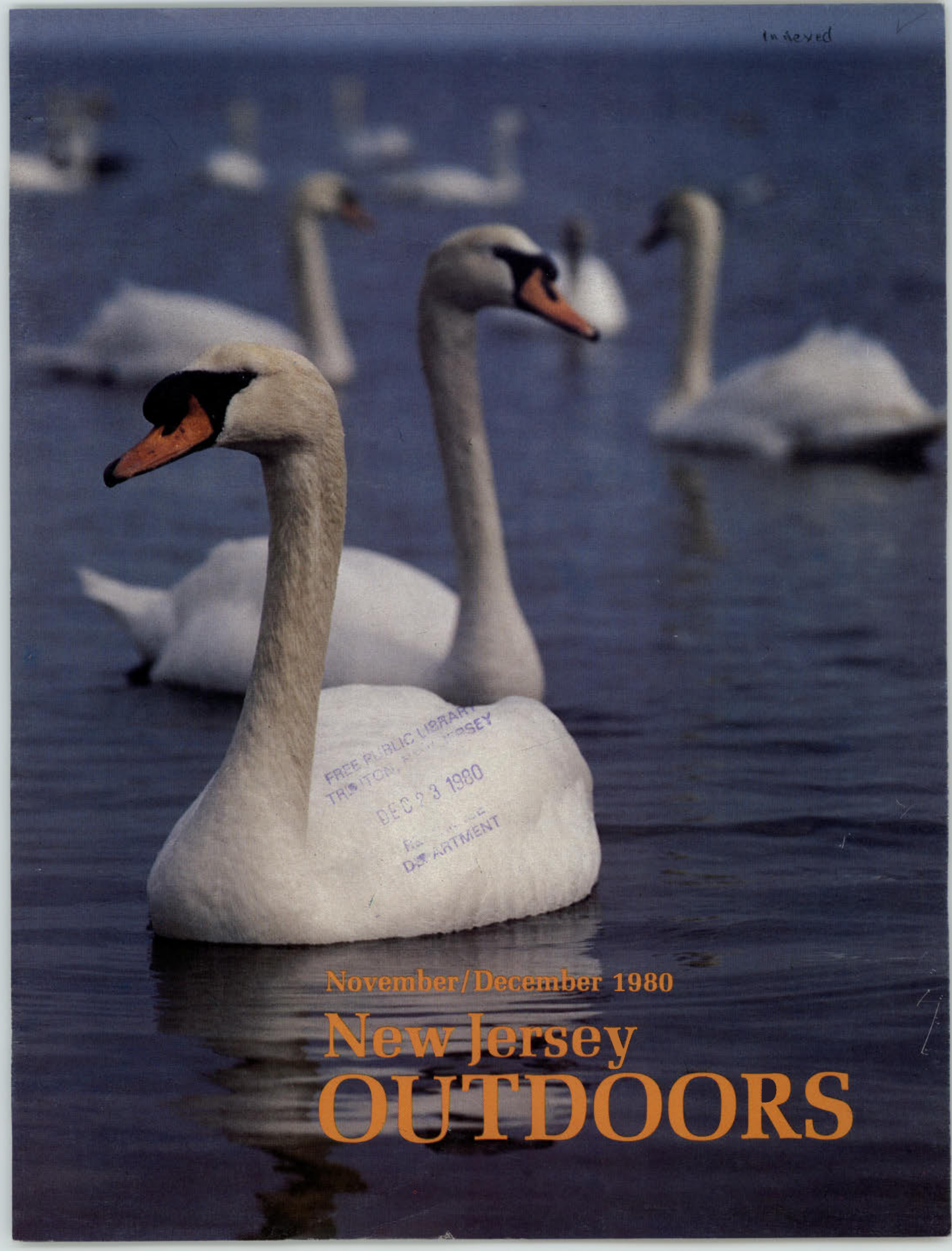

November/December 1980

New Jersey OUTDOORS

NEW JERSEY OUTDOORS is the bi-monthly magazine of the Department of Environmental Protection of New Jersey. This publication is dedicated to the wise management and conservation of our natural resources and to foster a greater appreciation of the outdoors.

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November/December 1980
VOL. 7 NO. 6

New Jersey OUTDOORS

from the editor

Happy Holidays

And more, much more. We wish you cleaner beaches, no fish kills, less air pollution, resolution of our chemical and solid waste problems, more fishable and swimmable waters, and intelligent land use policies for our coastal zones, the pinelands, and our disappearing farmlands. These wishes sound like the *impossible dream.* They sound like promises that lovers and politicians make—mostly unattainable.

Nevertheless, we wish you all these things. But let's be realistic. If we achieve but a few, we'll have a merrier Christmas and a happier healthier New Year.

And if you really want your friends and family to have a merrier Christmas, send them a gift that lasts and lasts . . . a subscription to *New Jersey Outdoors* that lasts one, two , or three years. Fill out the attached subscription cards today.

In This Issue

Because this is the season for family get-togethers, we'll kick off this issue with *Cross Country Skiing/The Family Outing,* by Wendolyn E. Tetlow. This article also contains a sidebar listing the dates, level of difficulty, and locations of the Northwest New Jersey Ski Tours 1980-81.

A new author, Bruce Scofield, writes about hiking on New Jersey's Bearfort Mountain. The article also contains information on trail books and region maps.

Photographer Mary Ann Welsh, another new author, writes about *The Next Time I Go Hunting,* which is all about one of the hunter education programs in New Jersey.

DEP Urban Forester Barbara Gardner (also new to our publication) provided us with a short historical piece titled, *New Jersey's Forest Resource/Past, Present and Future.*

Winter, Waterfowl, and the Saltmarsh, by biologists Ronald E. Kirby, U.S. Fish and Wildlife Service, and Fred Ferrigno, DEP's Division of Fish, Game and Wildlife, discusses the effects of the severe winters of 1976-77 and 1977-78 on wildlife and the New Jersey saltmarshes.

We promised to publish some of the winning photographs submitted to the Northeast Natural Science League's 1980 Natural Science Photography Contest (pages 14 & 15). And we did.

The full color illustration on the inside back cover by Carol Decker introduces the Wildlife in New Jersey article in this issue titled, *The New Jersey Bruin-Where Does He Go From Here?* Yes, we do have bears in New Jersey, says author/biologist Robert Lund.

Another new author, Robert Patarcity, writes about *Easy Enjoyment of Backyard Birdwatching.* Build or buy a bird feeder, install it in your backyard, and discover a new hobby.

In this issue we have *More on Saltwater Fish and Shellfish.* The species discussed are bluefish, blowfish and sharks. Text by Bill Figley and Ray Townsend; illustrations by Anthony Hillman.

A pictorial feature, *The Great Swamp and its Deer* was written and illustrated by S. John Percoskie, also new to our pages.

"Many sportsmen would like to have their small-game trophies mounted, but change their minds when they find out how much it costs or how long the wait may be when they check in at a professional taxidermist." So writes author Richard E. McKeeby, Associate Professor, Biology Department, Union College in the article, *Stuff it! Amateur Taxidermy—Try it!*

On pages 28 and 29, a collection of photographs of *New Jersey/A State For All Seasons.*

Steve Perrone

CROSS-COUNTRY SKIING— *the family outing*

By Wendolyn E. Tetlow

At last a winter sport has become popular that the whole family can enjoy together. No more leaving Mom in the car with the baby while everyone else ice skates. No more downhill skiing on separate slopes because each person is at a different level. Cross-country skiing is the answer: everyone, from the newborn carried in a pack to the octogenarian on his own skis can enjoy this activity—and you can all do it together.

Even though you can start children as young as two years old on cross-country skis, it is best to take only the strongest, four and over, for extended tours away from the house. The very youngest children can be carried by Mom and Dad in a pack, either a front cuddler for infants or back carrier for larger children. While one adult carries the youngest the other can carry the day pack with food and extra clothing (more on these later).

For children under four who are strong enough to take to the trail on their own skis, the simplest and least expensive skis to begin with are the no-wax skis that have fish-scale bottoms and cable bindings that fit onto a rubber boot or hiking shoe. These not only solve the sticky problem of when and how to wax, but the cable bindings also eliminate the expense of having to buy new boots every winter. Manufacturers frequently offer poles as part of the package with the skis, so you don't have to worry about picking through a box of poles for mini sizes.

Unless your child is an Olympic hopeful and plans to do a lot of racing, stay with the no-wax bottoms for children from eight years old up to the teenage years. You can buy the touring skis, poles, and boots separately, but make sure the boot fittings and bindings on the skis are compatible. The length of the ski should be approximately the same as the height of the child. And the poles should be slightly less than shoulder height.

Assuming Mom and Dad know how to ski, and that everyone else has practiced using his new, borrowed, or rented equipment in the backyard, you can then decide where to go for an outing. First and foremost, choose an area you know. Because cross-country skiing can be attempted by almost anyone, it attracts people not familiar with the outdoors in winter, and this can lead to trouble (see *Precautions*—page 32). So, for a trial trip, try your nearby golf course (get permission), an open park (they're doing it in Central Park), or a neighbor's orchard (again, get permission). Gentle hills and open areas are best. Stay away from narrow, steep trails in the woods. You don't want to see your beginner get pounded by tree branches or plunge into a ravine. And no matter how tempting snowmobile trails look, stay away from them. *You* may be able to leap out of the way fast enough, but your six-year-old may

NORTHWEST NEW JERSEY SKI TOURS 1980-1981

The following ski tours are led by volunteers and may be canceled without notice. Always call the leader the day before the tour to check snow conditions. With the exception of the clinic for parents and children all tours will be of sufficient length so that a day pack should be carried containing lunch as well as the usual items such as extra clothing, wax, etc. Members of the N.J. Nordic Ski Patrol often accompany the group for extra safety. Please note the level of difficulty for each trip. A novice skier is one who can ski under control with a snowplow turn and can safely descend a trail with a grade of up to ten percent.

Dec. 28, 1980
Sunday

PARENTS AND KIDS SKI CLINIC—N.J. School of Conservation, Branchville, N.J. A one day clinic will demonstrate some of the principles and practices described in the article on skiing with children. Parents and children of all ages are encouraged to attend. Meet at the School at 1:00 PM.

For details, contact: Jim Merritt;
(201) 948-4646 (office)
(201) 948-6507 (home)

Jan. 4, 1981
Sunday

WILDLIFE IN WINTER—Stokes State Forest, Branchville, N.J. This five mile tour, suitable for novice and intermediate skiers will be led by an information and education officer of the N.J. Division of Fish, Game and Shellfisheries. Meet at the ski touring area across from the Stokes Forest Office on Route 206 at 9:30 AM.

For details contact: Bob Byrne;
(201) 852-2565 (office)

Jan. 10, 1981
Saturday

BLUE MOUNTAIN LAKES—Delaware Water Gap National Recreation Area, N.J. This tour will follow some of the old roads in the Park. The length and difficulty of the tour will be determined by the make up of the group, but everyone should be at least a novice skier. Meet at the District Ranger Office in the Park at 9:30 AM.

For details contact: Jim Merritt;
(201) 948-4646 (office)
(201) 948-6507 (home)

Jan. 18, 1981
Sunday

SKI ORIENTEERING—Stokes State Forest, Branchville, N.J. Before this intermediate level tour begins, you will be taught how to use a compass and topographic map. After the instruction period, you will be divided into teams to make your way through the southern part of Stokes Forest, going from checkpoint to checkpoint. The team which finds the most checkpoints in the shortest time wins. Accuracy is more important than speed so you need not be a racer to do well. If there is no snow but sufficient interest, we will orienteer anyway. Call at least one week in advance for information.

For details contact: Jim Merritt;
(201) 948-4646 (office)
(201) 948-6507 (home)

Jan. 24, 1981
Saturday

TILLMAN RAVINE NATURAL AREA—Stokes State Forest, Branchville, N.J. An examination of the geologic features of a beautiful glacial ravine will be conducted by a geologist who special-

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not. Lakes and other bodies of water are dangerous, too, since thin ice is sometimes not detectable under snow.

When you and your family are ready for the trails of a state forest, be sure to check into the office. Sign in and write down the time you plan to return. Get a map of the trails and ask about the nearest police and rescue. In short, know where you are and where you can get help if you need it. You may even want to leave a note on your car's windshield in the parking lot telling where you have gone and when you plan to return. Nothing like double precaution when children are involved.

Whether you decide to ski in a state forest or nearby farm fields, plan to ski back the way you skied in unless there already is a well-prepared circular ski track. Trail breaking with skis for half the day with a two-year-old on your back can be very tiring. Even with two adults alternating in the lead, conditions are never perfect enough for skiing effortlessly on virgin snow.

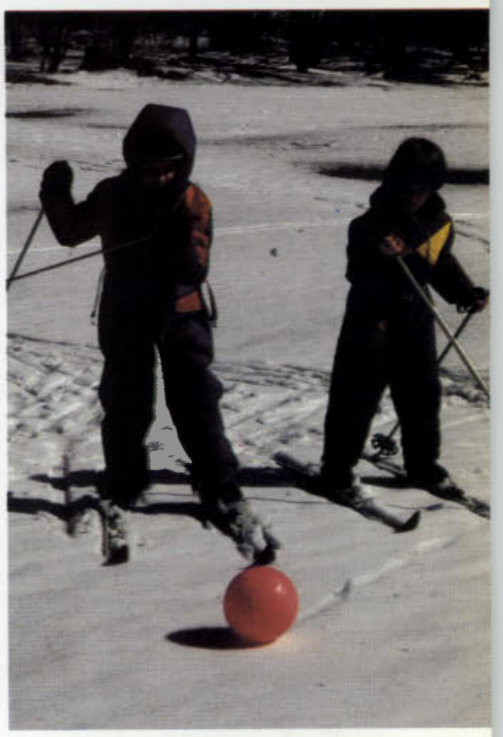
Where to go skiing and what route to ski are a lot harder to decide than what time to go and how long to stay out. Since the sun doesn't stay up for too long on a winter's day, you should hit the day's peak: 11 a.m.-2 p.m. If you have very young children on skis (four to seven), three hours of skiing with a couple of breaks is long enough. Children eight and older who are very active outdoors can stay out up to five hours. No matter what the ages, plan your outings on sunny days when there is no threat of storms. While on the trail, stop frequently, look around, take note of your surroundings, not only to enjoy your environment, but to get your bearings ("Look at that huge white pine tree towering over all the others").

Even the youngest can go cross-country skiing.

Dave Morris showing son Mathew the correct way to hold poles.

PHOTOS BY JIM MERRITT

Cable bindings are simplest for parents of young children.



Kids will invent their own fun on skis.

During these frequent stops you and your children may want to take off a sweater or windbreaker or put one on. Be sure to "layer" your children as you do yourself. That is, include the five basics: underwear, turtleneck, shirt, sweater, and windbreaker. The principle of these layers is to take off what you don't need as you warm up and put back on what you need when you cool down. One thick snow coat on top of a teeshirt simply won't do. Perspiration will build up under the coat while you're skiing and when you cool down, you'll be drenched in your own cold sweat. The important thing to remember when dress-

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PHOTOS BY AUTHOR

Scrub pine growing on bare rock. Upper Greenwood Lake is in the distance.

