the minnow. When a firm tug is felt, the time has come to rear back hard on the line, setting the hook.

The rest is simple—just pull the fish up and through the hole, on to the ice surface. With the heavy

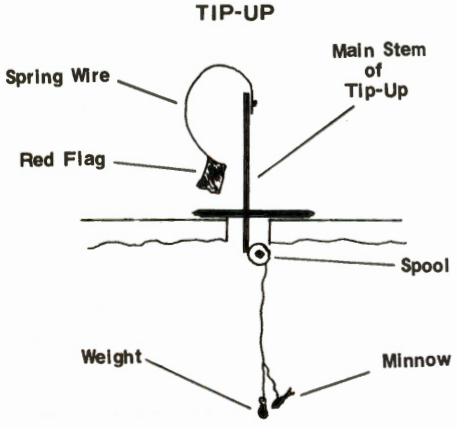
There he is! A big winter pickerel is lifted through the hole.

Dacron and monofilament line, little difficulty should be encountered in catching the heaviest pickerel.

Where are the best places to find pike-sized pickerel in New Jersey? Pickerel are abundant all over the state, especially in the Pine Barrens, but some lakes and ponds will yield more fish than others. In turn, some areas in those particular lakes or ponds will be more productive than others. Two important factors should be considered when looking for big pickerel water. First, the lake or pond must contain some weeds for the pickerel to spawn amongst and must reach a depth of at least five of six feet. Second, soft-rayed forage fish such as minnows should be abundant as a food supply.

Pickerel are a cover-loving fish, so when checking out a spot for winter pickerel, look for pronounced weedline edges situated in deep water, deep, weedy corners, and thick brush in deep water. Although the dead weeds of winter will not be as thick and abundant as those of summer, their remains plus any surviving weeds will pile on the bottom and a weedline edge will be visible just where it was during the summer.

To name a few, Lake Hopatcong, Greenwood Lake, Lake Muskenetcong—all located in the northern tier of the state—and Assunpink Lake in central New Jersey all harbor big pickerel. Wherever you do decide to go, make sure you know where the weedlines end and where any bush might be submerged. It's important to fish in the right area—you simple cannot catch pickerel where there aren't any.



Steve Rosso weighs his lunker—a three pounder, 22 inches long.

SNOW BIRD/ WINTER SPORT FOR NEW JERSEY HUNTERS

By Art Weiler Jr.

PHOTO BY LEONARD LEE RUE, III

My wife says I'm crazy! She says, "Don't you know how cold it has been? How could you go hunting in weather like this?" Who would want to climb steep hills and slip down ice-glazed ravines?

Well, maybe I am a little crazy—crazy about hunting, that is. Crazy about hunting in uncrowded woods and finding game in its natural setting. Crazy about the beauty and tranquillity of snow covered fields while watching my dog Clancey push through drifts and into storm-felled trees as the bird explodes into the crisp winter air.

After deer season, the woods of New Jersey become deserted of the troops that were present during opening day. A few late-season pheasant hunters or rabbit fans are to be found, but rarely in the northern woodlands where the ruffed grouse—our winter gamebird—lives. In the deep snow, the grouse reigns supreme. Nature has given this bird built-in snowshoes on which it can travel at will. The grouse finds a ready supply of food in nature's deep freeze, but is especially fond of the bright-orange bittersweet berries. Certain covers have the necessary feed and cover, so the experienced grouse hunter will seek out the spots that have plants such as catbrier, apples, grapes, and of course, bittersweet. Into these winter pastures the grouse will migrate or concentrate far above their early season numbers. As soon as grouse tracks are seen in the snow (they are closer together than the pheasant), the hunter can be sure that the birds are nearby, for they do not travel far in their wintertime jaunts for food. Above all, the hunter must remember that he is a foreigner to the bird's territory and the ruffed grouse has many plans for a quick escape—in fact, this is the bird that wrote the book on quick getaways. The hunter must slow down his normal upland hunting pace, for it is not unusual for these birds to wait until you have passed and then sneak out behind you and make a quick, low, flight into the nearest ravine—leaving you with your mouth open and your barrels still cold. Hunting slowly is the golden rule, especially for the hunter without a dog. The grouse hunter must *expect* a bird to fly from each new cover explored. He must be *ready.* Some hunters prefer not to use their dogs and this may depend on the dog's style. A close-hunting dog is preferred so the grouse is not put up too far away for a shot. A hunter must pay close attention to his dog in the winter, for the snow and ice can take a heavy toll on the dog's feet and pads, causing them to crack and bleed. If the dog's tracks show spots of blood, stop hunting and return the dog to the car. Don't hunt your dog until the feet have healed. Some hunters use protective "boots" which are sold for this purpose.

The wintertime hunter feels a great sense of being "in touch with nature" as he stalks through the quiet snow, but he must remember he is also at the mercy of winter chills and cold. Several precautions should be taken by all wintertime hunters. First, hunt with a buddy if possible. Next, let your family or friends know where you are hunting and about when you will return. Third, leave a note on your car stating that you are hunting and that you expect to return to your car at a certain time. Of course, dress for the weather, paying special attention to your feet. For footwear, waterproof boots are a necessity, as are two pair of socks—one pair to "wick" up the moisture and one wool pair for warmth. Insulated boots or felt liners will help also. If you are walking in a fair distance, you might want to carry a handwarmer and a "space survival" blanket. Remember to pack a big lunch, for 'ol man winter is sure to work up your appetite. The grouse you shoot will be hard earned and you will deserve each one of them.

Safe hunting this winter season for New Jersey's native gamebird and winter king—the ruffed grouse. □

Environmental News

COASTAL PROGRAM GETS GREEN LIGHT AND $800,000 FEDERAL BOOST. U.S. Department of Commerce Deputy Undersecretary Frederick A. Schenck (seated right) signs the formal approval of New Jersey's Coastal Management Program, while Governor Byrne prepares to do the same and DEP Commissioner Daniel J. O'Hern holds the just-awarded check for $800,000 to implement the plan. Smiling their approval are (standing from left) Dr. David Kinsey, chief of DEP's Office of Coastal Zone Management; Donald Graham, director of the Division of Marine Services, and Congressman Joseph LeFante. The ceremony was held at Island Beach State Park this past October 16.

The coastal program, known as the Bay and Ocean Shore Segment, covers 1,382 square miles of the state's coast from Raritan Bay to the Delaware Bay. Prepared by DEP's Office of Coastal Zone Management over a four year period, the program presents state policies which concentrate on a proper and efficient pattern of development including appropriate building design to minimize detrimental effects to natural resources and preservation of large open space areas. New Jersey is one of 33 states and territories participating in the national coastal program created by Congress in the Coastal Zone Management Act of 1972. The National Oceanic and Atmospheric Administration (NOAA) within the U.S. Department of Commerce administers the program. Federal aid for implementation of state coastal plans depends on NOAA approval.

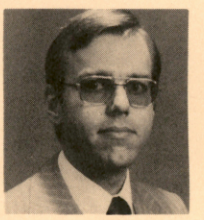
MIDLAND GLASS AGREES TO CONTROL AIR POLLUTION

The Midland Glass Company of Clifton (Monmouth County), while not admitting any violations, has signed a compliance order with DEP which calls for the repair, enlargement and installation of equipment to control dust emissions during material transfer. The company had been cited for violation of the state's air pollution control code.

The order contains a series of compliance deadlines over a seven-month period ending in May when the company must have adopted manufacturing practices which will keep the plant in compliance with state law. This compliance can be accomplished while continuing all current operations.

Midland Glass has posted a $10,000 performance bond which may be returned after the company meets all the terms of the order. Monthly progress reports are to be made to DEP until all work is completed. Should the company be prevented from meeting any specified completion date because of circumstances beyond its control (delayed arrival of equipment, for example), a reasonable adjustment in schedules will be made. The order does not exempt Midland Glass from enforcement or penalty activities resulting from violations of air pollution control standards after the signing of the agreement.

DEP Announces Changes In Top Level Management



PAUL H. ARBESMAN

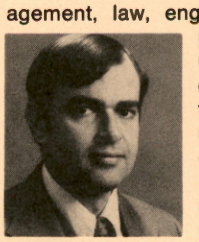
A change in the top management of DEP became effective on November 27. Under the plan, various DEP divisions, bureaus and programs continue to function as before but are grouped under four major categories: environmental regulatory matters, science and research, natural resources and governmental affairs.

Environmental Protection Commissioner O'Hern said, "This reorganization will enhance DEP's efficiency in coordinating and performing its vital environmental services for the taxpayers of New Jersey ... DEP will be organized to provide better relations with the municipalities and counties as well as other constituency groups."

No new positions have been added. Instead, there has been a reassignment of top personnel to meet the new priorities. Continuing to fill key roles in the management are Betty Wilson as first deputy commissioner, Joseph T. Barber as deputy commissioner for governmental affairs, Dr. Glenn Paulson as assistant commissioner for science and research, and Dr. Peter Preuss as director of the environmental cancer and toxic substances program.

Paul H. Arbesman, who had been director of the Division of Environmental Quality for three years, became assistant commissioner for environmental management and control. Richard J. McManus is the new chief of the Office of Regulatory Affairs. David C. Mattek became director of the Office of Inter-governmental Operations. George J. Tyler, who has been with DEP for seven years, the last four as legal analyst and special assistant to the director of the Division of Environmental Quality, became director of that unit.