Hiking on New Jersey's Bearfort Mountain

BY BRUCE SCOFIELD

I remember clearly my earliest hikes on Bearfort Mountain. The scenery was different from that of other New Jersey mountains, very colorful and even "pre-historic" in appearance. My first visit was during the summer months in the Terrace Pond area. I saw "beer hikers" and their litter along with the beautiful scenery. A ranger from the state park system was trying to enforce the new regulations. Terrace Pond was being abused. I returned again two months later to walk the Bearfort Ridge Trail during the fall color change and a few months after this I visited the mountain in mid-winter. I had become a confirmed Bearfort Mountain enthusiast. This New Jersey mountain is unique, and due to the efforts of many concerned persons, it is cleaner today than it was when I had first hiked on it.

From the west shore of Greenwood Lake, south to Newfoundland and Route 23, Bearfort Mountain is a prominent landform. The mountain itself is a ridge, fairly even on top, and about a mile or two wide. It rises quite dramatically from Greenwood Lake, at an elevation of just over 600 feet, to a height in some places of over 1400 feet. This is no small relief and from the east the mountain is visually similar to the Kittatinny Mountain Ridge. The only route through this ridge suitable for motor traffic is that of the Warwick Turnpike.

Route 513 parallels the ridge of its eastern side and offers several views of the sharp eastern escarpment. On the west, the ridge is paralleled by Clinton Road which is not paved completely and not well maintained (most of this road is within the Newark Watershed property). The views of the mountain ridge from Clinton Road are limited, but the road is excellent access point for hiking on the mountain.

Bearfort Mountain is actually part of a much longer ridge of similar rock. To the north, into New York State, the ridge continues under the name of Bellvale Mountain, and further, Schenemunk Mountain. To the south, the same ridge, geologically, is known as Green Pond Mountain. In this article, only Bearfort Mountain from the New York State line to the gap through which the Pequannock River and Route 23 pass will be considered.

Geologically, Bearfort Mountain is quite interest-

ing, for it is composed of much younger materials than the ancient Precambrian rock of the surrounding New Jesey highlands. Technically, Bearfort Mountain consists of mid-Paleozoic sediments which were deposited on folded, faulted and eroded Precambrian rocks. Between these sediments and the underlying Precambrian, some 300 million years of rock history, the early Paleozoic, is missing. Called an *unconformity,* this situation has made geological analysis of the mountain somewhat speculative.

The rock of Bearfort Mountain is comosed of many white quartz pebbles some several inches across, imbedded in a red "puddingstone" matrix. It is considered equivalent to the Shawangunk conglomerate of Kittatinny Mountain. The rounded, worn pebbles indicate that the material had been transported some district before it was deposited.

Apparently, the formation of Bearfort Mountain rock began with the deposition of sediments in a sound or inland arm of an ancient sea. Through uplifting and folding these sedimentary beds were tilted at sharp angles, forming a V when looked at in cross-section. This lateral folding has produced a series of troughs running along the top of the ridge in which several high altitude ponds occur. The glacial ice sheet deepened these depressions leaving the ponds and it has also left many glacial erratics, boulders transported from mountains to the north. The effect of glaciation on the Bearfort ridge is quite striking in places where large outcrops of rock have been ground to a smooth, curving surface.

Three types of forest are distinguishable on Bearfort Mountain. The predominant is a mixed oak forest which covers the base and slopes of the mountain. This is all second or third growth, the mountain having been heavily timbered to produce charcoal for furnaces during this area's iron-producing period. This mixed oak forest consists of mostly Red, Black and White Oaks, with some Maples, White Ash, Beech, Black Birch and hickories.

In the many small ravines formed by stream running down the mountain, and near some wet areas, are the Eastern Hemlock forests. These are usually small, although once the Eastern Hemlock was a widespread tree in the area. Some ancient hemlocks survived cutting thanks to their inaccessibility and stand today like lone giants. The Hemlock groves are dark and quiet, creating a very different atmosphere from that on the rest of the mountain. The acid soil created by decaying hemlock needles supports the growth of rhododendrons, ferns, the Indian Pipe and the Pink Lady's Slipper—quite an exotic environment. A fine example of a hemlock forest can be found on the Newark Watershed land, just off Clinton Road about a mile north of the Clinton Reservoir. The Two Brooks Trail starts here and follows the grove for about a quarter mile before it turns east and climbs to a higher elevation. A second easily accessible Hemlock grove is on the north side of the Warwick Turnpike. Though badly littered with beer cans and other evidence of disrespect, this grove is still worth viewing.

The third type of forest found on Bearfort Mountain is a very sparse Pitch Pine Scrub Oak forest typical of the rocky summit ridges. Here the trees are stunted by the full force of the elements, some standing only a few feet high. The reddish outcrop of rock above the vegetation, and the frequent and often tremendous views, combine to create some very wild and stunning scenery.

As mentioned earlier, the summit is actually a series of parallel ridges that were formed from the accordionlike folding of horizontal beds of sedimentary rock. These parallel ridges contain several elongated basins which are usually wet and support some very dense growth, including mountain laurel and wild blueberries. These basins hold several ponds and, in varying stages of succession, the former sites

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Terrace Pond viewed from its outlet.

Typical terrain of the Upper Slopes of Bearfort Mountain.

Bearfort Mountain

Continued from page 5

of others. In the spring these former pond basins, now swamps, provide a habitat for large colonies of frogs. Their croakings create a strange effect in the quiet woods. Because the total sound generated by the frogs has a limited range, each colony is an isolated island of sound.

In June the mountain laurel blooms, white and pink and very dense, only to be followed by wild rhododendrons in July. In many places on Bearfort Mountain, rhododendrons grow so big and dense that they create something that can only be called a jungle. Several trails cross these dense areas, the trail being much like a tunnel.

A few black bears are said to live in the vicinity, though I have never seen one. I assume that it is this animal's presence which has given the mountain its name. Deer and many species of birds are plentiful, and I have seen an occasional fox and raccoon. Rattlesnakes have been reported but these are probably as rare as the bear.

Bearfort Mountain is fortunately preserved and protected today by the state park and forest system and the Newark Watershed Conservation and Development Corporation. The area to the north of the Warwick Turnpike is in the Abram S. Hewitt State Forest and is open to the public with certain restrictions, such as no camping or swimming. This area includes Surprise Lake, West Pond, and some very dramatic viewpoints overlooking Greenwood Lake and beyond. At the New York/New Jersey state line, a blue-on-white blazed trail, appropriately called the State Line Trail, climbs the mountain and connects with the Appalachian Trail which heads north into New York State. Before this intersection, a left turn onto the yellow-blazed Ernest Walter Trail will take you to one of New Jersey's finest viewpoints and then to Surprise Lake. A dense rhododendron jungle just beyond the lake is penetrated by the Walter Trail which circles the two lakes and connects to the Appalachian Trail, making a circular walk possible. It is possible to continue hiking along the mountain ridge all the way to the Warwick Turnpike on the white-blazed Bearfort Ridge Trail with its many scenic views.

South of Warwick Turnpike, the mountain is in the Wawayanda State Park and is subject to the same restrictions as the state forest. This section contins the beautiful Terrace Pond, a small lake with steep slabs of reddish conglomerate on its sides, surrounded by an abundance of wild blueberries and mountain laurel. There are many trails in this area which are most easily reached from a designated parking area on Clinton Road.

Glacial erratics, boulders left by the retreating ice sheet.

South of the Terrace Pond area, the mountain is owned by the Newark Watershed Conservation and Development Corporation. A permit to hike must be obtained in person at their headquarters on Echo Lake Road, south of Route 23. The current fee is $5.00 per year and is well worth the price. You are given a map and informed of the many conveniently located parking areas and the trail heads. One of the points of interest in this section is the Bearfort fire tower which can be reached from several trails. The view from the tower is a quite spectacular one of forests, mountains, and lakes in all directions with little evidence of human habitation.

A hike from the New York state line to Clinton Road near Route 23 is also possible, almost continually following the main ridge of Bearfort Mountain. You would need trail maps to keep track of the color changes of the blazes, but a trailway of about 15 miles through some of New Jersey's finest mountain scenery is there for the walking.

For those who wish to see for themselves, a trail map and detailed descriptions of some of the trails can be found in the *New York Walk Book,* available in most bookstores. For information write the New York/New Jersey Trail Conference, 15 East 40th Street, New York, N.Y. 10016.

Hikers Region Maps 21B and 36A are excellent and can be obtained from Walking News, Inc., P.O. Box 352, New York, N.Y. 10013.

A very good map of trails in the Terrace Pond and Newark Watershed area comes as part of the hiking permit purchase from the Newark Watershed Conservation and Development Corporation, Box 319, Newfoundland, New Jersey, 07435. □

The Next Time I Go Hunting

BY MARY ANN WELSH

Hunting is not new to me. I am out there shooting game all year around even when it is out of season and in places where hunting is forbidden. Let me tell you about the eight-point buck, several does, and a dozen ducks I shot one day last August in Somerset County's Lord Stirling Park and in the Great Swamp National Wildlife Refuge.

But perhaps I should explain my actions first. I know it is in violation of the state game laws and regulations to hunt during closed seasons, to exceed bag limits, and to shoot game in areas where no hunting is allowed.

I am not a lawbreaker. I am a freelance photographer. All I have ever aimed or shot with at game animals is my camera. It has been loaded with film, of course.

But the next time I go hunting it may be with a Nikon around my neck or it might just be with a shotgun on my shoulder.

While no license is necessary to hunt with a camera, the State of New Jersey does require one if you want to use firearms. And though I had occasionally considered what it would be like to go hunting with a gun, I never expected to be able to apply for a license because I had made no plans to complete the prerequisite New Jersey Hunter Education Course. I could not see myself (a quiet and quite mature woman, weighing in at less than a hundred pounds), not even owning a shotgun, showing up at a Hunter Education class made up of probably 99% good-sized males.

Now, as luck and some serious study would have it, I possess a certificate that says I have been given sufficient instructions in the safe handling of firearms to qualify for a hunting license.

My unexpected chance to complete the Hunter Education course came about when a special gun safety program was set up in the area where I live.

PHOTOS BY AUTHOR

Hal Laskowski, Assistant Refuge Manager at the Great Swamp, gives Litty Hado personal instruction in safe shotgun loading at the range.

Lt. Robert J. Burns from the Hunter Education Section, Division of Fish and Wildlife, gives Litty Hado a lesson in gun handling. Although handgun training is not a regular part of the State's Hunter Education Program, the class was given a chance to become familiar with handling them.

Responding to a request for a course that would help a group of women become more at ease around guns, staff members at the Great Swamp National Wildlife Refuge and officers of the New Jersey Department of Environmental Protection, Division of Fish, Game and Wildlife, volunteered their time and services to provide a program tailored to the needs and interests of those taking it.

A gun safety course had been talked about for some time among a number of women who belong to the Passaic Township Grange. And, when Judy Schmidt, the Master of the Grange, told me that the classes were about to begin, I planned to

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I Go Hunting

Continued from page 7

attend just one or two sessions knowing at least one local newspaper would be writing a story and wanting photographs, especially since it was the first such program for women being given in the state. It took very little time once the class started for me to decide I wanted to be a member myself. As soon as the Chief Instructor, Lou Hinds, said the opportunity to earn a Hunter Safety Certificate would be included in the course, I joined then and there.

Most of my classmates took the course because they were either unfamiliar with or afraid of guns. They wanted to overcome their fears of even having in the house firearms owned by male members of the family. Some of the women (and I was curious about this, too) were interested in learning the legal aspects of using a gun to protect your home. Several wanted to understand better the hunting stories and gun talk of their husbands and sons. One member wanted to learn how to handle a shotgun because she had once made the mistake of picking up one in her home. Wondering what it would be like to shoot it, she aimed and pulled the trigger, not realizing that it was loaded. The results, she knows now, could have been a lot more disastrous than the hole she shot through a mattress.

No one who started the class really expected to go hunting but at the end nearly half the members (myself included) said they planned to obtain a license. Some even made inquiries about when and how they could apply for a permit to participate in any future deer hunts in the Great Swamp. For the past two years, I have covered the hunt as a photographer taking pictures of the hunters, the pro- and anti-hunt demonstrators, the observers, the Refuge personnel. If there is another hunt next fall, I will be there. Will it be with a camera? Or with a shotgun?

Several class members, while they are not interested in hunting, found they really liked shooting. As a result, plans are underway to set up a skeet shooting range. A little more experience and they may give up clay targets for live ones.

Paula Hinds looks over the shoulder of her instructor-husband, Lou, as he points out size of holes made by shotgun slugs.

Women taking the gun safety course at the Great Swamp National Wildlife Refuge cover their ears as Head Instructor Lou Hinds demonstrates proper stance for shotgun shooting.

The subject of shooting at live targets and why people hunt was discussed at length in class. Someone suggested that perhaps the human race, as with many other animals, is not yet old enough to have outgrown natural hunting instincts. Maybe that is why I have been out there hunting with a camera.

To be quite honest about it, I do not know yet if I will actually go out with a shotgun but I am sure there is no recipe around to make pictures taste as good as Venison Stroganoff and Honey Baked Duck. □

New Jersey's Forest Resource Past, Present, and Future

By Barbara Gardner

NEW JERSEY STATE MUSEUM

New Jersey is the nation's most densely populated state with some 7.3 million people concentrated on 4.8 million acres. In spite of this, there are still 1.93 million acres of forest land in the state.

Prior to the first settlement by white men in New Jersey in the early 17th century, an estimated 80% of the state was forested. However, the first white settlers did not find the forest to be a virgin resource. Some seven to ten thousand Native Americans lived in New Jersey prior to the first white settlers, with the greatest densities along the Delaware Valley and Bay, in the Passaic and Hackensack valleys, and in the Raritan Valley.

These Native Americans exerted some influence over the forest. Small plots of woodland were cleared to support maize culture and to create village sites. Vast acreages were intentionally burned to improve hunting, giving the forest a parklike appearance described by early settlers. The forest also provided wood for fuel and tools, and white cedar logs for canoes. In general, however, the effects of the Native Americans on the forest land base in the state was small.

Dutch and Swedish settlers arrived in New Jersey in the early 1600s. In general, they settled on cleared Indian land, leaving most of the woodlands in the state untouched. However, as more settlers entered an area, the amount of forest clearing increased.

Finnish settlers made up half the state's population from 1638 to 1655, and their slash-burn-cultivate-migrate agricultural practices destroyed some forested areas in the state. When English settlers entered New Jersey after 1664, there was a rapid increase in population, which was largely concentrated in the central portion of the state, and was largely agricultural. The forest clearing process was intensified, causing a statewide trend of decreasing forest area which lasted until the beginning of the 19th century.

Table 1 shows the general trends in New Jersey's forested acreage. The Report of Forests in 1899 by the State Geologist states "The rich agricultural districts had been nearly all taken up in farms at the beginning of the century (19th), and from that time the progress in clearing was probably due to the increasing demand for wood, rather than farmland." It can be seen from this table that since about 1800, the forested land base in the state has been fairly stable.

Table 1. Historical Trends in New Jersey's Forested Acreage.

1700	1786	1885	1899	1911	1956	1972
3,879,000	2,410,000	2,330,000	2,069,000	2,217,000	2,229,000	1,928,400

Table 2 shows the acreage of improved farmland in the state. The dramatic decrease of almost one million acres in cropland, pasture, and orchards in the last 120 years has been due to increasing urban development to meet the needs of a population which rose from 489,000 to more than 7 million in this same period.