Commissioner O'Hern said, "I feel these officials will use their skills in general management, law, engineering and science to place added emphasis upon the delivery of efficient governmental services performed by DEP under its legislative mandate."



GEORGE J. TYLER

Here's a breakdown of assignments under the reorganization:

Arbesman, as assistant commissioner for environmental management, has responsibility for the Division of

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President Carter Signs National Parks Bill

On November 10 President Jimmy Carter signed a bill authorizing the spending of $1.2 billion on more than 100 parks, rivers, historic sites and trails; and authorizes the spending of more than $725 million in the next five years to improve urban recreation facilities. The National Parks and Recreation Act of 1978, called by Carter "the most significant conservation legislation to pass the 95th Congress," is considered the broadest of its kind in history. Though the expenditures were authorized in the act, it will fall to the 96th Congress to appropriate them as the money would come from the 1979-1980 budget, becoming available in October 1979.

Two parts of the act are of particular interest to New Jersey:—**The establishment of a one-million acre Pinelands National Preserve in south Jersey's Pine Barrens.** A planning board including representatives of the U.S. Department of the Interior, each of the seven counties in the Pinelands and the governor is to start preparing a management plan for this ecologically valuable area early this year for submission to the Interior department in 1980. Upon approval of the plan, Interior will provide $25 million to New Jersey towards the purchase of about 30,000 acres of the Pine Barrens, with the state contributing the rest. This is the first federal recognition of the national importance of the unique Pinelands.

—The designation of 37 miles of the Delaware River in New Jersey and Pennsylvania as a "wild and scenic river." This deters the possibility of building a dam at Tocks Island. New Jersey has long been on record as being against its construction.

SHOW, TELL AND LEARN. New Jersey's pioneering statewide auto exhaust emissions control program has become a model for other states faced with instituting similar programs to meet the requirements of recent federal clean air legislation. DEP and the Division of Motor Vehicles have conducted executive workshops on the state's inspection/maintenance (I/M) program for representatives from the Northeastern and Middle Atlantic states, Colorado, and Washington, D.C. and regionally based staff members from the federal Environmental Protection Agency (EPA). Auto exhaust emissions are tested as part of the annual motor vehicle inspection required in New Jersey. The inspection process provides the right test equipment and technical expertise to correctly diagnose a vehicle malfunction, but it is the owner of the auto who must follow through and remedy any problems. Proper maintenance is the key to a successful program.

DMV Inspection Station Supervisor Edward Lambert (second from right, above) explains New Jersey Vehicle inspection requirements to workshop attendees (from left) Donald Byers, Connecticut Department of Motor Vehicles (CDMV); Herbert Wortriech, DEP; Commissioner Stanley Muzio, CDMV; and Marjorie Hart, Rhode Island Lung Association.

Good Times in Store For Hikers and Bikers

Within two years hikers along the New Jersey portion of the Appalachian Trail will be able to enjoy a true "wilderness experience" and hikers and bicyclists will be able to go from Washington Crossing State Park to Trenton without using the roadway. More than $1.1 million in federal aid has been approved for the two projects.

Appalachian Trail: New Jersey's part of the 2,000-mile Appalachian Trail which now includes some paths along roads and through private property, will be located entirely on protected public land with the help of a $500,000 federal land purchase grant from the Department of the Interior, augmented by state Green Acres funds. The federal grant has been earmarked for purchases along a 22-mile, 400-foot wide corridor that runs from High Point State Park to Wawayanda State Park. Other acquisitions will involve land along the Kittatiny Ridge between the Delaware Water Gap and Stokes State Forest. Hikers eventually will be able to walk from the water gap, where the trail leaves Pennsylvania, to Wawayanda, where it enters New York, without being exposed to civilization except

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Over-The-Counter Permits For 'Minor' Projects

DEP has a one-day processing service for "minor" sewer extension projects. Eligible projects must meet certain criteria, such as, length of 1,000 linear feet or less, cost of $25,000 or less, sewage flow per day of 8,000 gallons or less. No projects with pump stations, force mains, syphons, gallonage transfers or holding tanks will be processed over-the-counter. Projects cannot be located in areas under sewer ban, administrative orders, or litigation.

Projects must be in-house by 9:30 a.m., and all administrative documents must be in proper order. Pre-application conferences are strongly recommended. Appointments for the one-day processing service should be arranged through the Office of Business Advocacy, Department of Labor and Industry, P.O. Box 2766, Trenton 08625. Phone: 609-292-0700. For further information contact the above office or DEP's Division of Water Resources, P.O. Box CN029, Trenton 08625. Phone: 609-292-4869.

A PROBLEM IN WINTER

Dogs and Deer

Dogs are natural hunters and at any time of year will chase deer when they come upon one or its fresh track. When the ground is bare, or only lightly covered with snow, a deer in good condition normally has little problem out-running and evading the family pet. In winter, however, one or both of these conditions is usually lacking. Deer have enough trouble contending with the winter weather without contending with harassment by free running dogs.

Deer are much smaller than most people realize and when snow gets to be 15 inches deep, most deer will settle into the snow all the way up to their breastbone. When the snow is powdery dogs face the same problem and their deer chasing efforts abate somewhat. But, as the snow becomes more solid, dogs with their larger paws are soon able to travel on the surface while deer still settle deeply in the snow. Under crusty conditions this can be even more treacherous because deer may be

Continued on page 16D

MORE THAN EIGHTY DAMS INSPECTED

BOONTON DAM: SAFE, BUT SOME REPAIRS NEEDED. The Boonton Dam and Parsippany Dike across the Rockaway River in Morris County were inspected in May 1978 and deemed to be in generally good condition by the Army Corps of Engineers. Some deficiencies were found, however. DEP has notified the Jersey City Water Works, which is in charge of the facilities, of what must be done to remedy the conditions and the timetable for completion of the work. Included are preventive measures for overspills and development of an emergency drawdown and warning system. In the photo above, an inspector points out two conditions found at the Boonton Dam which must be corrected: Dislocation of grouted rip rap slope protection at north end of dam (left), and, Embankment damage by burrowing rodents at south end of dam.

By November 1 (1978) 84 of the 413 "high hazard" dams in New Jersey had been inspected under the nationwide, $70 million federal program authorized by President Carter in November 1977. The Army Corps of Engineers administers the program in cooperation with state officials (in New Jersey, DEP). The "high hazard" category does not indicate any structural deficiencies; it merely classifies a dam as having a potential for loss of life and great economic, community and structural damage, and losses downstream should a failure occur.

DEP's Flood Plains Management unit within the Division of Water Resources, which carries on the state program, used the following criteria to schedule the inspections: population downstream, height of dam, and impoundment (quantity) of water.

To meet the federal timetable for completion of the project (four years), it was necessary to contract with engineering firms to handle some of the dam inspections. The money to defray this expense for New Jersey and the other states across the nation involved in the dam inspection project is appropriated by Congress. New Jersey has received $840,000 to pay for the inspection of 120 dams during the period from October 1, 1978 through September 30, 1979.

Note: New Jersey laws related to the supervision of construction, repair and inspection of proposed and existing dam structures have been on the books for 67 years—since 1912. In addition to setting forth the particulars of dams to fall under state supervision, the laws (Title 56, Chapter 4, N.J.R.S.) empowered creation of a separate unit for dam inspection.

DEP Study of Toxic Substances in Water

The second set of results from a major statewide groundwater testing project which is examining wells for 50 selected toxic and cancer-causing chemicals has been released. The results from 163 wells tested in nine counties show that water quality, in most cases, was far better than recommended federal drinking water standards. (The initial preliminary report covering testing of wells in 12 counties was summarized in these pages, May/June 1978.)

However, in six wells, including three public supply wells, high values were found for one or more of the chemicals tested for in this study. The public supply wells have been taken out of service and local officials have been cooperating with DEP in intensive follow-up testing and investigation of pollutant sources.

This statewide groundwater study, conducted by DEP's Program on Environmental Cancer and Toxic Substances, is the first of its kind and employs recently developed highly sensitive laboratory techniques and careful attention to a comprehensive quality assurance plan to ensure validity of data. Laboratory analysis for this project is being done under contract by the Cook College Department of Environmental Science of Rutgers University.

The 50 chemicals for which the water samples are tested fall into three groups: organic compounds (chloroform, for example), pesticides and metals. Wells tested included private and public drinking supplies, industrial sites and wells in the vicinity of landfills. A second year of well testing as well as a new program concentrating on testing potable (drinking) water supplied by water companies, has begun.

Program Opens 14,491 Acres Of Land To Use By Public

Nearly 14,500 acres of open-space land in New Jersey owned by nonprofit organizations have been certified eligible for local property tax exemption in the four-year history of the Green Acres Tax Exemption Program. These lands become available to the public for recreation and nature observation when the tax exemptions take effect.

This past fall DEP certified applications from 11 nonprofit organizations: William O. Allen Trust, Camden County Girl Scouts, Community Club of Brookside, Del-Raritan Girl Scouts, Greater N.Y. Council Boy Scouts, Natural Lands Trust, N.J. Conservation Foundation, Philadelphia Conservationists, Ridewood-Glen Rock Boy Scouts, Wildlife Preserves, Inc., and Yaw Paw Camp Association. The approvals total 3,261 acres of open space available to residents in 21 municipalities. The property tax exemptions became effective on January 1.

Under terms of the state Tax Exemption Law (N.J.S.A. 54:4-3.63 et seq.) the exemptions can be granted for up to three years. At the end of the certification period, the organizations may apply for recertification provided no change is made in the nature of the organization, the ownership of the land, or the public access. Forty-two recertifications have been recommended for approval.

DEP is making a study to determine the extent to which a property tax exemption can be granted in any municipality without unduly impacting the community's tax base. Public comments on the study and other aspects of the tax exemption regulations will be solicited before the next review period. For further information write to Green Acres Tax Exemption Program, P.O. Box 1390, Trenton 08625.

North Sea Oil and Gas Development

DEP in October 1978 released a staff report on the "Pace of Oil and Gas Development in Scotland 1970-1977: Pointers for American Planners." Anticipating offshore oil and gas development off the Jersey coast, the report examines the pace of oil and gas development in the last decade in the North Sea to determine lessons that may be drawn from Great Britain's experience. For example, the study found that nine offshore fields began production within five years of commercial discoveries. Differences in American and British regulatory practices suggest that a comparable time span will be 5 1/2 years on the average in the United States—a relatively short time frame in which to make decisions having long term consequences.

The study was begun by Helga Busemann under a fellowship from Columbia University and continued after she joined the Office of Coastal Zone Management (OCZM) within DEP's Division of Marine Services. David Kinsey, OCZM chief, said the report "is intended to clarify some of the issues surrounding Outer Continental Shelf (OCS) planning and encourage further initiatives to ensure that this new coastal-dependent activity will be compatible with those activities now existing in the coastal zone." Copies of the report are available from DEP, OCZM, P.O. Box 1889, Trenton 08625.

News Capsules

Publication Sales

GEOLOGY/TOPOGRAPHY MOVES

DEP's Bureau of Geology and Topography, which also handles Publication sales, is now located at 88 E. State Street (4th floor of the Wallach Building) on the Trenton Commons. There is ample free parking in the Commons lot. The bureau's mailing address is Box 1390, Trenton 08625.

REMINDER: TROPHY DEER DEADLINE IS FEBRUARY 23

Hunters planning to enter the annual state record deer program are reminded that the cutoff date is February 23. The program is sponsored by DEP's Division of Fish, Game and Shellfisheries in cooperation with the New Jersey Federation of Sportsmen's Clubs. The competition is divided into two divisions: the 200-pound club and the antler club. Entry blanks are available from the division office or wildlife management area offices. Address all correspondence to the Division of Fish, Game and Shellfisheries, Box 1809, Trenton 08625.

TOWARDS MORE EFFICIENT PERMIT COORDINATION

DEP has developed a Master Permit Information Application which, upon completion, will indicate all the DEP permits required for a project. These can include stream encroachment, riparian, sewer extension, CAFRA and the like. Forms may be obtained by contacting the Office of Business Advocacy, Permit Coordination, Box 2766, Trenton 08625: Attention Mr. Lee Rudow. Phone: 609-292-0700.

$2.5 MILLION FEDERAL GRANT FOR NEW TROUT HATCHERY

A trout hatchery, designed to produce more than a half-million trout annually, will be built at Pequest in Warren County with the aid of a recently awarded $2.5 million grant from the U.S. Department of the Interior. The first phase of the two-year project is expected to begin this summer with trout production anticipated in 1980. An additional $2.5 million in state Green Acres funds will be provided for land acquisition and development—the 2,200 acre site, along the Pequest River, off State Route 46 near Buttzville, will include picnic areas, a visitors' center and outdoor recreation facilities.

ENVIRONMENTAL BOND PROPOSALS APPROVED

Voters in the New Jersey general election on November 7 (1978) gave their approval to both the $200 million Green Acres and $25 million Emergency Flood Control bond issue proposals.

URBAN ENVIRONMENTAL AID

DEP has proposed a new urban environmental aid program to enhance and revitalize New Jersey's city neighborhoods. The program will provide matching grants to environmental commissions in municipalities having a population density of 5,000 or more persons per square mile or 25,000 or more total population. Soil conservation districts also are eligible. The program has been designed to fund visible neighborhood projects such as sculptures, murals on building walls, fountains, benches and trees for main streets or centrally located flower gardens. The department's Office of Green Acres and Outdoor Recreation will administer the project, known as the Urban Neighborhood Environmental Assistance Program. For information write to the above Office at Box 1390, Trenton 08625, or call (609) 292-2455.

WHO SAYS PEOPLE ARE APATHETIC ABOUT GOVERNMENT? NOT DEP!

Any doubt about citizen interest in governmental policy was dispelled by the hundreds of interested New Jerseyans who turned out for the series of Public Participation meetings held throughout the state this past fall. Interest was high, the discussions spirited, and in general the response to DEP's proposed plan for public input on environmental programs was good. The testimony given at the meetings and the written comments received are being reviewed. The final version of DEP's Public Participation Policy will incorporate many of the offered suggestions.

Continued from page 16B

GOOD TIMES IN STORE

for an occasional road crossing. (The Appalachian Trail runs along the mountain crest between Georgia and Maine.)

D & R Canal Trail: An 8.2 mile trail for hikers and bicyclists will connect Washington Crossing State Park (Mercer County) with downtown Trenton. The trail will be constructed following the Delaware and Raritan Canal along abandoned Penn Central Railroad right-of-way. The federal Heritage Conservation and Recreation Service is providing $605,500 for acquisition and development of the trail, with state Green Acres funds providing an additional $67,500. The trail will end at the Trenton Battle Monument in the heart of the city, making it readily accessible to urban dwellers. In several places it also will be suitable for use by people in wheelchairs.

Continued from page 16B

DOGS AND DEER

supported part of the time, only to break through when they run.

Whether a deer is killed by dogs or a hunter may seem academic—until one sees a deer ravaged by dogs. It is a gruesome experience. Death for most dog-killed deer comes from literally being pulled apart alive. Every year DEP's conservation officers must destroy many deer that have been torn and slashed by dogs beyond the point of recovery.

Remember, your docile family pet has the instinctive urge to hunt. To prevent deer-killing by dogs, keep your pet under control in deer areas—especially in winter.

Continued from page 16A

DEP ANNOUNCES

Environmental Quality headed by Tyler, the Division of Water Resources directed by Jeff Zelikson, and the Solid Waste Administration headed by Beatrice Tylutki.

(The Division of Environmental Quality handles such programs as air, radiation, pesticides and noise pollution control. The water division oversees all aspects of water management including pollution control, sewerage facilities and water supply.)

In addition to serving as first deputy commissioner for the entire department, Betty Wilson has additional responsibilities as acting assistant commissioner for Natural Resources. Grouped in this category are the Division of Parks and Forestry directed by Alfred T. Guido, the Division of Marine Services headed by Donald T. Graham, the Division of Fish, Game and Shellfisheries directed by Russell A. Cookingham and the Green Acres program headed by Curt Hubert.

Assistant Commissioner for Science Dr. Glenn Paulson, along with Dr. Preuss, continue to have responsibility for the environmental cancer and toxic substances program. Also under Paulson are programs for environmental and historical review, environmental analysis, geology and topography, environmental science and environmental disaster response.

Governmental affairs, grouped under Deputy Commissioner Barber, include the Office of Regulatory Affairs headed by McManus, and the Office of Inter-governmental Operations headed by Mattek. These functions include liaison with elected officials on all levels, development of legislation and regulations, public information, and citizen participation and involvement.

DEP is developing a department-wide public participation program to draw upon the ideas and expertise of the public sector in the shaping of regulations and programs. Five informational meetings were held around the state and the final policy is expected to be adopted early this year.

Air Pollution Control Field Office Relocates

The department's metropolitan air pollution control field office has moved from Springfield to 1259 Route 46 in Parsippany-Troy Hills. William Hart, office supervisor, said anyone wishing to discuss air pollution control in Essex, Morris, Passaic, Sussex, Union or Warren counties may contact the office at 201-648-2560. The office is open Monday through Friday from 8 a.m. to 4 p.m. Emergencies occurring during nights or weekends may be reported by calling 201-747-2662.

TO REPORT ABUSES OF THE ENVIRONMENT CALL ACTION LINE 609-292-7172

nongame news

Endangered and Nongame Species Project

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIVISION OF FISH, GAME AND SHELLFISHERIES
P.O. BOX 1809
TRENTON, N.J. 08625

EDITOR'S NOTE
The time-consuming task of addressing hundreds of copies of this newsletter has been influential in the decision to publish it four times annually rather than bi-monthly as originally planned.