Table 2. Acreage of Improved Land in Farms (Cropland, Pasture, Orchard).

1850	1870	1890	1950	1964	1974
1,767,991	1,978,067	1,999,117	1,405,294	965,940	798,683

In summary, the history of land use is that following initial settlement of the state, those areas most suited to agriculture were continually cleared of forest cover up to about 1800. Decreases in forested acres of about 350,000 acres, or about 15%, have occurred since that time. Agricultural lands have abosrbed the brunt of increasing urbanization in the state.

The forest lands in New Jersey have provided products and jobs for the state since its beginning. They also provide recreational opportunities and watershed protection, as well as preserve open space. The demands for the goods and amenities provided by New Jersey's forests are increasing annually. Table 3 provides a projection of the commercial forest land base in the state to the year 2030, made by the US Forest Service. Only very slight decreases in the commercial forest land base are projected for the next 50 years. However, sudden changes in the profitablility of forest land ownership and political attitudes toward forest land will determine how large this forest land base will be in the future.

Table 3. Forest Service Projection of New Jersey's Commercial Forest Land Base to the Year 2030.

1977	1990	2000	2010	2020	2030
1,857,000	1,830,000	1,799,000	1,778,000	1,767,000	1,756,000

Winter, Waterfowl, and the Saltmarsh

RONALD E. KIRBY
and
FRED FERRIGNO

PHOTOS BY RONALD E. KIRBY

Two recent winters, 1976-77 and 1977-78, were unusually severe along the mid-Atlantic coast. In addition to substantial economic loss and dislocation of human affairs, wildlife and wildlife habitat also suffered. We are studying the winter ecology of waterfowl in coastal New Jersey, and have collected data throughout these severe winters. In 1976-77, much of our time was spent in assessing only the widespread mortality of waterfowl. However, we did gather data on a number of other topics of interest. We present this brief review for the benefit of New Jersey residents who experienced the severe weather and expressed an interest in the fate and future of wildlife populations in the state. We acknowledge with sincere appreciation the assistance of many biologists in our own agencies while in the field, as well as helpful discussion with wildlife management and research personnel throughout the Atlantic seaboard.

WINTER WEATHER

Although for the country as a whole, the winter of 1917-18 was the coldest winter in the 20th century, the winter of 1976-77 ranks as the coldest ever east of the Mississippi River. However, the long persistence of cold in the second half of February 1978 (in contrast to a rapid moderation in February 1977) helped make the winter of 1977-78 at least as severe overall as that of the previous year. In 1977-78, the core of the cold was over the middle third of the country instead of over the Ohio Valley as in the previous year, and the jetstreams were farther south and less convoluted, with storm after storm, at intervals of about five days, bringing snowfall throughout the East. As elsewhere in the region, the New Jersey coast was not as cold but was wetter. However, a better comparison than total precipitation is afforded by gross snowfall measurements: 13.6 cumulative inches of snow with at least a trace of snow on the ground during parts of 4 months in 1976-77; 33.9 cumulative inches of snow and 6 months with some snow on the ground in 1977-78 in Atlantic City.

EFFECTS UPON MARSH SOILS AND VEGETATION

During 1976-77, the bays, sounds, creeks, and inland waters of New Jersey were completely ice covered. The coastal marsh was frozen to depths up to five inches near the upland border and one to three inches elsewhere. In contrast, many larger water areas did not freeze in 1977-78 and snow cover on the marsh surface prevented deep freezing except for short periods. Freezing conditions have been normal phenomena in the mid-Atlantic states since the Ice Ages. Our vegetation and soils have thus evolved under climatic conditions similar to those observed during recent severe winters. Relative differences in the degree of cold, however, did result in some immediate and measureable changes in the physical and floral nature of the marshes.

On the surface of the marsh, ditch and creek banks froze during low-tide periods and often stayed frozen through a number of tidal cycles. Repeated freezing and thawing in late winter eroded banks of streams and ditches and clogged some small waterways with peat and mud. Scouring by ice along bay margins in 1976-77 removed surface mud layers in a few areas. Heavy ice cover compressed some soils, lowering them to the point where meltwater collected as pools. Continued warming brought most of these areas back to prefreeze elevations. Overall, physical changes in marsh topography and morphology were probably minor, but more rearrangement of creek channels and erosion of shoreline did occur in 1976-77 than in 1977-78.

Primary production in salt marshes is carried out by two groups of plants, the marsh grasses (mostly *Spartina* spp. in New Jersey) and the algae living on the mud surface. Grazers of these plants are few and energy largely flows through the detrital food chain. After bacterial degradation, detritus feeders (nematodes, snails, mussels, fiddler crabs) use some of the available energy, but as much as 90 percent of the total may be washed from the marsh as export. Weather conditions may therefore be of potentially great importance in modifying the amount of material exported to nearby estuaries. In northern areas, *Spartina* grasses are physically removed from the marsh surface by ice action as a regular event in the spring. On our study area, ice scouring on bay and large stream margins sheared saltmarsh cordgrass (*Spartina alterniflora*) at the soil surface and often completely removed the basal leaves of sea lavender (*Limonium carolinianum*). Vegetation in the higher marsh areas [saltmeadow cordgrass (*Spartina patens*), glassworts (*Salicornia spp.*), and salt grass (*Distichlis spicata*)] and on the marsh edge [marsh elder (*Iva frutescens*), groundsel bush (*Baccharis halimifolia*), and common reed (*Phragmites communis*)] were largely unaffected by ice scouring. Greatest damage to vegetation occurred from freezing of branch tips on marsh elder and damage from windblown ice, snow, and salt on both marsh elder and groundsel bush. Marsh elder, especially, was killed in large patches, and in most locations suffered damage to all but the lower stems when in exposed areas. Central shrubs in large stands and those on the edge of upland vegetation suffered the least damage.

We compared estimates of plant species density in August of 1975 and 1977 at three stations on each of nine sites near Seaville and could find no gross differences attributable to ice conditions during the winter of 1976-77. Neither the marsh grasses nor the layers of surface algae were reduced in abundance.

EFFECTS UPON INVERTEBRATE POPULATIONS

During midwinter, 1976-77, it became obvious that almost all of the ribbed mussels (*Modiolus demissus*) on the salt marsh surface were being destroyed. Ice sheets, lifted out of bays and creeks by high tides, tore them from the mud and deposited them on the surface where they froze. Other exposed mussels also froze in place. After the spring thaw, the marsh was littered with empty mussel valves. Measurements of remaining animals showed that only mussels buried at least 80% of their length in the mud near ditch banks were able to survive the freeze. Mussels also froze under similar conditions in 1977-78. However, their population was already much reduced, with only those in areas safe from freezing still alive. Heavy snow cover protected them from further freezing loss.

We investigated the density of a herbivore (a leafhopper) two detritus feeders (a snail and an amphipod), and a group of predators (spiders) before and after the winter of 1976-77.

At nine sites, the number of organisms per square meter in August was determined by sampling at each of three study locations on the marsh surface. Statistical analysis revealed no losses clearly attributable to severe winter weather among those populations sampled. Spiders actually increased in mean density. None of our analyses was capable of detecting small changes in numbers of species such as the fiddler crab or the numerous small fish living in ponds, creeks, and channels. We observed many dead minnows in small ponds that froze to the bottom, but their numbers were quite small in relation to the total minnow population. Crabs are normally protected from winter stress by being buried in the mud and inactive. We assumed that there was little significant winter kill of these and similar species.

EFFECTS UPON BIRDS

In 1976-77, many bird species suffered large population reductions, but it is now apparent that with a few exceptions, disastrous losses were more a local than a range-wide occurrence. Major declines were similarly documented for the winter of 1977-78, but conclusions regarding the range-wide effects were similar. It is clear that some species were hit very hard and that some populations will require perhaps more than a single successful breeding season to recoup losses.

Birds other than waterfowl

With casual observation, we found 15 species of birds other than waterfowl dead on the marshes we regularly surveyed in 1976-77 (Table 1).

Table 1. Species of birds other than waterfowl found dead on southern New Jersey marshes, December 1976-March 1977.

Double-crested Cormorant
Phalacrocorax auritus
Clapper Rail
Rallus longirostrus
Great Blue Heron
Ardea herodius
Black Crowned Night Heron
Nycticorax nycticorax
Herring Gull
Larus argentatus
Great Black-backed Gull
Larus marinus
American Woodcock
Philohela minor
Dunlin
Erolia alpina
Fish Crow
Corvus ossifragus

Continued on page 12

Man-made structures were severely damaged by the extreme cold. Ice action has lifted pilings and tilted docks in this photo.

When other foods are unavailable, Atlantic brant resort to winter cover crops (in this case rye) This is a new behavior for brant wintering in south Jersey.

MATTHEW C. PERRY

Atlantic brant were forced to resort to lawn grasses for sustenance when natural foods became unavailable on the frozen marshes. These grasses have little food value. Birds attempting to live upon only this vegetation usually succumbed.

Winter, Waterfowl,

Continued from page 11

American Robin
Turdus migratorius
Red-winged Blackbird
Agelaius phoeniceus
Mockingbird
Mimus polyglottus
Eastern Meadowlark
Sturnella magna
Common Grackle
Quiscalus quiscula
Cardinal
Richmondena cardinalis

Woodcock, which probe the soil for earthworms, were especially affected by frozen soil conditions. Concentrations of these birds were observed along the Garden State Parkway in Cape May County until ice storms covered the leaf litter, at which time we presumed that all woodcock remaining in the state succumbed. Wading birds concentrated on freshwater streams near bridges, but many were apparently unable to find sufficient food to combat the cold. Emaciated and lethargic Great Blue Herons were visible throughout January, usually standing on the ice. Carcasses were found into the spring period. Although we made only limited observations in upland areas, we believe that as groups, finches and woodpeckers suffered the least, wading birds and other ground-feeding birds the most. Gulls were affected in midwinter, but by late winter were feeding on the numerous waterfowl carcasses in the area. Great Black-backed Gulls were observed killing weakened Atlantic Brant and domestic Mallards. Gull numbers appeared much higher throughout the winter because they concentrated around open water. Based upon data from our search areas on the coast, the weather of 1977-78 did not result in appreciable losses of nonwaterfowl species. We found dead blackbirds, Dunlins, and gulls, but only as scattered individuals. Since almost all water areas remained open, the marsh species were able to obtain food except during periods of extremely high tide. Coastal New Jersey had no long ice storms in 1977-78; as a result, few upland birds on the margin of the marsh were found dead either, even though they may have been subjected to long series of stressful periods. After snowstorms, many ground-feeding species, especially American Robins, moved from the uplands to the marshes to feed on areas cleared of snow by tidal action.

Waterfowl

Eighteen species of waterfowl were found dead in southern New Jersey in 1976-77 (Table 2). A number of areas were searched regularly for weak birds, and visits were made to all types of habitat along the coast from north of Atlantic City to Cape May.

Table 2. Species of waterfowl found dead on southern New Jersey marshes, December 1976-March 1977.

Canada Goose
Branta canadensis
Atlantic Brant
Branta bernicla hrota
Snow/Blue Goose
Anser caerulescens
Mute Swan
Cygnus olor
Whistling (Tundra) Swan
Cygnus columbianus columbianus
Green-winged Teal
Anas crecca carolinensis
Northern Pintail
Anas acuta
Mallard
Anas platyrhynchos
Black Duck
Anas rubripes
Canvasback
Aythya valisineria
Redhead
Aythya americana
Lesser Scaup
Aythya affinis
Bufflehead
Bucephala albeola
Hooded Merganser
Mergus cucullatus
Red-breasted Merganser
Mergus serrator
Common Merganser
Mergus merganser americanus
Ruddy Duck
Oxyura jamaicensis
American Coot
Fulica americana

The Atlantic Brant was the species most severely affected by the winter conditions. Brant were at low numbers when they arrived in New Jersey in 1976 because of a series of poor reproductive seasons in the high Arctic. A severe storm in August 1976 had previously torn much of the sea lettuce (*Ulva lactuca*) and other brant foods from the bottom of the coastal bays and deposited it on the beaches. Deprived of their usual fall food, brant moved to the marsh surface and began feeding on saltmarsh cordgrass before the end of the year. Snow and ice cover quickly reduced the available feeding areas, and in most cases, the birds appeared to be unable to maintain their weight on *Spartina* alone. By late January, many brant were dead or dying of starvation, dehydration, and exposure. Large groups of brant and some Canada Geese moved into residential areas to feed on lawns, and many moved to golf courses, roadsides, and sod farms. Numerous deaths occurred in all areas. Most Canada Geese and all but a small group of Snow Geese moved south in December-January. Only a few of the brant in New Jersey made such a move in response to the continued freeze, and as a result, substantial mortality occurred throughout the range of the Atlantic Brant.

Ground observations suggested a loss of about 30,000 brant in New Jersey alone. Some did move southward, for they were found in North Carolina and Virginia by February waterfowl survey crews and were actually observed in flight in January in North Carolina. About 80,000 brant, 70% of the previous fall population, appeared to have succumbed to winter mortality during 1976-77.

Black Duck populations also were reduced in 1976-77, but appeared to fare well in most areas largely because of feeding programs in problem situations. About 2000 birds were estimated lost in New Jersey, with additional losses elsewhere in the mid-Atlantic region. Previous studies have indicated that winter weight loss may be a severe limiting factor for Black Duck populations in some years. In New Jersey, minimum weights of males below 1021 g (2 lb. 4 oz.) and of females below 907 g (2 lb.) have been found to indicate a high probability of substantial mortality. Our data collected during banding operations showed that minimum weights were below the critical level by early January and into mid-February 1977. Mean weights, however, quickly stabilized as the birds fed heavily on corn at the banding stations.

Mortality of diving ducks were relatively low, and appeared to occur as isolated incidents, with many birds moving south to areas of open water. Concentrations of birds near bridges and in the ocean did suffer rather continual loss throughout the colder period. Weaker and/or younger birds were apparently unable to feed sufficiently in the strong currents where open water was available. Mergansers, Canvasbacks, and scaup were present in greatest numbers and were the most common winter-killed specimens. Sea ducks appeared to fare well, although they became concentrated near groins on beaches and along shores covered with riprap.

In 1977-78, natural foods of Atlantic Brant were again unavailable when the birds arrived in New Jersey, possibly because heavy late fall rains and coastal storms killed or uprooted much of the sea lettuce. Only one large stand of this plant was located in aerial surveys between Atlantic City and Cape May during December 1977. Brant therefore began

Dead waterfowl and other birds could be found throughout the marsh at the height of the cold weather. Birds collected by research and management staff were given complete necropsies to determine exact cause of death.

Cooperative banding programs continue to yield much data on waterfowl population dynamics. Birds banded during extreme periods permit later analysis of the effects of the severe weather on survival of local populations.

feeding on lawns, golf courses, rye fields, and the marsh surface very early. With the onset of hard freezes, even though they were of short duration, food was essentially unavailable for the species except in cultivated areas. Starvation occurred, with young birds dying first, and rapidly. Of 78 brant found dead along a one-mile stretch of beach on Barnegat Bay, 75 were young-of-the-year. Losses did not approach those of the previous year, however, because the marsh surface remained frozen or snow covered for shorter periods. Some protected marsh areas froze completely, but areas subject to todal inundation thawed quickly after overnight freezes. The best estimate is that approximately 6000 brant succumbed to winter conditions in 1977-78.

Black Ducks were prevented from feeding on the marsh surface during many days and most nights in midwinter 1977-78 by freezing of the surface. Their main foods on the marsh at this time of the year appear to be small snails, some grass seeds, and minnows, all of which became unavailable under a thin skim of ice. Many Black Ducks used baits at banding stations, but all quickly returned to natural foods whenever a thaw or high tide put water instead of ice among the cordgrass stems. Weights of Black Ducks varied widely, but their mean weights did not fall below the critical threshold as in the previous year. We concluded that deaths due to starvation and exposure may have been only slightly greater than usual, and definitely less than in the previous year.

APPRAISAL

Although the economic losses suffered by human communities during the winter of 1976-77 were severe, wildlife habitat and wildlife populations generally appeared to be quite resilient in the face of the unusual cold. From our observations in New Jersey, we were able to identify widespread mortality in only two species of animals among those studied: the ribbed mussel and the Atlantic Brant. Research has shown that mussels can rapidly remove particulate matter from the water and deposit it on the marsh where it becomes available to deposit feeders. Although little energy flows through the mussel population, its ability to retain phosphorus in the *Spartina* zone greatly affects marsh fertility. In this respect, then, the New Jersey marshes did suffer damage. We hypothesize that the overall productivity of the marsh in that year was lowered by the death of a large fraction of the mussel population.

Winter damage to marsh border shrubs was also substantial enough to reduce the overall productivity of the marsh. Since most plants were not killed, however, we expect recovery of the individual plants to be uncomplicated except by a temporary rearrangement of dominance in the shrub community and some changes in the animal life of these areas.

Winter mortality among waterfowl is a common annual occurrence, but massive mortality, such as that of the Atlantic Brant, only rarely can be documented. J.M. Penkala suggested that Atlantic Brant are capable of changing their food habits without significant weight losses; the brant he studied in 1972-74 fed upon sea lettuce, saltmarsh cordgrass, widgeon grass (*Ruppia maritima*), surface algae, and some unidentified upland grasses. These foods were largely unavailable in quality form in 1976-77, and only irregularly available in 1977-78. Brant populations have fluctuated quite widely in recent years as a result of either breeding failures or winter mortality, both caused by severe weather.

Although our work has only touched upon the complexities of food web relationships and seasonal population dynamics of our coastal waterfowl, it is clear that studies of winter habitat and winter behavior of these species are sorely needed. Unusual weather permits identification of potentially limiting environmental variables for many species. The interplay of all intrinsic and extrinsic factors throughout time, however, determines the distribution of a species. Our research is now directed toward an understanding of these relationships.

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NORTHEAST SCIENCE LEAGUE'S 1980 PHOTOGRAPHY CONTEST

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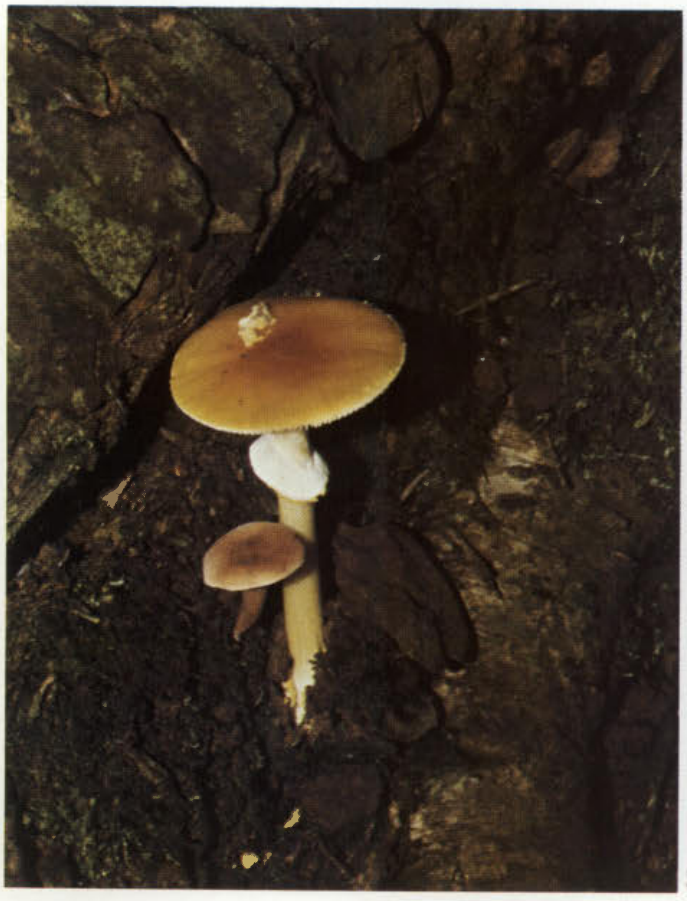


3.

PHOTOCREDITS—

1.

He Leads me beside still waters (Delaware Water Gap)—By Steven Foote, Montclair, N.J. Division A.—Earth; Sub-Division III—The environment. (FIRST PRIZE)

2.

Three-week-old great horned owls in nest—By Roy E. Decker, Branchville, N.J. Division A—Earth; Sub-Division I—Fauna (THIRD PRIZE)

3.

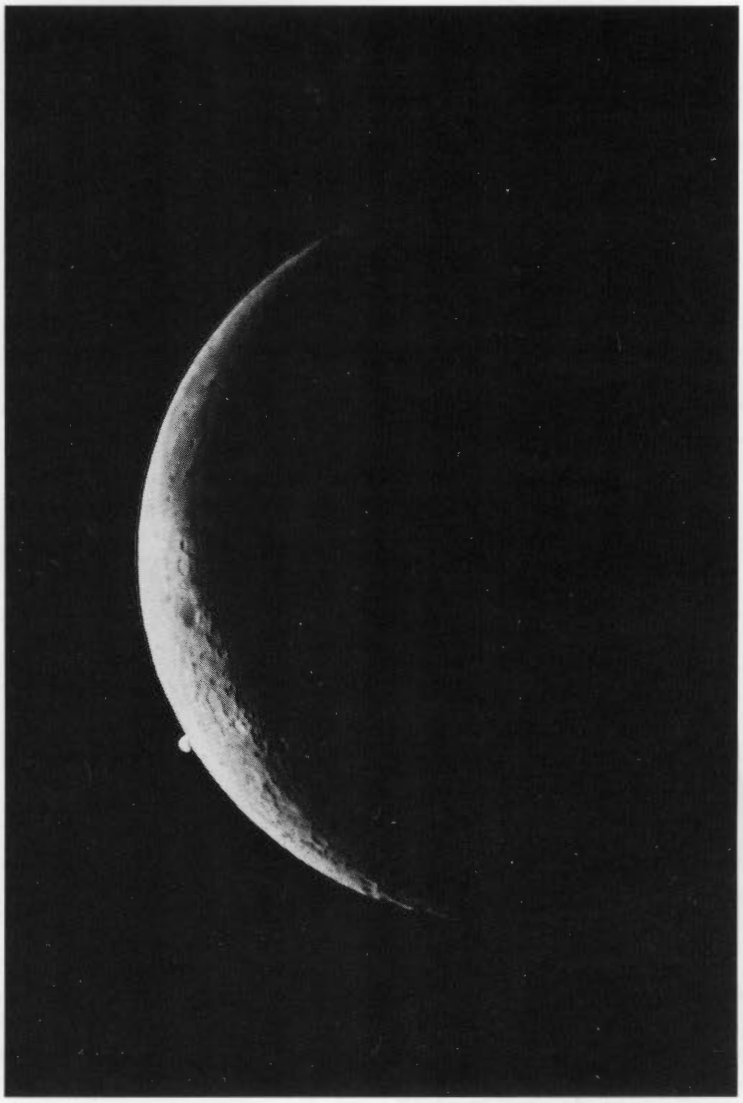
Gnome home—By Cathy Walker, Branchville, N.J. Division A—Earth; Sub-Division II-Flora (HONORABLE MENTION)

4.

Cool Waters—By Clinton E. Retzsch, Morristown, N.J. Division A—Earth; Sub-Division III—The environment (SECOND PRIZE)

5.

Venus—occultation—By Richard D. Peery, Lambertville, N.J. Division B—Space (BEST IN DIVISION B)



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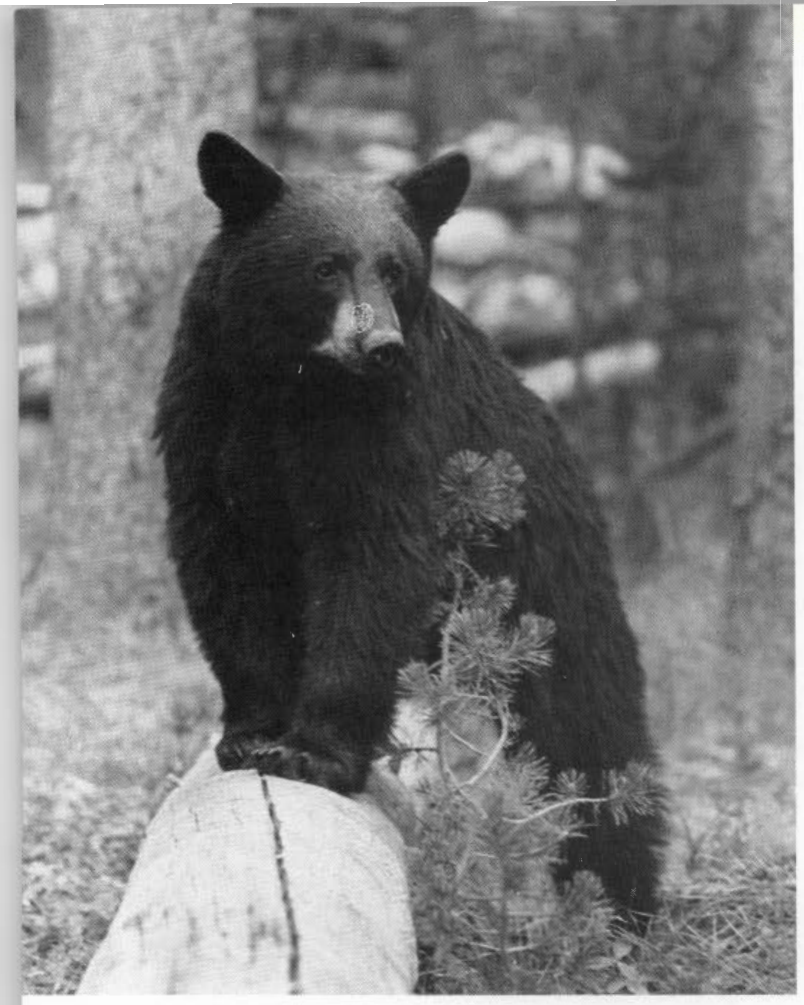
Editor's Note

We promised to publish some of the winning photographs submitted to Northeast Natural Science League's 1980 Natural Science Photography Contest. The contest winners were printed in the July 1980 *Megafocus,* the newsletter of the Northeast Natural Science League, Raymond J. Stein, Curator and Chairman, Bureau of Science in the Division of the State museum, is the Editor of *Megafocus.*

More than 500 photos (slides and prints) were submitted by 130 photographers for this year's competition. The judges who made the tough decisions were David Stager of Princeton University, Joseph Crilley of New Hope, Pennsylvania, and William Sharp of Madison, New Jersey.



LEONARD LEE RUE, III

Wildlife in New Jersey—

The New Jersey Bruin Where does he go from here?

BY ROBERT LUND

Yes, there are bears in New Jersey, the American black bear to be exact, *Ursus americanus.* Historically, it was recorded statewide through the late 1800's, disappearing from the Pine Barrens of southern New Jersey about 1900. No bear sightings have been confirmed south of Trenton for over 70 years, and the species is now primarily confined to the northwestern portion of the state.

Although the majority of reported black bear sightings are from Sussex County (39% of all sightings reported in the last four years), bears have recently been reported from as far south as Mercer County.

The black bear in New Jersey is primarily a spring/summer phenomenon with 75% of the sightings reported during fiscal year 1979-80 for the months of April through September. However, sighting reports have been recorded for every month of the year with the exception of February. Few bear sightings are reported from January through April (Table 2), since this is the period when most bears are "denned" for the winter.

The month of greatest black bear activity, based on the number of sighting reports received, is June. This corresponds to the peak in breeding activity, when bear movements, especially those of young males, become more extensive. Adult female black bears breed in alternate years and the cubs of the previous breeding often remain with the female until she drives them off just prior to breeding again.

Females probably begin breeding when about three years old. The gestation period is about 200-210 days, with the young born in January or February, while the female is in her winter den. The first litter is often only a single cub, but 2 or 3 are common thereafter. At birth, the cubs weigh about eight ounces. Their eyes remained closed for approximately 40 days. When they follow the sow from the winter den in March or April, they will weigh four or five pounds.

The number of sightings recorded since systematic recording first began in 1975 indicates that New Jersey's bear population is expanding both in number and distribution. A total of 81 sightings representing an estimated 30 to 50 individual bears was recorded for fiscal year 1980 compared to 31 sightings reported for 1979, 19 for 1978, 10 for 1977 and 24 for 1976 (Table 3). Though this apparent increase in our bear population could be the result of a number of elements, there appears little doubt that Pennsylvania is a contributing factor. Bears captured and ear tagged in Pennsylvania have been observed in New Jersey on several occasions. Three ear-tagged bears were observed during fiscal 1980 alone; two in Sussex County and one in Somerset County. Pennsylvania biologists have also monitored radio-collared bear crossing the Delaware into New Jersey.

Though officially listed as a game species, the black bear season has been closed in New Jersey since 1970. Between 1958 and 1970, 46 bears were reported killed by New Jersey hunters; three with bow and arrow and 43 with shotgun and buckshot. The black bear has never been an important game species in New Jersey. Those taken were usually incidental to deer hunting. It is doubtful that many New Jersey hunters purposely went hunting for bear. The season was opened periodically to keep bear numbers at a minimum, thereby minimizing human conflicts.

Current management efforts are primarily confined to minimizing bear-man conflicts. The Wildlife Control Unit is now "geared-up" to quickly respond to bear complaints. Most of the "complaints" are simply that "a bear was seen". We find many people are afraid of bears, and therefore, intolerant of them. Often the "problem" solves itself with the bear going his own way. Our policy is to do nothing in cases where a bear is just

Continued on page 17

Environmental News

WATER EMERGENCY IN NORTHEASTERN NEW JERSEY . . . WATER RATIONING IN OVER 100 TOWNS

"We take this difficult and demanding step because total reservoir storage in North Jersey has dropped to a dangerous level. If we all follow these equitable, attainable restrictions, we can overcome immediate shortages and help rebuild water reserves for next summer. We need everybody's help."

—Governor Brendan Byrne

On September 27 Governor Byrne, by Executive Order No. 98 instituted a mandatory water rationing plan for over 100 communities in Bergen, Essex, Hudson, Morris, Somerset, Passaic and Union countries previously declared water emergency areas by Executive Orders 94, 96 and 97. A hot summer and lack of rainfall—nearly 11 inches below normal in the peak usage months, May through September, caused a serious drop in the amount of water stored in the reservoir systems serving these areas. Voluntary efforts to conserve water, while helpful, were not enough to maintain adequate supplies.

The rationing plan involves a uniform 25 percent reduction in current (September) water use by both residential and commercial customers.