Commencing with this issue, readers are urged to submit comments and suggestions and also to make use of the items found herein by including them in their own club newsletters, newspapers, etc. □

SEEN ANY ENDANGERED SPECIES LATELY?
Forms for the recording of endangered species sightings are available from the Trenton Office of the Endangered and Nongame Species Project. These report forms are designed to provide information helpful in assessing the distribution and status of endangered and threatened wildlife. Phoned-in reports are also recorded on the forms. Forty-three completed reports have been filed since their inception in March 1978. □

PEREGRINE FALCON SHOT
A young male peregrine hacked from the Sedge Island tower this summer has been injured by a shotgun blast. Discovered by a hunter in the Hackensack Meadows, the bird is currently under the care of experienced raptor rehabilitator, Len Soucy. A humeral fracture of the wing has been diagnosed. At last report the falcon was feeding on its own and gaining the strength needed before corrective surgery can be attempted. □

INJURED OSPREYS
A total of eight ospreys have been treated recently for maladies ranging from broken wings to exhaustion. Seven of this year's birds and one adult have been picked up in Middlesex, Monmouth, Ocean, Atlantic and Cape May Counties. Only two of the birds, one of which later died, were hacked from New Jersey nests as indicated by their bands. Two ospreys have been released, two have been donated to zoos and three remain under care at the Avian Rehabilitation Center in Absecon. □

PROJECT HOSTS NORTHEAST NONGAME MEETING
Thirty-three biologists, representing the nongame interests of federal, state, academic and private organizations, met in early October at the Wetlands Institute in Stone Harbor. The two day conference was sponsored by the Endangered and Nongame Species Project and was the first such meeting devoted solely to nongame, endangered species and urban wildlife concerns.

The second day of the conference began with a business meeting during which the formation of the Northeast Nongame Working Group was approved. The decision that the meeting be held annually was also decided and the State of New York offered to serve as host of the next conference projected for October 1979. The remainder of the second session was devoted to a field trip to the Cape May Hawk Banding Station and the nearby Higbee Beach Wildlife Management Area leaving out-of-staters with a favorable impression of New Jersey. □

BLUEBIRD ALERT
Information is sought on the size (number of boxes), location and success of any currently active bluebird trails or nesting box programs and natural nest sites in the state. Project biologists, aided by a Cook College wildlife student, are attempting to assess the nesting population of bluebirds in New Jersey in order to determine the species' status. The bluebird is currently listed in the "undetermined" category. Persons having records of nesting bluebirds within the past five years are urged to contact:

Mr. David Verbyla
220 N. 5th Avenue
Manville, N.J. 08835 □

ENDANGERED SPECIES DECALS
It is again time to mention the availability of endangered species decals. These colorful decals, featuring the bog turtle, make ideal and unusual gifts for conservationists and other concerned citizens. The purchase of a decal for a friend or relative simultaneously provides the Project with your tax deductible gift, of $5.00, earmarked for endangered species work. Send a check or money order to:

Endangered Species Project
Division of Fish, Game & Shellfisheries
P.O. Box 1809
Trenton, N.J. 08625 □

11 PEREGRINES BANDED AT ISLAND BEACH
The endangered species-funded raptor banding station established at Island Beach State Park banded a total of 11 peregrine falcons this fall along with numerous other falcon species. The station was managed by Bob Dittrick of the National Wildlife Federation's Raptor Information Center. A similar facility in Cape May succeeded in banding an additional 11 peregrines bringing the statewide total to 22 for the fall of 1978. □

REPTILE AND AMPHIBIAN FIELD RESEARCH
Current herpetological research in New Jersey was the topic of a meeting held recently at Turtle Back Zoo in Orange. Highlights of this year's field work on the bog turtle, timber rattlesnake, pine snake, corn snake, Pine Barrens treefrog and Southern Grey treefrog were presented by Robert Zappalorti. Mr. Zappalorti is the President of Herpetological Associates, a Staten Island based consulting firm which is under contract to the Endangered and Nongame Species Project to study endangered and threatened reptile and amphibian species in New Jersey. □

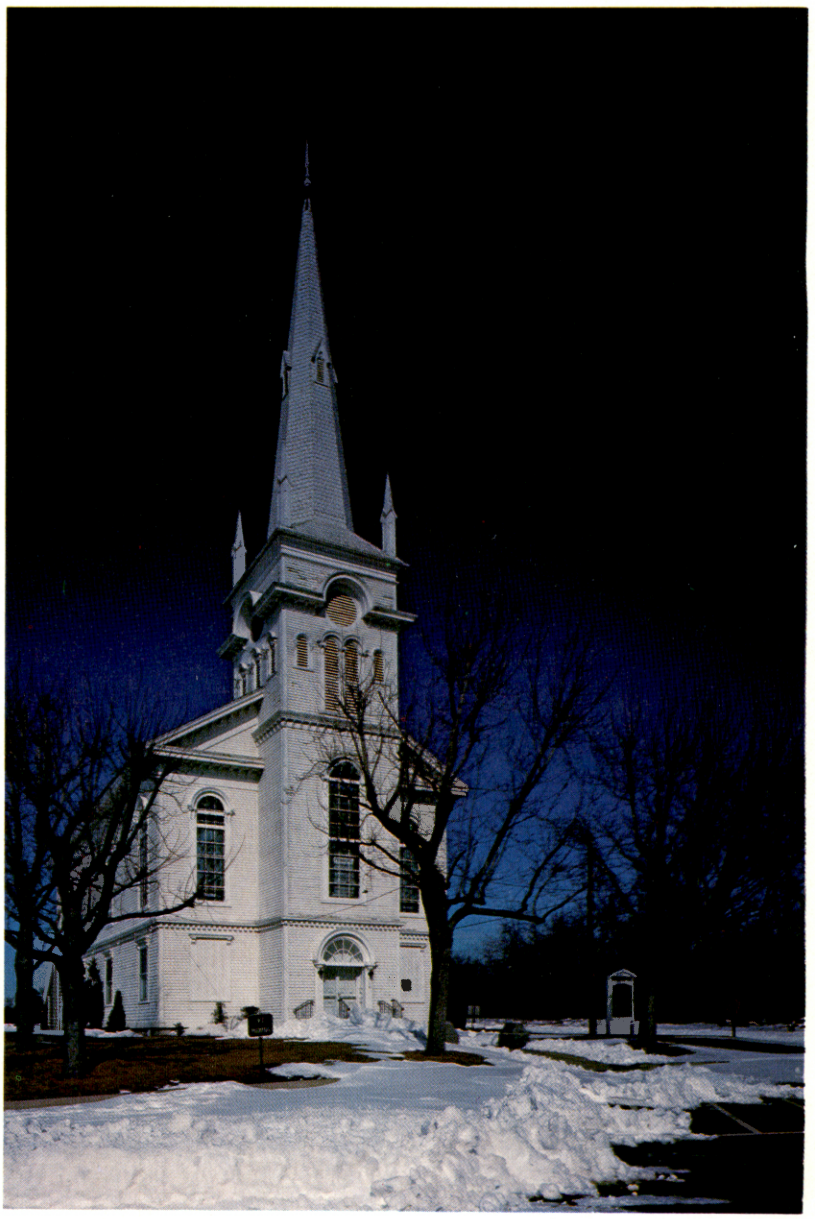
COLONIAL WATERBIRD PAPER GIVEN
"New Jersey's Colonial Waterbird Project" was the title of a paper presented by nongame biologist, Joan Galli, at the 2nd Annual Colonial Waterbird Group Conference in New York

Continued on page 31

NEW JERSEY in '78...

Watchung Mountains in the Fall
By Jeanne Quinn

Barnegat Light as Seen from Island Beach State Park
By Judith Doggart



Old Church Along the Mullica River
By Dave Campione

Camie Morrison, Down on the Farm
By G. Halsey Holmes

Woodland Lake in August
By Robert Fales

seasons, landscapes, wildlife and people

Spring in Verona Park
By Carol Zbuska

Canada Geese on the Maurice River at Dorchester
By Wayne L. Berner

Dr. A. Lee Meyerson, of Kean College, examines with student aides core samples taken from marshlands as part of N.J.M.S.C. research project. Various strata are analyzed to unlock ecological data. (B. R. Henderson photo)

NEW JERSEY'S MARINE SCIENTISTS: **How They Serve Us All**

By William L. Wilson

The common ocean quahog clam. Its succulent carcass protected by a hard shell as much as a quarter-inch thick and of an overall size that may be as large as a saucer, the ocean quahog is rapidly becoming the main source of supply for New Jersey's and the nation's clam processing industries.

And recently discovered evidence indicates that the quahog may be the world's longest-living invertebrate—the Methuselah of all spineless creatures on the earth. Some live for a century and half or longer, so perhaps it is the longest-lived of all animals, vertebrate or invertebrate.

This notable finding was made in the course of an in-depth study of the life cycle of the clam that has been in progress for more than three years, sponsored by the New Jersey Sea Grant Program which in turn is managed by the New Jersey Marine Sciences Consortium. The purpose of the research is to develop the information that is urgently needed for drawing up management plans and regulations for the harvesting of the species.

With the depletion of available commercial quantities of the surf clam on which eastern clam canning processors once relied, the harvesting of ocean quahogs, which are found farther out from the coast, is increasing by leaps and bounds. Many fear that unless controls are adopted the presently ample stock of quahogs will in turn be dangerously depleted.

This study is just one of many Sea Grant research projects conducted through the New Jersey Marine Sciences Consortium which are having an impact on New Jersey's natural environment and the lives of us all. The Consortium is based in Princeton and is a coalition of 22 New Jersey universities and colleges and one in Pennsylvania. In it, these institutions have pooled their resources of scholars and laboratory facilities for the constructive development, use, and protection of our coastal and inland water resources.