In addition, the Governor extended the mandatory ban on outdoor water use to all the remaining communities not covered by rationing in six counties—Bergen, Essex, Hudson, Passaic, Union and Morris. Outdoor use of well water also is prohibited in these counties since public water systems are often interrelated with well water systems and ground water levels also are dropping in North Jersey.

Governor Byrne established an Emergency Task Force by executive order to monitor the water situation on a daily basis and recommend any further action that may be necessary. The task force consists of the Commissioner of Environmental Protection as chairman, the Attorney General, the Superintendent of State Police, the President of the Board of Public Utilities, and the Commissioners of the departments of Community Affairs, Health and Labor & Industry, or their designated representatives. DEP was designated lead agency.

Under the rationing plan—

- Commercial users will be required to reduce water consumption by 25 percent of current (September) use.
- Similarly, residential customers will face a 25 percent reduction, which means using no more than *50 gallons of water per person per day.*
- Rationing will be enforced through checks of water meters and excess usage charges will be added to water bills.
- Water companies will collect, an excess use surcharge computed as follows:

EXCESS USE CHARGES

Five dollars will be charged for each 100 cubic feet of water (750 gallons) or part thereof, to a maximum of 300 cubic feet (2,250 gallons). The fee will be $10 per 100 cubic feet of water or portion thereof, in excess of 300 cubic feet. Excess use fees will be added to the regular water bill figure.

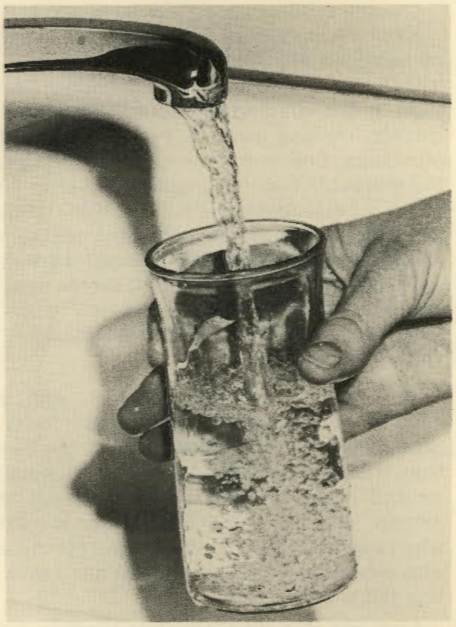
For a family of four with a rationing allocation amounting to 6,000 gallons a month and a water rate of $9 for the first 6,000 gallons, the surcharge for 2,000 gallons of excess use would be about $15.

Any monies collected through excess use charges will not be accounted for as income, but will be placed in a reserve account for disposition as directed by the Governor's Emergency Task Force to help cover costs for the rationing plan.

In addition to the excess usage surcharge, noncompliance with the rationing program will result in the following:

1. **First excess use**—a warning issued to the customer by the water company.
2. **Second excess use**—installation of a flow restricter in the customer's service line for a 15-day period to be removed only upon payment of the following penalty fee:

continued on page 16D



WATER SAVING HINT: Don't let the water "run cold" when getting a drink. Keep a bottle of drinking water in the refrigerator. (Other suggestions on page 16D.)

LIBERTY PARK UPDATE

Waterfront cleanup: DEP Commissioner Jerry Fitgerald English recently announced the signing of an agreement with U.S. Army Corps of Engineers for completion of waterfront cleanup at Liberty State Park and for beginning of cleanup along the Jersey City shoreline. "This will complete the waterfront cleanup at Liberty State Park," said the Commissioner, "and will bring us one large step closer toward fulfillment of the park's artistically acclaimed Master Plan and toward its actualization as America's finest urban park." The cleanup will consist of removal of all existing debris such as rotted piers, tires, and the like with the Jersey City waterfront cleanup extending from the north edge of the Tidewater Basin up to and including the Exchange Place area at the foot of Montgomery Street. "When this is completed, it will permit Jersey City to proceed with the development of their planned Waterfront Park," noted the Commissioner. The

continued on page 16C

ENGLISH ON THE ENVIRONMENT

Most of us think of the Statue of Liberty as being an enduring symbol of our country, and solid as the Rock of Gibralter. The truth is she is standing there in New York Harbor, melting away in the rain. Edward McManus, one of a team of experts giving the statue its first thorough overhaul in 40 years, was quoted in the NEW YORK TIMES this past May 19 as saying that the acid rain so prevalent east of the Mississippi is creating "a tremendous problem." It seems to be causing the statue's copper skin "to deteriorate at a faster rate than we thought." That's not all.

Acid rain is cursing the earth with a decline in soil fertility, decreased forest production, and disappearance of species from freshwater lakes and rivers. It pollutes air and water, and is therefore a threat to human health and welfare. It is produced when oxides of sulfur and nitrogen combine with moisture, form sulfuric and nitric acid, and fall to earth.

Acid rain is a by-product of modern industrialization. Emissions from coal-burning power plants are a notable source of sulfur dioxide and sulfate pollution which are particularly responsible for increasing the acidity of today's rainfall. These pollutants can be carried in the air over great distances, causing environmental effects far from their point of origin.

To express the relative acidity or alkalinity of any chemical solution, scientists use the value "pH". A low pH is acid; a high pH is alkaline. A pH of 7 (as in pure water) is neutral. Lakes and rivers usually range from a pH value of about 5 to 10. Rain normally has a pH of 5.7. (This compares to a pH of 2.5 for lemon juice; 3 for orange juice; 7 for milk.)

A downward change from one pH value to another represents a tenfold increase in acidity. For example, a solution with a pH of 5 is ten times more acid than a solution with a pH of 6; a solution with a pH of 4 is 100 times more acid than one with a pH of 6.

In 1975, Dr. David W. Lecher of the Trenton State College Physics Department reported in the magazine NEW JERSEY OUTDOORS that precipitation measurements from many places around the world were showing pH values ranging from 3 to 5, especially in densely populated and highly industrialized areas. This meant precipitation from ten to 100 times as acid as it should be.

Acid rain began to be an environmental problem in the 1950's. In the late '60's and very early '70's, many species of fish disappeared from northern Ontario lakes. Trout and salmon in Norway and Sweden were also affected. Fertility of deciduous forest soils declined in places as far apart as Sweden and New Hampshire.

By about 1973, it was determined that rainfall east of the Mississippi was very acid and that large areas of farmland had been affected by acid fallout. Add to effects of acid rain increased leaching of nutrients from plant leaves, decreased pollen generation, decline in plant vigor, adverse changes in aquatic ecosystems and corrosion of metal, limestone and marble, resulting in structural damage to buildings and statues.

Dr. Lecher reports that a seven-month study of rainful acidity conducted at Trenton State College in 1974 indicated that New Jersey's environment was then receiving precipitation as acid as that in areas where "significant ecological damage" from acid rain had been documented.

Emissions from two power plants owned by the Cleveland Electric Illuminating Company in Ohio are at present held to be among contributors to acid rain in New Jersey and the northeast. New Jersey joined with Pennsylvania, New York, Maine, Massachusetts, New Hampshire, Connecticut and Rhode Island in protesting relaxation by the federal environmental agency (EPA) of sulfur dioxide emission limits and compliance dates for the two Cleveland generating plants. (The emission limits and compliance dates were set in the Ohio State Implementation Plan, as required by the federal Clean Air Act.) The states' protest was made by letter on February 29, 1980. In addition, New Jersey filed written comments with EPA, expressing opposition to its proposed substantive revision of the Ohio State Implementation Plan.

New Jersey is situated so that it receives windborne pollutants from Ohio. Winds do not respect boundaries on a map. Consequently, New Jersey and the northeast are severely affected by sulfur dioxide and sulfate pollution from sources like the two Cleveland power plants. To fulfill DEP's mandate to achieve air quality standards stipulated in New Jersey's State Implementation Plan, and to protect the health and welfare of the people of New Jersey, we declared our opposition to EPA's relaxation of emission standards and compliance dates for the Cleveland Electric Company.

At a conference held on April 8 and 9, involving EPA and all states east of the Mississippi River, I testified to the need for regional solutions to environmental problems of regional scope, and for national emission standards for control of sulfur dioxide from electric power generating stations, to provide an equitable resolution to the acid rain problem.

Finally, on May 22, New Jersey, in support of Pennsylvania, filed a motion to intervene in the acid rain case of *Pennsylvania v. EPA*.

A syndicated cartoon recently showed a man looking at his umbrella, of which only the ribs remained, and saying to his wife, "That must have been one of those acid rains we've been reading about." Acid rain is really not a joke, and the cartoonist did not mean to imply that it is. But, through the legitimate device of humor he has highlighted a growing environmental menace which affects us all.

From this as from all environmental plagues, . . .

LET'S CONTINUE TO PROTECT OUR EARTH! □

MARINE FISHERIES POSTS TO BIOLOGIST, ECONOMIST

Bruce L. Freeman, of Monmouth County, recently was named administrator of the newly organized Marine Fisheries Administration within DEP's Division of Fish, Game and Wildlife. Dr. Bernard Brown, of Mercer County, was appointed economist for the Bureau of Marine Fisheries.

Bruce L. Freeman

Freeman came to DEP from the National Marine Fishery Service (NMFS) Gloucester, Massachusetts, where he served as staff assistant to the director of the Northeast Region and the chief of the Fisheries Management Division. Also, he was a fishery biologist with the NMFS in Sandy Hook for 11 years and has authored and co-authored over 30 publications dealing with marine fisheries resources. A graduate of North Carolina State University, Freeman attended the University of Massachusetts for his graduate studies.

Dr. Bernard Brown

Brown came to DEP from the Governor's Office of Policy and Planning where one of his major assignments was the preparation of a proposal for the development of the New Jersey commercial fishing industry. Brown received his doctorate in Economics from the University of Wisconsin. He taught economics at the University of Houston and has also worked for a New York consulting firm. □

OVERCOMING OBSTACLES. enrollees in the 1980 Youth Conservation Corps (YCC) proudly showed off the Physical Fitness Trail they built this summer in Washington Crossing State Park (Mercer County) at the August 27 dedication ceremony, and demonstrated their prowess on, over and through the 14-obstacle, 1.5-mile course. The 13 enrollees participating in the project were chosen randomly from YCC applicants in the Trenton area.

Ninety (90) percent of the materials used in constructing the trail were natural and recycled (used railroad ties, telephone poles, tires and lumber).

The federal/state YCC program is administered for New Jersey by DEP's Division of Parks and Forestry. Statewide in 1980 more than 500 young people, 15 to 18 years of age, were employed under the program.

WATERFRONT GROUP FINISHES ITS JOB

The Governor's Hudson River Waterfront Study, Planning and Development Commission, established in 1979 to develop basic goals and recommendations for a proposed project to revive the decaying 17-mile stretch of waterfront between the George Washington Bridge and Bayonne, has completed its task. The 39-member commission in early fall submitted a report containing more than 20 policy recommendations to the Governor and the Legislature. The recommendations include proposals to—create a permanent regional commission, whose first job would be to devise a master plan for the waterfront and Palisades portions of the 11 communities* involved; create a linear pathway (park) along the entire waterfront from the George Washington Bridge to Bayonne; encourage a variety of economic activity along the shore front, including commercial and port-related projects; and deter new development on the Palisades if it would block the view or hasten erosion. (The policies stated in the report also will help DEP in its Riverlands Renaissance program.) The report is available from John Weingart, DEP, Bureau of Coastal Planning and Development, Box 1889, Trenton 08625.

*Cliffside Park, Fort Lee and Edgewater in Bergen County; and Union City, North Bergen, West New York, Guttenberg, Weehawken, Hoboken, Jersey City and Bayonne in Hudson County. □

SAVE MONEY! CUT YOUR OWN FIREWOOD

New Jerseyans with wood-burning stoves and fireplaces can get a real bargain in firewood at certain state parks/forests if they are willing to bring their own equipment and cut the wood themselves. A permit is required and must be secured in person from the park/forest office. There is no charge for the permit, but there is a fee of $5 per cord (a cord of wood measures 4 feet by 4 feet by 8 feet). The wood is for private use only (cannot be sold) and the limit per family is two cords per calendar year. Collecting or cutting dead wood is permitted from mid September through March in designated areas.

Listed below are the parks which have designated wood cutting areas. To make sure the area's supply hasn't been depleted, call the park/forest of choice before leaving home.

Allamuchy Mt. State Park (SP), 201-852-3790; High Point SP, 201-875-4800; Wawayanda SP, 201-764-4120; Ringwood SP, 201-762-7031; Stokes State Forest (SF), 201-948-3820; Bass River State Forest (SF), 609-296-1114; Belleplain SF, 609-861-2404; Lebanon SF, 609-726-1191; and Wharton SF, 609-561-0024. □

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

Two new laws

BOATERS, TAKE NOTE

Two bills pertaining to the operation of the New Jersey Marine Police were signed into law by Governor Byrne on August 29, 1980.

Senate Bill No. 1407 (now Chapter 96, Public Laws of 1980) transfers the 103-member force of the Marine Police from the Department of Environmental Protection to the Division of State Police in the Department of Law and Public Safety. The transfer will become effective on July 1, 1981.

Assembly Bill No. 1027 (now Chapter 97, Public Laws of 1980) revises certain sections of the Boat Act of 1962 to generate funds to support and maintain the operations of the Marine Police. The legislation increases the fees for power boats and will extend the numbering and fee requirement to nonpower vessels. Nonpower boats under 12 feet in length are exempt from fees, as well as canoes and kayaks. The legislation also makes revisions to the Boat Act so that it conforms with the violations and penalties section of the Criminal Code and the rules and regulations of the Administrative Procedures Act. The new law became effective immediately upon enactment.

The revised fee schedule is as follows:

Boat Length	Former Fee	New Maximum Fee
Under 16'	$ 4	$ 6
16'-26'	10	14
26'-40'	20	26
40'-65'	30	40
65' or more	100	125

□

continued from page 16A

LIBERTY PARK

work should be completed by September 1981. The total cost of the contract is estimated at $2 million, with the state's share an estimated $667,000 and the federal government providing the rest of the money. The cost breakdown is for $300,000 to be spent on Liberty Park and $1.7 million on the Jersey City waterfront.

Caven Point: Governor Byrne, Jersey City Mayor Francis F.X. Smith and Congressman Frank J. Guarini, recently jointly announced the White House has approved a $1.4 million matching grant for the purchase of Caven Point and the Caven Point pier in Jersey City as an addition to Liberty State Park. The 285-acre area is south of the existing 678-acre park. The pier extends nearly a mile into the Hudson River and is expected to be used for fishing and other recreation. The federal money will be matched 50-50 with state Green Acres funds.

continued from page 16A

WATER EMERGENCY

Meter Size	Fee
5/8" to 1"	$50
1-1/2 to 2"	$75
3" and larger	Actual Cost

3. **Third and subsequent excess uses** —installation of a flow restricter in the customer's service line for a period to be determined by the Emergency Task Force. Removal will require payment of a penalty to be determined by the Emergency Task Force, not to exceed $500.

The above surcharges are in addition to any possible criminal penalties imposed by the Governor's Executive Orders No. 94, 96 and 97.

A public information campaign has been initiated. Helping hints on water savings have been distributed by water companies in the emergency areas, as well as through civic groups and service organizations.

Meetings are being held with officials of local water and local law enforcement officials to coordinate enforcement.