In addition to its research programs, the Consortium contributes to the improvement and wider use of the State's marine environment via two other main avenues. One is to develop and offer educational opportunities involving marine subjects to students from the primary grades to college postgraduate levels. The second is to provide a broad range of advisory services to increase public awareness of and interest in marine affairs and to supply information to those using New Jersey's waters for either commercial or recreational purposes.

The Consortium receives support from the budgets of the state's Department of Environmental Protection and Department of Education, from the federal government's Sea Grant Program, and from contributions by individuals and organizations.

Work on the quahog clam Sea Grant research project is being done in the laboratories of Princeton University by principal investigator Dr. Ida Thompson and associates. These researchers have developed a method by which the ages and life histories of individual clams can be read from the number and formation of their shell bands. The shells are sliced into "peels" that reveal the bands so they can be studied and read microscopically or through enlargements. The information obtained is equivalent to that derived from observing the growth rings in tree trunks, with each shell band representing a year's growth.

Preparing for studies in the cause of the periodic "red tides" that blight New Jersey waters, scientist carefully bottles and catalogues water samples for use at the N.J.M.S.C. Sandy Hook field station. (B. R. Henderson photo)

The sexual development of the clams also has been studied, indicating that some of them do not reach sexual maturity until the age of at least 14, compared with the surf clam which can reproduce as early as its first year. Some quahogs more than 100 years old show no signs of sexual senility.

Dr. Thompson observes that further research into the reasons for the remarkable longevity of the ocean quahog may produce valuable information regarding senility in other organisms, even human beings.

In normal catches today, only a few young quahogs are usually taken. This indicates, according to the Princeton researchers, that the larger, older clams probably monopolize most of the available space and

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SLUDGE COMPOSTING An Answer to a Major Problem

Aldo Cevallos
Principal Engineer - CCMUA

Ed Lempicki
Utilization/Marketing Specialist,
N.J. Bureau of Forestry

Wood chips, to be used as bulking agent material for the composting process are purchased and stored on site. To this point approximately 13,000 cubic yards of chips have been delivered to the Camden facility.

PHOTOS BY HARRY GROSCH

The City of Camden, New Jersey was the first city on the east coast to stop ocean dumping of sewage sludge. In response to new federal regulations regarding sludge disposal, the last barge of sludge from Camden was dumped on June 6, 1978. Since then, the City of Camden and the Camden County Municipal Utilities Authority have embarked on a progressive sludge treatment demonstration program—sludge composting using wood chips. The following is an outline of that process and a review of the role of wood chips as a bulking agent.

The Process

Composting is the natural biological decomposition of solid organic matter. Basically, the process consists of the partial decomposition of organic materials, mostly of plant origin, by bacteria, fungi and other organisms associated with the soil. Composting is a process that continually occurs throughout our environment and it has been nature's way of recycling nutrients and mineral elements back into the soil.

At Camden raw sludge received at the treatment plant is first dewatered to remove excess moisture. The moisture level is reduced from 95% to approximately 72-78% during this stage. The sludge "cake" is then mixed with a bulking agent material, wood chips in this case, at a ratio of two parts chips to one part sludge. The wood chips provide the necessary surface area and air passageways essential for the composting process to function. The chips promote the growth and activity of needed aerobic (oxygen using) bacteria which in turn facilitates the composting process.

This mixture of sludge and chips is heaped into long sloping mounds about 8-12 feet high and 100 feet long. A series of perforated pipes under the mounds draws air by vacuum blowers through the pile. These blowers are operated to maintain a level of air passage necessary for the aerobic bacteria and fungi to survive. Heat is generated naturally within the mound and it builds to temperatures of up to about 160° F in four to five days. This temperature level is sufficient to remove most of the pathogens from the mixture. Most of the sludge alteration takes place during this stage of the process which takes about 21 days. The mound is then removed to a curing pile for approximately 30-45 days where it is further stabilized and cooled. The wood chips and composted material may be screened prior to or after curing. During this screening, the compost is separated from the chips which are used again. Approximately 75% of the wood chips can be recycled in this process.

Long rows of wood chips-sludge mixture are aerated to encourage the composting process. This part of the process takes about 21 days.

The Wood Chips

A continual supply of bulking agent material (wood chips) is essential to this composting process. Presently whole tree wood chips are being used which are produced by a New Jersey landscaping company. The whole tree chipper clears wooded areas for power lines, high-

ways, developments, etc., and the entire tree is utilized with little or no material wasted. This type of wood chip has proved most desirable at Camden and other similar sludge composting facilities. Other materials could be used as bulking agents; however, at this stage in development, the whole tree wood chips appear to be the best.

In January, 1978, the New Jersey Bureau of Forestry was contacted to assist in procuring wood chips for Camden's composting operation. The Bureau's Marketing and Utilization Foresters began canvassing existing suppliers with capabilities for producing and delivering large amounts of this material on a contract basis. Landclearing companies, wood residue dealers and other major suppliers were approached and introduced as possibilities. Specifications were written concerning the amount, quantity and delivery of the wood chips and open competitive bidding took place. The chip supply contract was awarded to a New Jersey Landscaping Company which has been supplying chips to the Camden project. To date approximately 13,000 cubic yards of chips have been delivered with additional supplies to follow.

It is anticipated that other similar composting facilities will begin operation as tighter regulations on sludge disposal take effect. As the demand for wood chips for this use increases, existing supplies may become strained. To meet this possible future shortage, the Bureau has been investigating supplies of other wood type substitutes. For instance, tremendous quantities of wood residues are generated each year by New Jersey wood processors, and primary and secondary wood product manufacturers. Slabwood, edgings, rippings and cutoffs produced from product manufacture often end up in landfills for the lack of existing markets. This type of material could easily be modified into bulking agent material for composting uses. And the vast majority of wood product manufacturers are located in urban areas—precisely where the composting plants are anticipated. Thus, supply and transportation problems would be kept to a minimum. The Bureau of Forestry has been categorizing and classifying New Jersey sources of wood residues as a part of an overall assistance program to the wood industry, and much information on the subject is available.

Wood wastes such as this may play a future and important role in this composting process. Such a use would help solve two problems simultaneously—the problem of sludge management and the problem of wood waste utilization. □

Pictured above: Blowers are used to draw air through perforated pipes which run under the composting piles. This greatly increases bacterial action necessary for the process to function. Curing Pile pictured below.

After the sludge has been composted it is mechanically separated from the mixture. Approximately 75% of the wood chips will be recycled for re-use in the process.

MARINE SCIENTISTS

Continued from page 21

nutritional elements available to the clams. In the long run, with heavy harvesting of clams of all ages, the rate of productivity of the species may be reduced because an adequate younger generation of breeding clams would not become established. Such information supports the adoption of regulations encouraging the taking of the older clams and the protection of the younger members of the species as future breeding stocks.

Many other important research projects are going forward under the Consortium's Sea Grant auspices. As another example, fish wastes (the parts of their catches discarded by commercial fishermen) and so-called "trash fish," such as dog sharks and skates, are being found to contain important drug elements that may have great medicinal value.

Dr. Salvatore S. Stivala and his associates at Stevens Institute of Technology, Hoboken, have succeeded in extracting the vital anticoagulant drug heparin from fish wastes, blue crab scraps, squid, the inedible parts of scallops, and many other marine organisms. Heparin, an essential drug used in most surgical operations to prevent dangerous blood clotting, is now obtained from hog livers and cattle lungs. The demand for it is constantly rising, while the supply depends on fluctuations in the meat-packing industry, since it is a byproduct of the slaughtering process.

If a commercial heparin-producing industry can be developed using marine wastes, not only will incomes of the state's commercial fishermen be greatly benefitted but much material that now adds to the pollution of our waters will be put to a constructive use.

Another series of experiments, conducted by Dr. Douglas E. Eveleigh of Rutgers University, has shown that the waste residue of shrimp and crab skeletons contains a substance, chitosan, that can be employed to produce highly effective wound-and burn-healing agents, anticoagulants, and growth inhibitors for malignant cells. A complex chemical and electromagnetic process has been developed to convert and purify the marine wastes into a promising medical agent. Chitosans also may be employed in the future as nutritionally valuable food additives.

A project directed by Drs. Churchill B. Grimes and Kenneth W. Able of the Rutgers University Environmental Resources and Zoology departments, respectively, is studying the life history the aging, growth, mortality, and reproduction patterns—of tilefish. The long-term goal is to develop effective management techniques and regulations for the future harvesting of the species, ensuring that tilefish will continue to be one of the most important sources of income of the New Jersey fishing industry.

Tilefish until recently were relatively little known to both science and the public, despite their excellent taste and other food qualities. Running to three feet in length and weighing 25 pounds or more, they are taken farther out in the ocean than most other common food fishes. For many years, commercial fisherman had neither the need nor the equipment to go after them. Depletion of other species and their virtual disappearance in the winter months have made tilefish, which abound in winter, attractive to both commercial fishermen and party boat operators. As a result, from 1973 to 1976,

Dr. Ida Thompson, Princeton University researcher, points out the annual bands in this photo enlargement of the shell of an ocean quahog clam used to study the life history of the important seafood species.