Several million copies of a flyer giving helpful hints on ways to save water were distributed throughout northern New Jersey to both residential and non-residential water users. The news media —newspapers, radio and television— have fully cooperated in making the information known to the public. The material, prepared by DEP's Division of Water Resources with the Governor's Water Emergency Task Force, can help all New Jerseyans to practice conservation of our precious water resources. The full text of the flyer is given below. Clip and save it.

WATER EMERGENCY

Governor Brendan Byrne has declared a Water Emergency for this area because lack of enough rainfall and unusually hot summer weather have caused reservoirs to become dangerously short of water. Some saving of water has already resulted from stopping outdoor water uses such as private car washing and lawn sprinkling, but it is not enough.

It has been determined that water must now be rationed. In order to be fair, the Governor's Water Emergency Task Force has determined that every user of water (household, commercial, industry and all others) be rationed so as to cut water use by the SAME extra amount—25 percent below present use. FOR EACH PERSON, THIS MEANS USING NO MORE THAN 50 GALLONS OF WATER PER DAY.

As a resident of the emergency area, you can easily use less than 50 gallons of water per day without discomfort. Here are a few ways:

- Do not keep the water running while washing, shaving or brushing teeth.
- Do not let the water "run cold" when getting a drink. Keep a bottle of drinking water in the refrigerator.
- Wait until the dishwasher or clothes washer has a full load before turning it on. It takes the same amount of water and you will not use it as often. Better yet, handwash your dishes.
- If you wash dishes by hand, fill a dishpan, not the sink. And do not keep the faucet running needlessly. (You can water shrubs with used dishwater.)
- Check your house for dripping faucets or leaking water-using appliances. A leaking faucet can waste 20 gallons of water per day.
- See if you can fit one or two half gallon plastic jugs, filled with water and capped, into the toilet tank without stopping movement of the float arm. This will save water. Do not use bricks; they can crumble and clog pipes.
- Do not flush so often. Flush only for sanitary reasons, and NOT to get rid of tissues or cigarette butts.
- Take showers instead of tub baths, and turn off the shower while soaping yourself.

If you think about your daily habits, you will probably be able to find other ways to save water.

HERE IS AN EXAMPLE OF HOW YOU CAN USE LESS THAN 50 GALLONS OF WATER PER DAY. YOU MAY WISH TO POST THIS IN YOUR HOME:

3-minute showers at 3 gallons per minute	9 gallons
3 toilet flushes at 5 gallons each	15 gallons
3-minute personal hygiene at 3 gallons per minute	9 gallons
Cooking and Drinking	1 gallon
Clothes washing (approx. 30 gallons per load) per person	5 gallons
Dishwashing (approx. 14-25 gallons per load) per person	5 gallons
Housekeeping, etc.	1 gallon
TOTAL	**45 gallons**

Without enough rain, soon enough, further rationing will be necessary, possibly leading to loss of jobs through industrial and commercial shutdowns. This rationing plan may have to remain in effect through the winter months so that reservoirs can reach normal levels before next summer. If normal reservoir levels are not reached by next June, we shall face even worse water shortages later in 1981.

This rationing plan is being enforced by your water supplier, as directed by Governor Byrne. Water meters will be read to assure compliance. Frequent spot checks of meters will be made. Overuse of water will result in extra charges on water bills. Installation of flow restricters in water lines will follow continued overuse.

IT IS ESSENTIAL THAT EVERYONE DOES HIS OR HER SHARE BY SAVING WATER DURING THIS EMERGENCY. WE CAN OVERCOME THIS PROBLEM BY WORKING TOGETHER. □

RECYCLING PLAN

Five public hearings have been held on a draft statewide comprehensive plan setting forth a phased, five-year program for recycling material from solid waste. The plan was drafted by the 50-member New Jersey Advisory Committee on Recycling, established at the initiative of the departments of Environmental Protection and Energy. The proposal calls for increased recovery of scrap paper, glass, metal, tires, used oil, plastic and food wastes. To attain its goal of reducing the solid waste flow that is expected to use up all existing landfills by 1985, the proposal calls for financial incentives to participating municipalities and counties, low-interest loans to recycling industries, educational programs for the public, and legislative action. □

OUTDOOR ENTHUSIASTS FIND 'TOPO' MAPS USEFUL

New Jersey topographic maps, color coordinated for easy reading and available in different scales, are called "silent guides" by outdoor enthusiasts. Hunters, canoers and anglers, for example, often favor the state Atlas Sheets for a regional overview of an area. Each Atlas Sheet covers 800 square miles using a scale of 1 mile to 1 inch. (Cost: $5 each.) The geological survey Quadrangle Maps, on the other hand, are attuned to local use as they indicate housing areas, factory locations and the like. Each Quadrangle Map details an area of about 40 square miles using a scale of 2,000 feet to 1 inch. (Cost: $2 each.) For more information, write to Publication Sales, DEP Bureau of Geology and Topography, Box 1390, Trenton 08625. □

OFF-SEASON BONUS FOR PARK PATRONS

Parking fees have been discontinued at 20 state parks/forests and reduced to $1 daily at Island Beach State Park until the busy season begins again Memorial Day weekend 1981. The summer "free parking on Tuesdays" program holds true at Island Beach year-round. Free parking for the quiet season is in effect at the following areas: Allaire, Atsion, Barnegat Lighthouse, Bass River, Batsto, Belleplain, Cheesequake, Hacklebarney, High Point, Hopatcong, Lebanon, Parvin, Ringwood-Skylands and Sheperd Lake in Ringwood, Round Valley, Spruce Run, Stokes, Swartswood, Washington Crossing and Wawayanda. All are administered by DEP's Division of Parks and Forestry. □

The New Jersey Bruin

Continued from page 16

there. Developing a degree of understanding and a response plan with local police departments has been of aid in preventing bears from being unnecessarily "controlled".

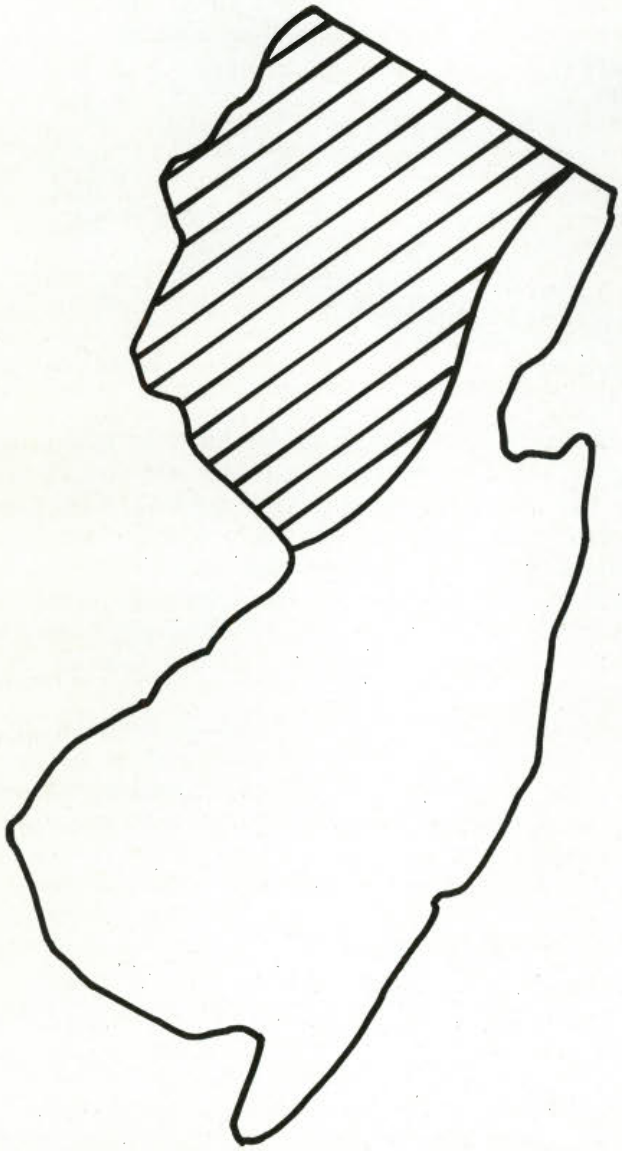
Some problems are real, such as the proverbial conflict between bear and beekeeper. Five major incidents of apiary damage were reported in fiscal 1979. The Control Unit has responded by supplying portable electric fencing and flashing light systems for short-term control. Capture and relocation is rarely employed, with only one or two bears being relocated annually.

What to do with a nuisance bear once captured will become more of a problem in the future. New Jersey has 7.4 million people and their demand for space has resulted in increased occupation of previously sparsely-inhabited areas. Conflicts will increase as places to put bears decrease.

Our current policy toward the black bear is to maintain the population in areas of suitable habitat within its present range at a density compatible with human activities. Hopefully with some understanding and a little tolerance, the black bear can remain a part of New Jersey's wildlife heritage.

Note: Anyone sighting a black bear is requested to report to our Clinton Office. Your cooperation is appreciated:

Clinton Wildlife Management Area
RD Box 409
Hampton, NJ 08827
(201) 735-8793



Current Distribution of the Black Bear in New Jersey Based on Sighting and Specimen Reports Collected from May 1975 through June 1980.

Table 1. County Distribution of Black Bear Sightings Recorded for the Period 1977-80.

County	Number of Sightings	% of Total
Hunterdon	17	12.1
Mercer	7	5.0
Middlesex	5	3.5
Morris	14	9.9
Passaic	11	7.8
Somerset	5	3.5
Sussex	55	39.0
Warren	27	19.2
TOTALS	141	100.0

Table 2. Distribution of Black Bear Sightings by Month for the Period 1977-80.

Month	Number of Sightings	Percent
July	18	12.8
August	15	10.6
September	11	7.8
October	20	14.2
November	6	4.3
December	9	6.4
January	1	0.7
February	—	—
March	1	0.7
April	2	1.4
May	24	17.0
June	33	23.4
Totals	141	99.3

Table 3. Reported Black Bear Sightings for the Period 1976-80.

Year	No. Reported Sightings	No. Bears Represented By Sightings*	No. Sows With Cubs	Known Mortalities
1976	24	2	0	0
1977	10	10	0	1 (auto)
1978	19	20	3	1 (auto)
1979	31	26	2	1 (shot)
1980	81	30-50	0	2 (shot)

*Many reported sightings were of the same animal. Duplicate sightings were determined by the time and location of each report.

The Easy Enjoyment of Backyard Birdwatching

BY ROBERT PATARCITY

We were watching some house sparrows feeding juveniles nearly their own size. The young were very awkward despite their bulk. Suddenly my wife exclaimed, "Look up in the tree. There are a couple of those ridiculous babies acting just like woodpeckers."

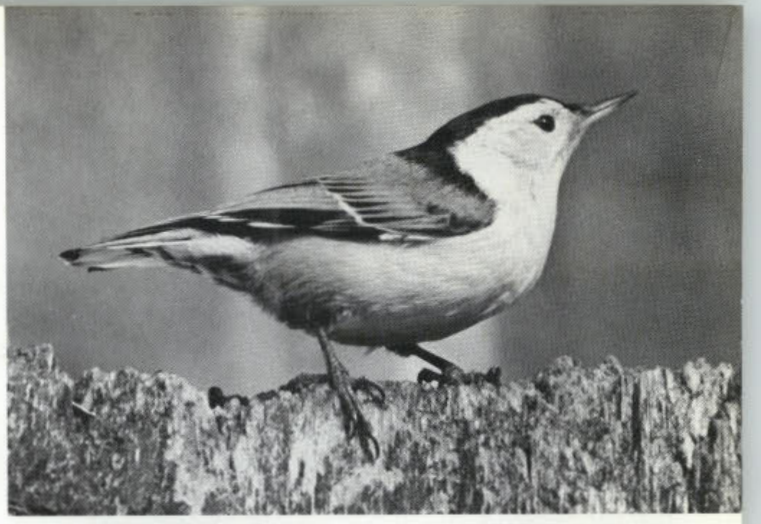
I looked up. Sure enough, two little birds were climbing on rather thin limbs and pecking them with great animation. "I never thought the behavior of the young ones would be so different from that of the adults," I said. "Maybe they're not sparrows. I can see better now. They are black and white." We looked carefully. It was a pair of downy woodpeckers.

Were we in a wooded park or in one of New Jersey's well known bird sanctuaries? Did we have a blind and high power binoculars? No. We were in the backyard and the woodpeckers were only fifteen feet away. Was this sighting a one time peculiarity? We thought so and assumed that most people just do not see downy woodpeckers unless they go into the woods and search for them. We were wrong.

There are few pastimes as easy to start as casual bird identification and few as easy to enjoy as serious birdwatching. We are fortunate, here in New Jersey, to have a wealth of wild birds. Dr. Paul Phillip Sher's article, "New Jersey is for the Birds," which appeared in the September/October 1978 issue of *New Jersey Outdoors,* may have surprised the many of us who assumed that there were only dozens, rather than hundreds, of species in our state.

If that article aroused your interest and you would like to give birdwatching a try, *start today!* You need almost nothing and you do not have to leave your home. Just look out the window. With a little observation time and a little practice, you will be pleasantly surprised at what you see. There is a great variety of birds to be found in built-up areas. If your neighborhood has trees, the probability of seeing more species increases. If you have a tree nearby, you are in good shape.

The do-it-at-home approach requires a small cash outlay to start. Most small birds have rapid and erratic movements. The trick, therefore, is to attract them so that you can observe them closely. If you have room for a feeder, your chance of success is good. Therefore, investment number one—seed. If you do not have a feeder, simple scatter some seed in an open area. Mixed seed will probably be the most productive. You can start with bread crust, but will most likely attract only starlings.



White-Breasted Nuthatch LEONARD LEE RUE III

Pine Siskin LEONARD LEE RUE III

It may take a day or so for birds to find a new feeder. Once discovered, the feeder will attract birds as long as seed is present. After refilling, birds often return within a few minutes. Do not be discouraged if you do not see some action right away. Put out some seed, wait a half hour and then check frequently. In favorable weather, you can station yourself close by and if you sit quietly, the birds will tolerate your presence.

A feeder can be made of almost any material. Ours is a 12" x 12" plywood board with a half-inch molding lip on the edges to keep the seed from falling out. It is nailed to the top of a fence post. Another piece of plywood, nailed to a 6 inch 2 x 4, is attached to this base to give protection from rain or snow.

After a few watching seesions, you may find that you need help to identify your visitors. A trip to the library to borrow a field guide is recommended. You may learn that birds you have considered to be the same are not so at all.

Our first experience seemed headed for disappointment. Seed sat untouched for two days. Finally, we had a visit from what I thought were about a dozen sparrows. It did not take long to see that there were several varieties. What I had casually dismissed as

White-Throated Sparrow—female WM. D. GRIFFIN

Black-Capped Chickadee WM. D. GRIFFIN

"common sparrows" were, in fact, three species. One had a strawberry head and breast; one a yellow eye tuft and a white throat, and one a black bib. Obviously, my description "common sparrows" was inadequate. I needed a book and bought a soft-cover edition of Peterson's *Guide to the Birds*. I dug out my 6 x 25 pocket binoculars. Readers who have done some birdwatching will already know what I saw. Actually, I had seen only one true sparrow. The one with the white throat is, conveniently, called the white-throated sparrow. It has a tuft of bright yellow feathers in front of each eye and is a rather attractive bird. The black-bibed fellow is very common and is often, but erroneously called the English sparrow. Actually, it is a weaver finch and is not a native species. The redhead is a house finch. These birds were hardly the drab creatures I had expected.