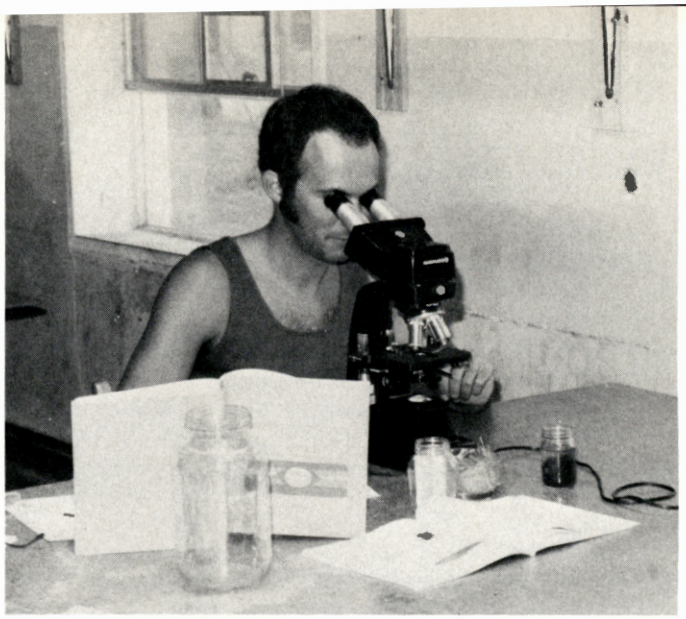
the dollar value of the tilefish catches of New Jersey fishermen has risen from 11th to 5th among all species landed. In the past two years, the dollar volume of the catch is estimated to have doubled again. The Rutgers researchers believe that this important resource can be managed intelligently using the data they are gathering from cooperating captains of vessels participating in the fishery.

Two other ongoing projects have exceptional ecological importance. One is a study being conducted at one of the two field stations of the Consortium, at Sandy Hook, on the causes and possible controls for the catastrophic "red tides" that invade our coastal waters periodically. The organisms responsible, called dinoflagellates, are responsible for huge fish kills and several economic losses for the state's tourist industry. Both changes with the algae organisms themselves, which may trigger them to "bloom" disastrously, and external changes, such as water conditions, may contribute to the outbreaks. The Sandy Hook research conducted by the Consortium's Dr. Stephen C. Esser is analyzing these conditions so that both the prediction and control of future outbreaks may be possible.

A massive project mobilizing scientists and research facilities of Kean College, Montclair State College, New Jersey Institute of Technology, New Jersey Medical School, Rutgers University, Stevens Institute, and the Consortium itself, is directed at pinpointing and proposing solutions for the heavy-metal pollution problems of Newark Bay, possibly the most polluted estuary in the nation. The investigating team is composed of experts in biology, civil and environmental engineering, zoology, anatomy, bacteriology and marine science. Since the fall of 1975 they have combined their efforts to identify the nature and sources of the Bay pollution. These findings are regarded as essential "before intensive cleansing operations can be initiated by state agencies," to quote an official statement.

Not all the Consortium-sponsored programs are of a scientific character. One Sea Grant project is a sociological study of the lifestyle and social and economic problems of a typical New Jersey commercial fishing community—Point Plesant Beach. Dr. Bonnie J. McCay, of the Rutgers Department of Human Ecology and Social Sciences, with student assistants, is interviewing and otherwise studying in depth all those who are a part of the fishing industry there. These include trawler fishermen, fish dealers, representatives of the local fishing cooperative, and other concerned individuals in the community. The main objective is to define and measure the effects of fishery conservation and management programs, particularly those under the Federal Fisheries Act of 1976, on New Jersey commercial fishermen and the communities where they live and operate.

Substantial educational programs are carried on at both the Sandy Hook field station and the Consortium's second field station at Seaville in Cape May County. An 18-acre site with 30 buildings, the latter was formerly Palermo Air Force Base and was given to the Consortium by the Federal Government in recognition of its accomplishments and potentials. At the two stations, undergraduate and graduate credits can be earned by those attending certain of the courses and there are also many offerings for the average citizen in such subjects as Scuba diving, marine first-aid, and boat handling.



Seagoing researcher at the N.J.M.S.C. Sandy Hook field station examines (with high-powered microscope) slides containing marine organisms being studied in postgraduate program. (B. R. Henderson photo)

Under the Sea Grant Program, the Consortium also manages a Marine Advisory Service in association with the Cooperative Extension Service at Cook College, Rutgers. This is a marine affairs equivalent of the Land Grant County-Agent Service that provides advice, research, and guidance in agricultural matters to the state's farmers. The Service distributes useful how-to-do-it information to those using New Jersey's water resources. Many forms of communication are employed, including the press, radio, a newsletter, and periodic bulletins. Its marine agents and extension specialists are always ready to answer questions or give advice to anyone seeking assistance. The headquarters of the Marine Advisory Service is at the Seaville field station.

As it observes its tenth anniversary this year, the New Jersey Marine Sciences Consortium has earned an important role in the scientific, environmental, social, economic, and recreational life of New Jersey. Not long ago, the Consortium's achievements were recognized in the Congressional Record by New Jersey Congressman William J. Hughes. He hailed it and the Sea Grant Program for ". . . creating jobs, putting additional money in the pockets of our constituents who make their living from the sea and bringing into being now, more useful or less costly products for use in commerce and medicine. It is also helping to protect our waters from many kinds of pollution and danger, both natural and man-made. It is producing a new, larger and better-prepared generation of marine scientists capable of ever-greater accomplishments in this field of study and discovery that is so important to our Nation . . . I salute . . . the pathfinding work of the New Jersey Marine Sciences Consortium." □

winter canoeing

Continued from page 3

gaining access to it? These may include poor sandy roads, for which the Pine Barrens are notorious. Other obstacles are spillways and lakes, which should be scouted prior to departure since these are the areas which freeze first. Lastly, how long will the trip take?

To aid those who are contemplating winter canoeing, the chart on page 31 outlines the major features of the various streams. In the following paragraphs I conclude the article with a description of a winter canoeing trip on Cedar Creek.

A Day on Cedar Creek

One of the many rivers I enjoy canoeing over and over again in the Pine Barrens is Cedar Creek. Much like the Common Yellowthroats and Yellow Warblers who return again and again to nest along the river bank, I paddle and paddle again this quiet gentle stream. While the winter undergrowth no longer resounds with the "witchity-witchity-witch" of that masked lone ranger of the bird world nor echoes with the "sweet-sweet-sweet-sweeter than sweet" song of his yellow cousin, it is not that these birds have forsaken the creek, merely that their travels have then them father away. Whatever it is which compels these small feathery travelers to return from thousands of miles away, certainly there is a force which keeps luring me back. If such fragile birds can risk such perils covering vast expanses of ocean and fight buffeting sea winds which sometimes blow them eastward to their watery doom, I can endure the seasonal discomforts and return throughout the year.

Feeling this way about the creek, it's not surprising I would want to canoe it in winter. Rising early one January morning, to where I looked out the window with sleep-laden eyes, the back porch light illuminated the results of a winter's evening storm. While the snow blanketed the landscape and even yet continued to fall, it did nothing to chill my desire for the upcoming canoe trip. There is a certain enjoyment and even exhilaration in being outdoors during the coldest months. When one's life is normally so secure and sheltered, I long for my all-too-infrequent winter excursions and take delight in feeling the cold of the bitter winter's wind. It's at times like this that I think of the Indians and their courage and travail during this harshest of seasons.

Driving to pick up my canoeing partner on snow-covered, early-morning, Sunday roads, I was not concentrating on the highway but rather thinking of the upcoming trip. Constructing in my mind a picture of the creek's evergreen cedars mantled in snow, a river bank layered with a virgin snowfall and covered with ice in a wide variety of designs. Surely on a day like this we would have the creek all to ourselves.

After arriving at Pete's and having a warming cup of coffee, we began to tie the canoe on the car in a cascade of snowflakes. Pete's wife, Susan, was peering out the window at us. Whenever the temperature becomes bitterly cold she is uneasy about our travels in the pines and asks the same question, "Is the water deep?" She knows that the streams in the barrens are shallow and you can in most places easily walk across them. It's her way of saying "Be careful." Certainly the silent snowflakes did nothing to quiet her fears.

As the storm continued Pete remarked, "I wish the snow would stop at least until we've gone since we are

under such close scrutiny."

As we finished making the clove hitches which secured the boat on the car rack I noticed that there were only two paddles in the car. "Where's the spare paddle?" I asked.

"For six years we've been canoeing together, countless times on Cedar Creek," Pete stated. "Have we ever needed a spare paddle?"

After completing the long drive to Double Trouble State Park, we proceeded to ride along the snow covered dirt road to reach a point upstream on Cedar Creek just below Bamber Lake. Along the roadside the pitch pine seemed to have lost much of its gnarled, twisted, and fire-ravaged look, clothed in its white insulating layer of winter precipitation. Quiet seemed the word to describe the ride as our car silently glided over the snowy blanket and the pitch pine blinded with its winter coat took no notice. Here was a road which seemingly had not changed considerably in a hundred years.

Sliding the boat effortlessly along the snowy bank we slipped peacefully into the water under the wooden overpass. Normally busy with the summer nesting activity of Barn Swallows, the bridge was now deserted and only the rhythmic lapping of amber water against the underpinnings could be heard. Upper Cedar Creek is very narrow and the smaller the canoe the easier one paddles through this watery maze amidst the wintry Barrens. Submerged logs complemented the narrow river as they frequently grasped the boat impeding our passage. (Submerged cedar logs are so perfectly perserved in the acidic, bacteria-free water of the Pine Barrens that at the turn of the century they were being mined.) Other obstacles were partially fallen cedars and maples, which forced us to perch precariously on their trunks as we lifted our water craft over. It did not make for leisurely canoeing but it seemed in perfect juxtaposition to the wild stream and pitch pine forests through which we passed.

In autumn the red maples along these river banks play the leading role in a pageant of color. But alas the show is only a matinee in length since winter draws a curtain over Cedar Creek's neglected cranberry bogs at Dover Forge and Double Trouble. Gone is the fiery red of the cranberries and harsh is the action of ice and water of Dover Forge's spillway, already fallen into disrepair. The blankets of white after a fresh snowfall costar with the sheets of ice denoting the creek's high water mark. Unusual crystalline patterns, droplets, mazes and icicles provide a backdrop to the winter scenery and the bright winter sun a spotlight to heighten brillance. In marshy flooded areas denuded cedars stand, now only branchless silhouettes of past evergreen glory. At times a totally forbidding place, yet not a deserted one. Omnipresent are the curtain calls of its winter residents. The nasal notes of the White Breasted Nuthatch, who seeks some long-neglected woodpecker's home to withstand winter's chilling freeze, adds a certain warmth that temperature alone cannot provide. The winter honking of Canada geese who

overwinter here along the Atlantic flyway are part of this winter repertory company. Although many of the smaller birds have gone southward, the "chick-a-dee-dee-dee" sounds still continue, with the birds warmed only by their black winter caps. Mallards and black ducks also inhabit this area and the sightings of these birds causes an inner fire which makes me applaud each year their winter return. As quiet and as muted as this performance seems, the only tragedy is that it comes but once a year.

We paddled quietly around tortuous river bends through tunnels of cedar, startling upwards of 200 hundred ducks. The open water attracts these winter residents and they provided us company on an otherwise canoe-free waterway. The only two people we met that day were ice skaters at Dover Forge. Although ice covered most of the watery expanse, a channel remained open through the neglected cranberry bog.

Continuing downstream the temperature was beginning to drop and water splashed into the boat began to form a thin layer of ice on thwarts and gunwales alike. Being prepared for the trip we did not feel the cold at all. It was only when we had stopped to enjoy a pipeful of fine tobacco that the season's harshness penetrated and yet we still lingered. Floating in our little canoe on a stream as wild as this, one could not be bothered by the temperature. Too often in our modern lives we fail to pay the price for worthwhile experiences when hardships are required.

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Pine Creek Railroad

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it tends to overshadow the more routine work, of which there is plenty. Tracks on the 3/4 mile loop must be inspected for loose spikes and/or shifting ties. The roadbed must be maintained. Switch operation must be ensured. And—back at the shop—cleaning, painting, oiling, and numerous other tasks are always waiting.

Of all my visits to Pine Creek, one is especially memorable. It was the day when engine 26 was made ready for its first run of spring. When I arrived at a little after 8:00 a.m., a fire had already been started in 26. Then, while the fire's appetite was fed, grease and oil were applied to vital parts. Trim around the circumference of the engine's wheels received a fresh coat of white paint. And time seemed to stop as I waited for pressure to build in 26's boiler.

At 11:00 a.m. the whistle sounded, announcing that it was time to roll. I was invited to ride in the cab for 26's first run. It took about 1/2 second to accept the offer, and I quickly climbed aboard with two cameras hanging from my neck. I expected to get some super pictures of this event, but it didn't work out quite that way. It seems that the sounds of locomotive running on metal rails tapped out a mesmerizing beat—suggestive of a folk song. One song came to mind immediately—the modern railroad ballad, "City of New Orleans." The words seemed so appropriate: "The sons of Pullman porters and the sons of engineers, ride their fathers' magic carpets made of steel."

(If you would like more information you may write the N.J.M. of T., P.O. Box 622, Farmingdale, N.J., 07727, or you may call Allaire State Park office, 201-938-2371). □

Top photo: The stationhouse at Allaire, after one of the many snowfalls of the winter of '78.

Lower photo: In the station's backroom, a shelf holds a lantern and forgotten conductors' hats. Above a clock is stopped a little past 3:00.

The payoff—a train that runs! #26 as it rumbles to life after a long winter.

FEEDING WILDLIFE DANGEROUS

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mentioned are largely water and have little nutritional value. The few deer which consume these offerings do so at a net energy loss. ***That is, the amount of energy expended in chewing, swallowing and digesting these materials is greater than the energy derived from them.*** This fact has fatal consequences during the cold weather when energy conservation is so critical.

The concept of feeding deer is largely irrational, since it assumes that these animals will be "saved." Even if they do survive to produce offspring the demands placed on the food source will continue to increase until the bottom falls out of the population through starvation and other diseases. Anyone who has visited drive-through zoos will appreciate what a large number of deer in a limited area can do to the trees and grass. Just as zoo deer herds must be periodically culled, so too must wild herds. Proper reductions in deer numbers through hunting keep the animals in balance with their food supplies and eliminate the necessity for even contemplating feeding programs.

Unweaned fawns are also frequent victims of the wildlife feeder. The milk of a whitetail doe is much richer than that of a cow. It contains three times the protein content and five times the fat content of cow's milk. Fawns taken captive and fed cow's milk frequently develop diarrhea and die of starvation. The best course of action when a fawn is found in the field is to leave it alone. ***With rare exception, it is not abandoned.***

Feeding of wildlife has, on occasion, proven unhealthy for humans as well as wildlife. A man at Greenwood Lake was in the habit of feeding black bears in his backyard. When he went away on vacation the brazen, semi-domesticated bears ripped the door off his kitchen and fed themselves.

Several New Jersey citizens have been bitten by squirrels, raccoons and foxes while attempting to feed them. Seemingly tame, free-ranging wildlife should always be viewed with suspicion, since such animals are often diseased.

Not all wildlife feeding is detrimental. There are extenuating circumstances when feeding programs may be worthwhile. During the winter of 1977 tens of thousands of brant and black ducks were saved from certain starvation by a feeding program supervised by the Division biologists. The difference between this and the other feeding activities mentioned lies primarily in the fact that trained professionals were administering and monitoring the effects of the program and it involved species whose breeding populations were being threatened. White-tailed deer, the most frequent target of unauthorized winter feeding, are not in jeopardy as a species.

The most useful action by individuals interested in feeding wildlife is to provide them with natural foods by planting grains, fruit-bearing native shrubs or cutting timber to allow the proliferation of browse species. Variety is the key. The more variety in the vegetation on your property the greater the variety of wildlife you will attract. □

winter canoeing

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We want to camp without any bugs; we want to backpack without sore feet, hot temperatures or any discomfort; we want to paddle without blisters on our hands or winds blowing in the wrong direction. Mostly we talk about enjoying the outdoors but spend our time inside.

As we paddled into the shallow lake formed by the spillway at Double Trouble the sight was forbidding yet strangely beautiful. Stands of cedar stood ice-bound in the lake, killed by the risen water, denuded of all greenery, bark and most branches, wracked by numerous woodpecker attacks, stripped of all signs of life, serving merely as a bird's perch or winter shelter, and slanting at a variety of angles seemingly held up only by winter's blanket of snow and ice. The air was so crisp and cold that the solitary call of a single nuthatch filled the entire landscape with its sound. Only that call and the rhythmic repetition of our paddles entering and re-entering the water disturbed the winter's peace. We felt a hundred miles away from anyone on a lake that appeared to be twice as large as it does in the warmer more hospitable months of summer. The sky was becoming more and more overcast and what remained of the sun's brightness fell lower and lower on the horizon.

Crossing the lake before the first spillway at Double Trouble our paddling was as easy, effortless, and smooth as the water's glassy surface. One more carryover at the spillway and our trip was almost complete—and none too soon since darkness comes early in January. Being so close to the end we interrupted the lake crossing by taking pictures of the ice formations, the edge of cedars surrounding the lake and the flight of an escaping flock of Canada geese.

Nearing the spillway Pete remarked from the bow, "We are coming into a little ice." The canoe easily glided through the first wafer-thin layer of ice, causing a crunching which disturbed the wintry slumberous silence.

"No problem," I said, "we can easily crack through this thin ice for the couple of hundred of yards it takes to reach the shore."

But as we continued ice-breaking the wafer-thin ice gradually thickened the closer we approached the shore. No longer could we plunge the paddle into the frozen surface and watch foot-long pieces break off and float away. Now in places where we chopped at the surface no chunks broke loose—rather the shaft would remain standing upright in the ice taunting us. Our earlier confidence was fast disappearing as we realized our mistake in not scouting this second spillway prior to departure. Here the water was deeper and slower moving so it froze first.