Since then, I have positively identified 22 species. My wife and sons have seen five others. We have not counted geese, ducks, and vultures that occasionally fly over because we have not had the chance to make positive identification. We live in a suburban neighborhood. Our yard is small, but we do have a few, large trees. There are no woods or fields nearby and there is a fair amount of traffic. Even so, we attracted nearly 30 species by simply putting out some seed and sitting back. So can you.

The species we have seen in our backyard are:

Starling
Robin
Cardinal
Goldfinch
Purple Grackle
House Finch
House Sparrow
White Throated Sparrow
Dark-eyed Junco
Song Sparrow
Redpoll
Pine Siskin
Northern Oriole
Mourning Dove
Blue Jay
Mockingbird
Catbird
Crow
Downy Woodpecker
Brown Thrasher
American Redstart
Cowbird
Black-capped Chickadee
Rufus-sided Towhee
Wren (probably a House Wren)
Ruby-crowned Kinglet
Nuthatch (probably a White-breasted Nuthatch)

Maybe I am not hooked on all this yet, but I am pretty interested. I now use inexpensive, 7 x 35 mm, super wide-angle binoculars with a fast focus bar. We have two feeders and plan a third. I now actively search for birds. Although I have not gone on trips solely for that purpose, I do carry my binoculars and field guide when we fish or camp.

After you have watched backyard birds for a while, you will find that they have distinct food preferences and habits. Bread will be eaten by starlings. Sunflower seeds bring blue jays, cardinals, and grackles. Peanut butter in our hanging feeder attracted only squirrels. Mixed seeds have been most productive; the sparrows and finches eat the little seeds, the jays and cardinals take the larger.

Cardinals travel in pairs, but usually take turns eating. They are noisey eaters. Blue jays are belligerent, but rarely frighten the smaller birds. Jays do not eat in the feeder. They take sunflower seeds to a tree; hold a seed against a branch with one foot and peck out the center. House sparrows are very aggressive and often fight. Robins feed on the ground (and do not appear to eat seeds, by the way).

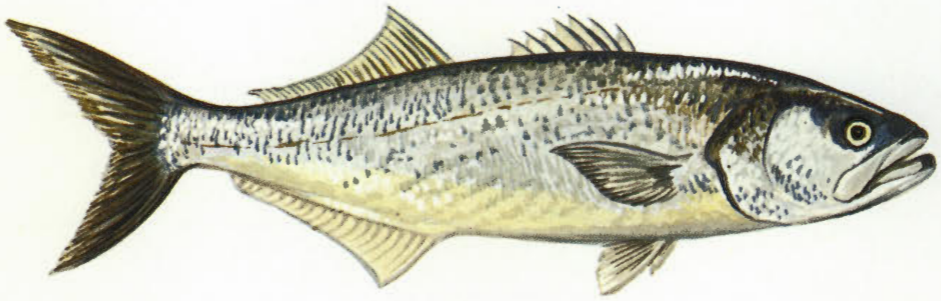
Young birds are comical. They are as clumsy as puppies. They stumble and fall. Young house sparrows, as large as adults and able to fly, were still fed by adults in our feeder.

Some backyard birds exhibit strange activity. The antics of the redstart are unmistakable. They fan their wings and tail and flit rapidly from branch to branch. In the middle of a severe, January storm, a few dozen redpolls landed in our neighbor's white birch and clung upside down on bobbing branch tips to eat the seeds. Grackles often clutch the roof of our feeder and turn almost upside down to look inside.

Your backyard birds are sure to surprise you. With little effort you will see a variety of birds; many unfamiliar although they are around every day. Give it a try. Your interest in nature will be renewed or reinforced and you may even find a new hobby. There is beauty all around us and this is one way to capture a bit of it. □

MORE ON NEW JERSEY'S SALTWATER FISH & SHELLFISH

BLUEFISH



BIOLOGY

Common names: ***bluefish, tailor, greenfish, snapping mackerel***
Scientific name: ***Pomatomus saltatrix***
Range: Northward regularly to Cape Cod and occasionally to Nova Scotia. South to Brazil, Argentina, and Bermuda.
Size: The length weight relationship is: 14" = 1 lb.; 17" = 2 lbs.; 20-21" = 3 lbs.; 24" = 4 lbs.; 28-29" = 8 lbs.; 30" = 10-12 lbs.
Food: Bluefish are highly predatory on other fish, with the menhaden being a favorite.
Migration: Bluefish are caught in late March along the Florida coast. They pass the Carolinas during late March and April. Blues reach the offshore waters of New Jersey and New York in April and May; about a month later they begin to move inshore.
Habitat: Bluefish are warmwater fish. The young inhabit warm, shallow coastal waters. Larger adults prefer cooler (about 55°F), deeper offshore waters.
Spawning: Spawning takes place in spring or early summer in offshore waters.

Bluefish swim in schools sometimes numbering many thousands. In 1901, a school 4 to 5 miles long was spotted in Narragansett Bay. Blues are perhaps one of the most voracious feeders, even after they have filled their stomachs they will continue destroying fish, leaving a trail of mangled fish and blood behind.

RECREATIONAL AND COMMERCIAL IMPORTANCE

The bluefish is now New Jersey's number one gamefish. Bluefish stocks are extremely abundant, with snappers providing excellent fishing in the bays and big choppers forming the mainstay of the state's party and charter fleet. Recent surveys estimate that on the Atlantic coast sportsmen catch 17 times more bluefish than commercial fishermen.

Because of their strong flavor and poor freezing qualities, bluefish are restricted to the fresh fish market. For this reason, only limited numbers of blues are taken commercially, in comparison to their abundance. Most are caught in gill nets fished near shore, while one-third are landed in otter trawls.

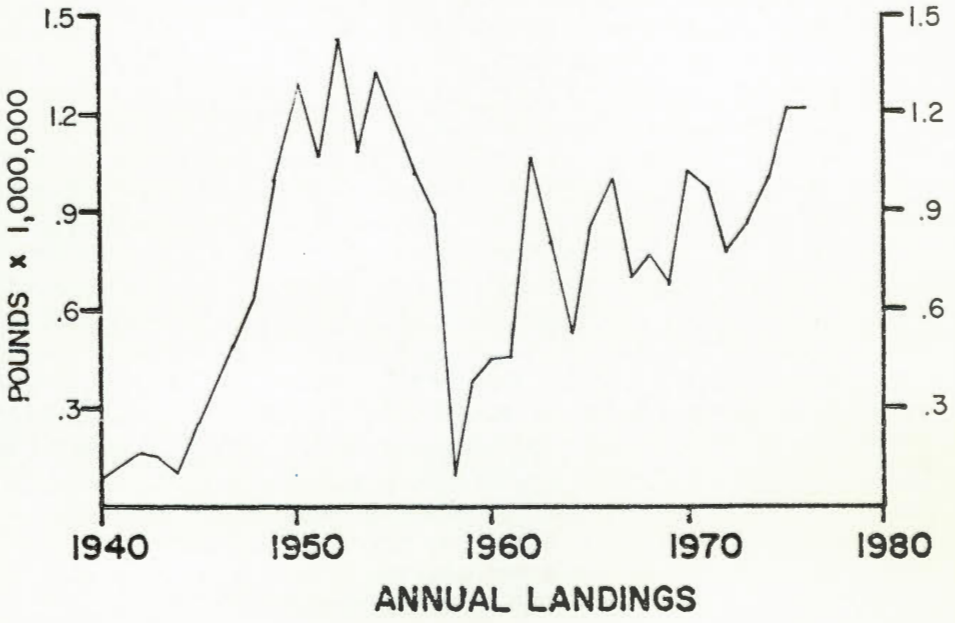
SPORTFISHING FACTS AND TECHNIQUES

Because of their tremendous abundance and voracious feeding habits, bluefish are taken in large numbers by anglers. Between May and November, they are accessible to all types of saltwater fishermen in the bays, the surf, and the offshore ridges. A wide variety of techniques are effective, but only a select few will be discussed here. From bay piers or around bridge pilings, small snappers are taken with bobber rigs baited with spearing or small killies. Small hooks are used for snappers and the best catches are made between late July and September. From a boat in the bay, larger blues, ranging in size from 3/4 to 5 pounds (or more), may be taken by trolling or casting rebels and spoons. Surf fishermen use cut mackerel, bunker, or mullet for bait fishing or cast and retrieve spoons and plugs. Offshore fishermen troll at moderate speeds with spoons, plugs, and tube lures. During the middle of the day, deep-diving planers are needed to reach blues that move to the cooler waters of the depths. One of the favorite methods of party and charter boats is to chum with ground-up bunker. The blues attracted to the chum slick are then taken with cut baits or by jigging.

Some general rules that can be helpful for all bluefish anglers are as follows: Blues are most active in the early morning and at dusk. Look for birds "working" the water over schools of surface-feeding blues. For their size, blues are tenacious fighters and strong; dependable tackle is necessary. Leaders should be wire or heavy monofilament to withstand the blue's gnashing teeth. (Never put you finger inside a bluefish's mouth!) Hooks should be large. When retrieving a lure, reel as fast as possible, for blues will often pass up a slow-moving target.

ACKNOWLEDGEMENTS AND REFERENCES

Anthony Hillman (art), Barry Preim (graph), Hildebrand and Schroeder (1972), Bigelow and Schroeder (1953), McHugh (1977), Breder (1948). □



BLOWFISH

BIOLOGY

Common names: ***northern puffer, swellfish, swelltoad, blowfish, balloonfish, bellowsfish, globefish***

Scientific name: ***Sphoeroides maculatus***

Range: Cape Cod to Florida

Size: Few blowfish reach a length greater than 10". The females are generally larger than the males.

Food: The blowfish is basically a bottom feeder, eating mollusks, worms, shrimp, barnacles, and other small crustaceans.

Habitat: Blowfish are inshore fish, generally in water a few fathoms deep and within one or two miles of shore. They occasionally venture into brackish water.

Spawning: They spawn throughout the summer in inshore waters. Blowfish can produce as many as 176,000 eggs. The eggs are tiny and adhere to anything; hatching occurs approximately 4-1/2 days after release.

The blowfish has the unusual ability to inflate itself with air or water when disturbed. The blowfish is also able to partially bury itself by means of its specialized clavicles which act as shovels. In southern waters, the flesh of several species of blowfish is deadly poisonous. The northern puffer common to New Jersey waters, however, is only mildly toxic and poses no danger to people.

RECREATIONAL AND COMMERCIAL IMPORTANCE

While the blowfish can be a nuisance to anglers fishing for other species, they provide excellent eating for those willing to keep and clean them. Blowfish have never been of great importance as a commercial species in New Jersey. The peak commercial landing of 132,000 pounds was harvested in 1948. Supposedly, the trouble of skinning the fish deterred local fishermen from catching greater numbers. The species is much more important to recreational anglers, especially youngsters and novices. For unknown reasons, blowfish numbers declined almost to the point of nonexistence in the early 1970s. The species still has not recovered and only small numbers are caught each year.

SPORTFISHING FACTS AND TECHNIQUES

The following section is written under the assumption that blowfish will eventually return to their former abundance in New Jersey waters. Until that time, fishing for them will be a hit-or-miss operation.

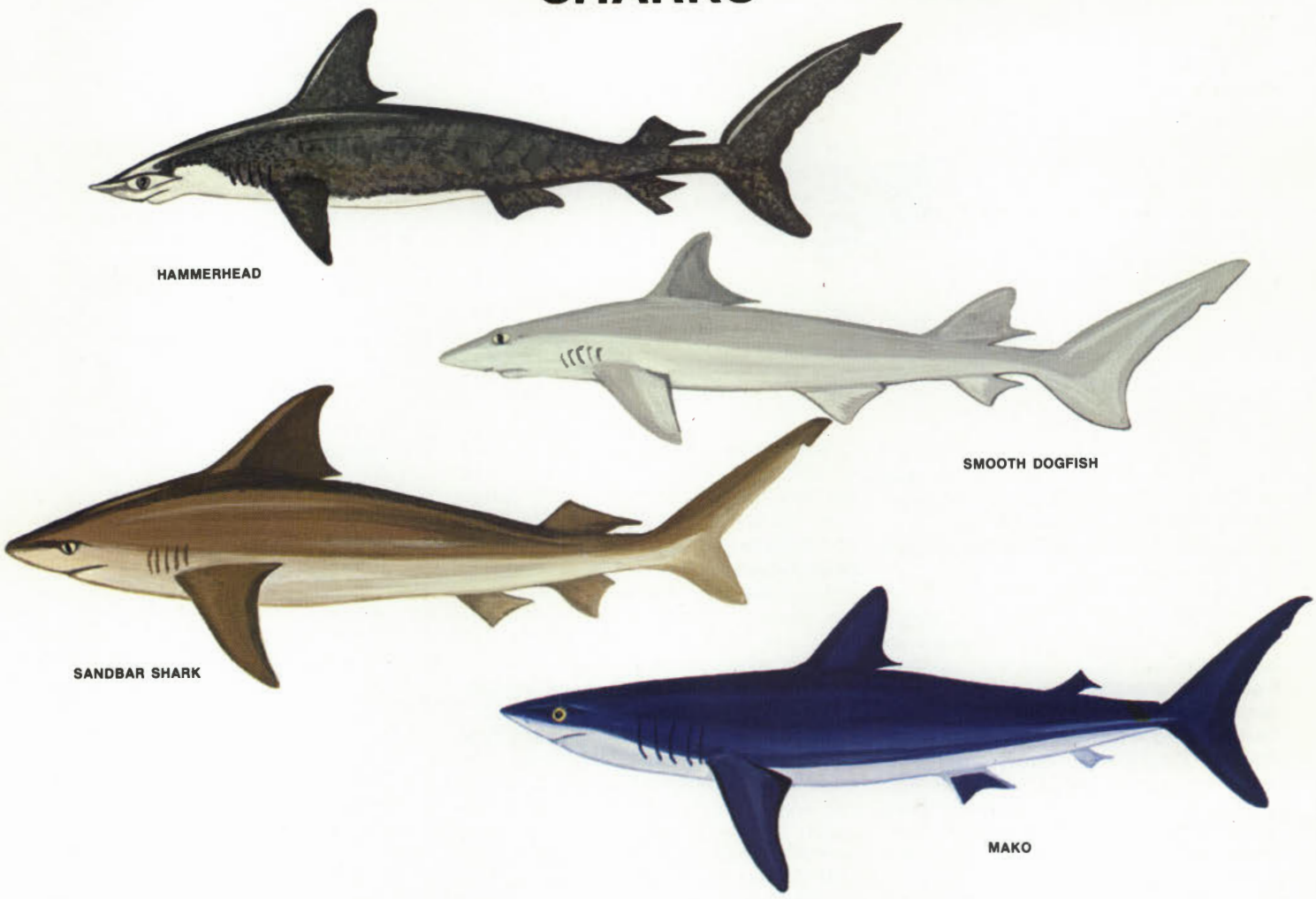
Most anglers would like to know how not to catch blowfish, for when this pesky fish is abundant, it will hit almost any bait, lure, or rig lowered into the water, making fishing for other species almost impossible. For those anglers seeking to catch a mess of tasty "sea squab," however, the period from late April through May provides the best fishing action, although blowfish are abundant during the entire summer. They can be found throughout the state's saltwater bays, especially near inlets and along the ocean surf. They may be taken from boats, beach, or bank. The most commonly used bait for blowfish is small strips of squid. Almost any bait, small spoon, or spinner, however, will work well. A small fluke hook is best; the long shank permits easier removal past the blowfish's rodent-like teeth. Chumming can help hold large numbers around the boat.