"Let's stand up in the boat and see if there is a channel of thinner ice," Pete suggested.

Our scouting proved fruitless and we were forced to resume our paddle ice-breaking. In order to get through this thicker ice we had to pound furiously at it and consequently splashed icy water into the canoe and over ourselves. Our camers quickly were hidden in the waterproof plastic bags as we continued the work. Pete was in the bow doing most of it when he abruptly stopped, turned to me looking rather sheepish, and held the wooden paddle out for my inspection. Seeing a 10-inch crack down the middle of the blade and the end all battered, we both had the same thought—our minds fixed on that spare paddle resting uselessly in Pete's garage. Have you ever been icebound sitting in a canoe in the middle of a large deserted cranberry bog with winter's darkness fast approaching?

We have an unspoken rule which has served us well in eight years of canoeing in some tight situations. The rule is to maintain control and forget about placing the blame since if the other partner had also been a little more careful the problem would not have occurred. Then after the momentary panic and the realization of the dilemma that has occurred, try and think of the proper solution.

That was exactly my course of action as I bent toward Pete and screamed, "You fool, what about that spare paddle back in your garage!"

Pete remains calm through even the toughest crises. "There is a saying which describes our situation," he said.

"What's that," I snapped back realizing immediately that the trap had been sprung from the calm grin that slowly stole over my canoeing partner's face. I merely waited helpless for the "Have you ever heard the saying 'up the creek without a paddle.' "

Trying to cover my embarrassment I offered a solution. "Why don't we ram the ice using our weight and the boat's to break through," I said.

"That's a solution," Pete returned, "of questionable merit" (again he paused) "and founded on thin ice."

Since the only other alternative was to paddle back to the other end of the lake and try and portage the boat through a half mile or more of tangled trees and swampy undergrowth in the midst of coming darkness, we opted for the ice-breaking technique. By paddling backward until free of the frozen surface and then furiously paddling forward to drive us on the ice we were able to gain approximately 50 yards after a number of attempts. Finally the last attempt merely placed us on top of the glassy surface. Could we climb out and onto the frozen lake without falling through? Would it support not only our weight but the canoe and all of its gear as well?

An icy plunge in subfreezing temperature with the car still 10 minutes away after the carryover was quite a chilling thought. Since there was no real choice Pete slowly and unsurely put his weight unto the ice and on all fours dragged the boat ever so carefully farther up unto the surface so that I could climb out. We must have made a ludicrous sight both kneeling and trying to distribute our weight on hands and knees and dragging the canoe slowly and fearfully forward

over the frozen lake the last hundred yards. Except for wet pants and gloves we covered the distance without mishap, completed the carryover, and canoed the rest of the trip to reach our car.

After jockeying the car around and with darkness upon us we tied the boat on the car. Pausing before departure we stole one last glance from the spillway at the risen moon.

AN EVALUATION OF PINE BARRENS STREAMS FOR WINTER CANOEING

Stream	Put In	Take Out	Time of Trip (hrs)	Description
Cedar Creek	Below Bamber Lake	Double Trouble State Park	4	Upper stretches cedar lined, narrow, and turning, with submerged trees. May require getting out of the canoe. Ice forms first at spillway above Double Trouble. Stream is wild.
Batsto	Quaker Bridge	Lake Batsto	4-1/2	Attractive stream of mixed cedar and hardwoods. Requires traveling a few miles on a potholed sandy road to reach put in. Lake Batsto freezes first. Wild.
Great Egg Harbor	Penny Pot	Weymouth		No longer a wild stream although stretches are very attractive. One frequently canoes past backyards.
Maurice	Below Willow Grove Lake	Rt. 552	4-1/2	Stream is wild but mostly swampy lowlands. Little cedar or color during winter.
Mullica	Lake Atsion	paved road leading to Batsto village	6 to 7	Trip is long for a winter excursion. Best to put in at the take out point paddle upstream then return with the current. Both hardwoods and cedars with most of the cedars on the last half of the river. Wild.*
Oswego	Lake Oswego	Lake Harrisville	4-1/2	All stretches cedar lined and very attractive. Ice forms first at Lake Harrisville. Region believed to have largest stands of Atlantic white cedar. Wild. *
Oyster Creek	Rt. 532	Rt. 9	3	Wild except when Oyster Creek Nuclear Power Plant is passed. May require a half-mile carry at end because of low water.
Rancocas	Brown Mills	Pemberton	4	Best done in the fall since little cedar is present. Down trees present in the river below Mirror Lake at Browns Mills. Semi-wild.
Toms River	Rt. 547	Rt. 37	5	Mostly hardwood swamp forest. Some color provided by holly trees and shrubs. Mostly wild.
Wading	Rt. 563	Evans Bridge on 563	4-1/2 to 5	Lower half is cedar lined with the upper part lacking in color. No lakes or spillways present but a low dam may require carrying around when water is low. Wild.

*One can paddle upstream on all the Pine Barrens rivers but it is best to check the strength of the current first. After very heavy rains paddling may be difficult. Also on very cold days bubbles caused by water passing over the spillway may freeze and collect giving the river a blocked appearance. Yet if one paddles through the frozen foam often the river may be clear and unobstructed.

Nongame News

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City. The paper highlighted the four year effort of the only state-sponsored project in the East to survey, census, monitor and protect nesting habitat for colonial waterbirds. In 1978, the project involved an estimated 60,000 nesting adults of seventeen species, including terns, skimmers, gulls, herons, and egrets, at 150 colonies along the New Jersey coast. In the past, this work has been partially funded by grants from the Jersey Shore Audubon Society, the New Jersey Beach Buggy Association, the Summit Nature Club and particularly the Atlantic Audubon Society. □

BOARDWALK BUST

Nongame zoologist, JoAnn Frier, a graduate of the five week long conservation officer training course, issued five summonses to an Atlantic City animal exhibitor early this fall. With the aid of the Attorney General's Office, a $300 fine was collected for the violations, all stemming from the illegal possession of exotic species. □

Vermont

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Tapping the tree

Tapping can begin as soon as the weather conditions are right. In New Jersey, this is usually in February. Using a 7/16-inch bit, drill a hole 2 1/2 to 3 inches deep about four feet from the ground. Do not overtap your trees. A 10- to 14-inch-diameter tree can take one hole. You can safely add one more hole for every additional 5-6 inches in tree diameter up to a total of four holes.

A taphole should be usable from the time it is bored until the end of the season. However, if the season is generally warm, the holes may clog because of microbial growth in the sap which remains in the taphole between flow periods. To sterilize the tapholes, prepare a solution of one part household chlorine bleach to twenty parts of water. Squirt a small amount of this mixture into the taphole at least twice during the season.

Once the hole has been drilled, gently hammer in the sap spout, or "spile." In setting the spile, take care not to split the tree bark; such a split will result in sap leakage and may permantly damage the tree.

You can purchase metal spiles or make your own out of wood. Metal spiles, with a hook to support the sap bucket, can be purchased from G. H. Grimm Co., Inc., Rutland, Vermont, or from the Great Swamp Outdoor Education Center, Chatham, New Jersey.

The use of a wooden spile requires that a nail be driven into the tree in order to hang the sap container. Wooden spiles can be made by hollowing out the soft pithy center of sassafras or nonpoisonous sumac twigs. Taper one end of the twig so that it will fit snugly into the taphole. Slice the top half off part of the other end of the twig to create a large trough-like opening for delivery of the sap.

The sap bucket or container can be any device of your choosing. A container with a lid is preferable because the lid will keep out snow, rain, debris, and animals which may wish to taste your "sweet water." The smaller the container, the more often it will need to be emptied. If you are not going to boil down the sap immediately, store it in a cool place to retard fermentation.

Evaporating the sap

Maple sap as it comes from the tree is a sterile, clear, ever-so-slightly sweet liquid. The characteristic color and flavor of maple syrup are the result of chemical reactions occurring as the sap boils. And boil it must, because it will take approximately 40 gallons of sap to produce one gallon of syrup. It is best to start the evaporating process outside. Boiling sap in the kitchen is a good ideas only if you want to remove the wallpaper at the same time!

When the sap becomes thick and golden, it is wise to move to the kitchen stove where you can more easily control the heat. The simplest way to determine when the sap has evaporated to syrup consistency is by temperature. Using a candy thermometer, determine the boiling point of water on the day and at the place where the syrup is being made. When the boiling sap reaches a temperature seven degrees higher than the boiling temperature of water, the sap has evaporated to standard density syrup and should be removed from the heat at once. Should the sap begin to foam up during the final boiling, a drop of oil or a dab of butter can be added to prevent bubbling over.

Toward the end of the evaporating, you will notice sediment forming throughout the syrup. These suspended particles of sugar sand are salts which precipitate out as the temperature and concentration of the syrup solution increase. Sugar sand can be removed by filtering the hot syrup through several layers of cheesecloth.

Be sure to store your precious golden elixir in the refrigerator to prevent spoilage.

FRONT COVER

Wild Turkey—Photographed By Roy E. Decker. Immature Tom taken from a blind along Old Mine Road in Sussex County. (See article on page 10)

INSIDE BACK COVER

River Otters—Illustration by Carol Decker (See article on page 8)

BACK COVER

Drift Fence—Photographed by David Bast


Carol Decker
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