To clean blowfish, cut down behind the head, through the backbone, but not through the belly skin. Hold the head in one hand, grab the exposed meat with tongs or pliers and then pull up and back. This action will leave skin and entrails behind and produce a choice piece of meat resembling a butterfly shrimp.

ACKNOWLEDGEMENTS AND REFERENCES

Anthony Hillman (art), Barry Preim (graph), Bigelow and Schroeder (1953), McHugh (1977). □

SHARKS



BIOLOGY

Common names: ***smooth hammerhead, common hammerhead***
Scientific name: ***Sphyrna zygaena***
Range: Tropic to warm temperature belts of the Atlantic, occurring north to southern New England.
Size: In New England waters, hammerheads average less than 7 feet. They do grow to 17 feet and 1500 pounds, however.
Food: The hammerhead eats fish, smaller sharks, and sting rays.
Migration: The hammerhead is limited to inshore and offshore movement.
Spawning: Hammerheads mature at 7 to 8 feet.

BIOLOGY

Common names: ***smooth dogfish, smooth hound, grayfish***
Scientific name: ***Mustelus canis***
Range: Cape Cod to southern Brazil
Size: Dogfish may reach 5 feet in length, although the average is 2 to 3 feet.
Food: Dogfish feed on large crustaceans and are considered the most relentless enemy of lobster.
Habitat: Smooth dogfish inhabit coastal waters, entering shoal waters and bays.
Spawning: Dogfish give birth to 10 to 20 live young (11 to 14 inches long) during May to July.

BIOLOGY

Common names: ***spiny dogfish, dogfish, spiked dogfish, grayfish, horn dog***
Scientific name: ***Squalus acanthias***
Range: Greenland to North Carolina
Size: Spiny dogfish average 2 to 3 feet in length and 7 to 10 pounds.
Food: Dogfish eat all small fish, squid, worms, shrimp, and crabs.
Habitat: Spiny dogfish are winter visitors to the New Jersey coast, preferring43° to 59°F waters.
Spawning: Dogfish give birth to 3 to 11 young (8 to 12 inches long).

BIOLOGY

Common names: ***blue shark, blue dog, Milbert's shark***
Scientific name: ***Prionace glauca***
Range: Blues occur throughout the temperature and tropical waters of the world; in Middle Atlantic waters, they extend northward to Woods Hole, Massachusetts, and occasionally north to Nova Scotia.
Size: Blues are mid-sized sharks, averaging less than 10 feet; recorded as large as 11 feet, 410 pounds.
Food: Blues feed on mackerel, herring, squid, and other sharks; additionally, they commonly feed on garbage dumped at sea.
Habitat: Blues are pelagic sharks, frequenting offshore waters; their occurrence is chiefly determined by the presence of a food source.
Spawning: Maturity occurs at 7 to 8 feet and as many as 54 are born at one time, although 8 to 20 is more usual. The young, 1-1/2 to 2 feet long, are generally born during June and July.

BIOLOGY

Common names: ***sandbar shark, New York ground shark, brown shark***
Scientific name: ***Carcharhinus maculipinnis***
Range: Sandbars migrate between Massachusetts and Florida.
Size: Sandbars average 4 to 6 feet in length, but may reach 7 or 8 feet and a weight of 200 pounds.

Food: They feed on bottom fishes, such as winter flounder, and crustaceans, particularly crabs.
Habitat: They prefer inshore ocean waters and bays.
Spawning: Sandbars give birth to 8 to 12 live young during the summer months. Young are 22 inches long and about 2-1/2 pounds at birth.

BIOLOGY

Common names: *sand tiger shark, dogfish shark, ground shark*
Scientific name: *Odontaspis taurus*
Range: Coastal waters on both sides of the Atlantic.
Size: Sand tigers reach 8 to 9 feet; an 8-foot shark weighs approximately 250 pounds.
Food: They feed on small fish, such as menhaden, cunners, mackerel, skates, silver hake, flounder, alewives, butterfish, scup, weakfish, and bonito, and on lobsters, crabs, and squid.
Habitat: Sand tigers live on or close to the bottom. They occur very close to the shore in depths of 1 to 5 fathoms, and are sometimes seen moving across sandbars. Occasionally, they enter river mouths.

BIOLOGY

Common names: *shortfin mako, sharp-nosed mackerel shark, Atlantic mako*
Scientific name: *Isurus oxyrinchus*
Range: Makos occur in tropical and warm temperature belts of the Atlantic.
Size: Makos average 5 to 8 feet in length and average 100 to 300 pounds. The largest makos are 12 feet long and weigh more than 1000 pounds.
Food: They are voracious feeders, chasing small fish such as mackerel and herring, while also feeding on larger prey, particularly the swordfish.
Habitat: Makos are oceanic sharks, often seen swimming at the surface.

BIOLOGY

Common names: *dusky shark, shovelnose*
Scientific names: *Carcharhinus obscurus*
Range: Maine to North Carolina
Size: Duskies may reach 14 feet and 600 pounds, but ones over 10 feet are rare.
Food: They feed on fish, squid, and crustacea.
Habitat: Duskies occur in a wide range of habitats, from close inshore to well offshore. They are more pelagic than sandbar sharks.
Spawning: Duskies give birth to live young during the early fall in New York waters. Females produce up to 10 young. The young are 3 feet long at birth.

BIOLOGY

Common names: *tiger shark, leopard shark*
Scientific name: *Galeocerdo cuvieri*
Range: Tigers prefer warm water but occur as far north as Cape Cod.
Size: Tigers average 12 to 13 feet and may reach 18 feet.
Food: They feed on sea turtles, other sharks, fish, horseshoe crabs, crabs, and conchs.
Habitat: Tigers are found in a wide range of depths.
Spawning: They produce 10 to 80 live young which are 18 to 19 inches at birth.

Sharks serve a necessary role as predators and scavengers in the sea. They should not be killed except for use as food, because they are slow growing and have a relatively low reproductive rate. Sharks mature at a late age; the blue shark, for example, does not mature until about 8 or 9 feet in length. Unlike most fish, sharks give birth to live young. The egg develops within the mother; the embryo utilizes the large yolk sac for nutrition. The gestation period may last up to two years in some species. For the safety afforded the young through internal development, sharks have sacrificed the ability to produce enormous numbers of eggs like the bony fishes.

RECREATIONAL AND COMMERCIAL IMPORTANCE

With the exception of a short-lived fishery for the Vitamin A contained within shark's enormous liver, sharks are mostly ignored by commerical fishermen. The primary reason for this is that shark meat has not been widely accepted as a food source by Americans. The flesh is delicious, however, and spiny dogfish were once the primary species used in England's fish and chips. There are currently very large stocks of dogfish present along the mid-Atlantic coast and someday they may be harvested in great numbers for domestic or foreign markets.

Sharks are becoming more important for recreational fishermen each year. While smooth and spiny dogfish are considered nuisances by anglers fishing for other species, larger sharks are now considered challenging gamefishes. Their rise in popularity has led to the organization of shark clubs and fishing tournaments.

SPORTFISHING FACTS AND TECHNIQUES

During the past 10 years, shark fishing has dramatically increased in popularity. Sizeable sharks can be taken in all of New Jersey's saltwater bays and ocean waters. In smaller bays, the best places to fish are in deep sloughs near inlets. Evening and night fishing, when the disturbance from boat traffic is minimal, is usually the most productive. The species usually taken in the bays include smooth dogfish, sandbar, and sand tiger. In the ocean, sharks can be taken anywhere, but serious shark anglers usually travel offshore to waters over 100 feet deep. Late June is the best time to intercept migrating sharks, although they are present in our waters until October. The most highly prized oceanic shark is the mako, which ranks among the top gamefishes for its fighting and spectacular leaping ability. Other common offshore sharks include blues, duskies, sandbars, and hammerheads.

The most common fishing technique is chumming with ground-up fish. The smell of the chum lures sharks to the bait. Chumming is done either by adding water to the chum and ladling the slurry overboard or more simply by placing a block of frozen chum into an onion bag and hanging it over the side. The most important thing is to maintain a continuous, unbroken slick. Some anglers toss an occasional chunk of fish into the slick. In bays, chumming is done from an anchored boat, while drifting is the usual practice in the ocean.

Best baits are live eels or other medium-sized fish, followed by fresh, and lastly frozen, fish. The size of the bait used is dependent upon the area fished and the species sought. Hooks should be at least 8/0 and a long 8- to 12-foot stainless steel wire leader is essential. When rigging baits, the barb of the hook should be exposed to provide maximum hooking ability. Stout rods and conventional reels of at least 4/0 size equipped with several hundred yards of 40-pound test (or heavier) line should be used for sharks 6 feet and larger; smaller sharks can be taken on lighter gear.

Most anglers put out two or three lines, each at a different depth. In bays, one bait should be placed on the bottom and the other at mid-depth. In the ocean, set baits at 25 feet, mid-depth, and near bottom. Baits should be kept in the chum slick, which tends to sink away from the boat at an angle toward the bottom. Thus, the deepest baits should also be the furthest from the boat.

Rods are best placed in rod holders with the reel's clicker on and drag off. This will allow line to pay out smoothly when a shark strikes. At the strike, pick up the rod, engage the drag, and allow the running fish to take up the slack in the line and hook itself with its own momentum. Then, the battle begins.

Be patient while reeling in a shark and let the fish tire itself out—"green" shark at the side of a boat can creat serious problems. When the fight is over, release all sharks not to be used as food or mounts by simply (but cautiously) snipping the leader as close to the mouth as possible.

ACKNOWLEDGEMENTS AND REFERENCES

Anthony Hillman (art), McClane (1974), Breder (1948), Bigelow and Schroeder (1953), Hildebrand and Schroeder (1972), Susan Toogood and Raymond Townsend. s □

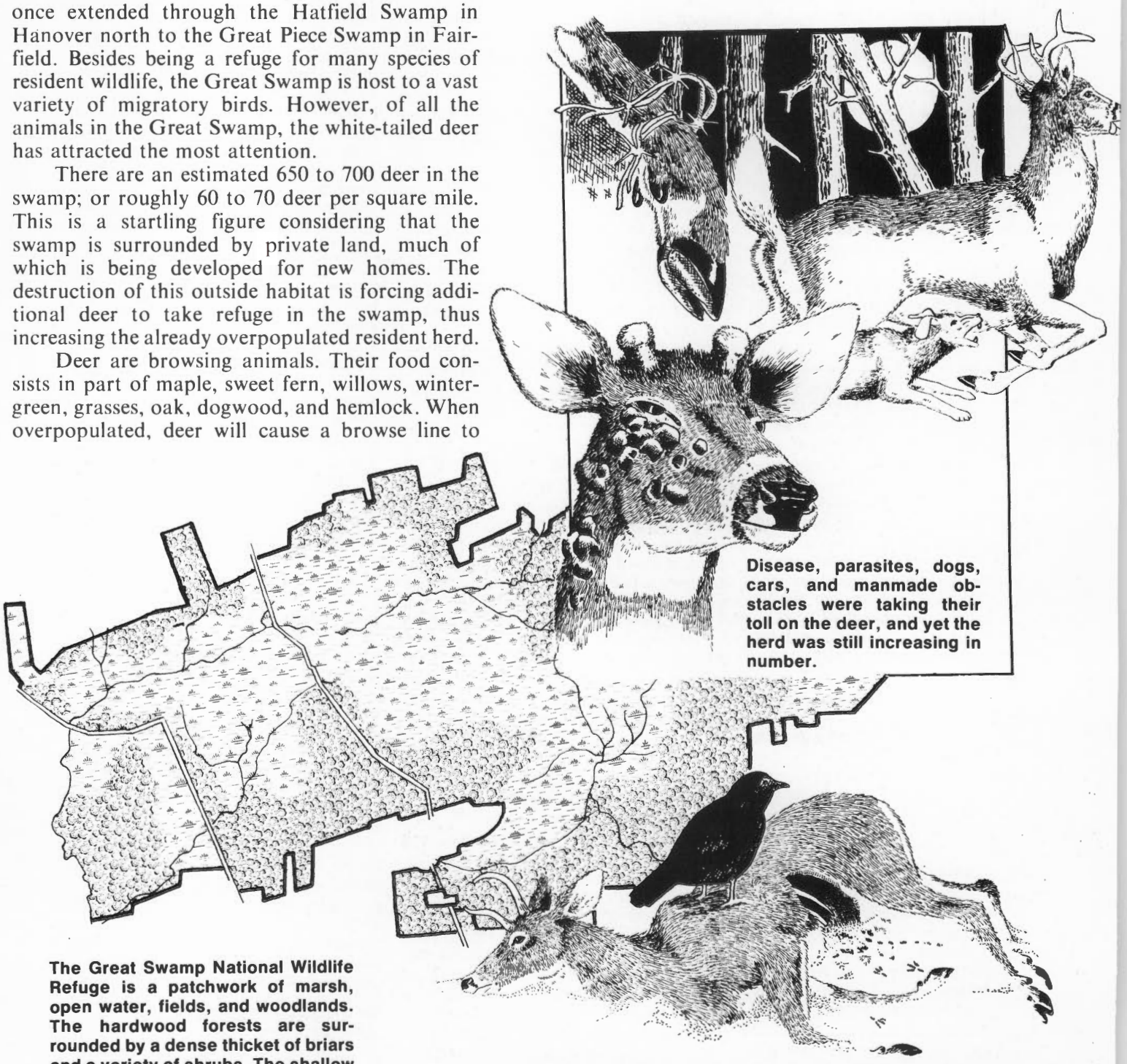
The Great Swamp and its DEER!

Written and Illustrated by S. John Percoskie

The Great Swamp Wildlife Refuge, less than 50 miles from New York City, is located just southeast of Morristown in Harding and Passaic townships. The unique 5900-acre refuge lies at the southern end of an extinct prehistoric lake that once extended through the Hatfield Swamp in Hanover north to the Great Piece Swamp in Fairfield. Besides being a refuge for many species of resident wildlife, the Great Swamp is host to a vast variety of migratory birds. However, of all the animals in the Great Swamp, the white-tailed deer has attracted the most attention.

There are an estimated 650 to 700 deer in the swamp; or roughly 60 to 70 deer per square mile. This is a startling figure considering that the swamp is surrounded by private land, much of which is being developed for new homes. The destruction of this outside habitat is forcing additional deer to take refuge in the swamp, thus increasing the already overpopulated resident herd.

Deer are browsing animals. Their food consists in part of maple, sweet fern, willows, wintergreen, grasses, oak, dogwood, and hemlock. When overpopulated, deer will cause a browse line to



Disease, parasites, dogs, cars, and manmade obstacles were taking their toll on the deer, and yet the herd was still increasing in number.

The Great Swamp National Wildlife Refuge is a patchwork of marsh, open water, fields, and woodlands. The hardwood forests are surrounded by a dense thicket of briars and a variety of shrubs. The shallow swampy areas are dotted with small islands.

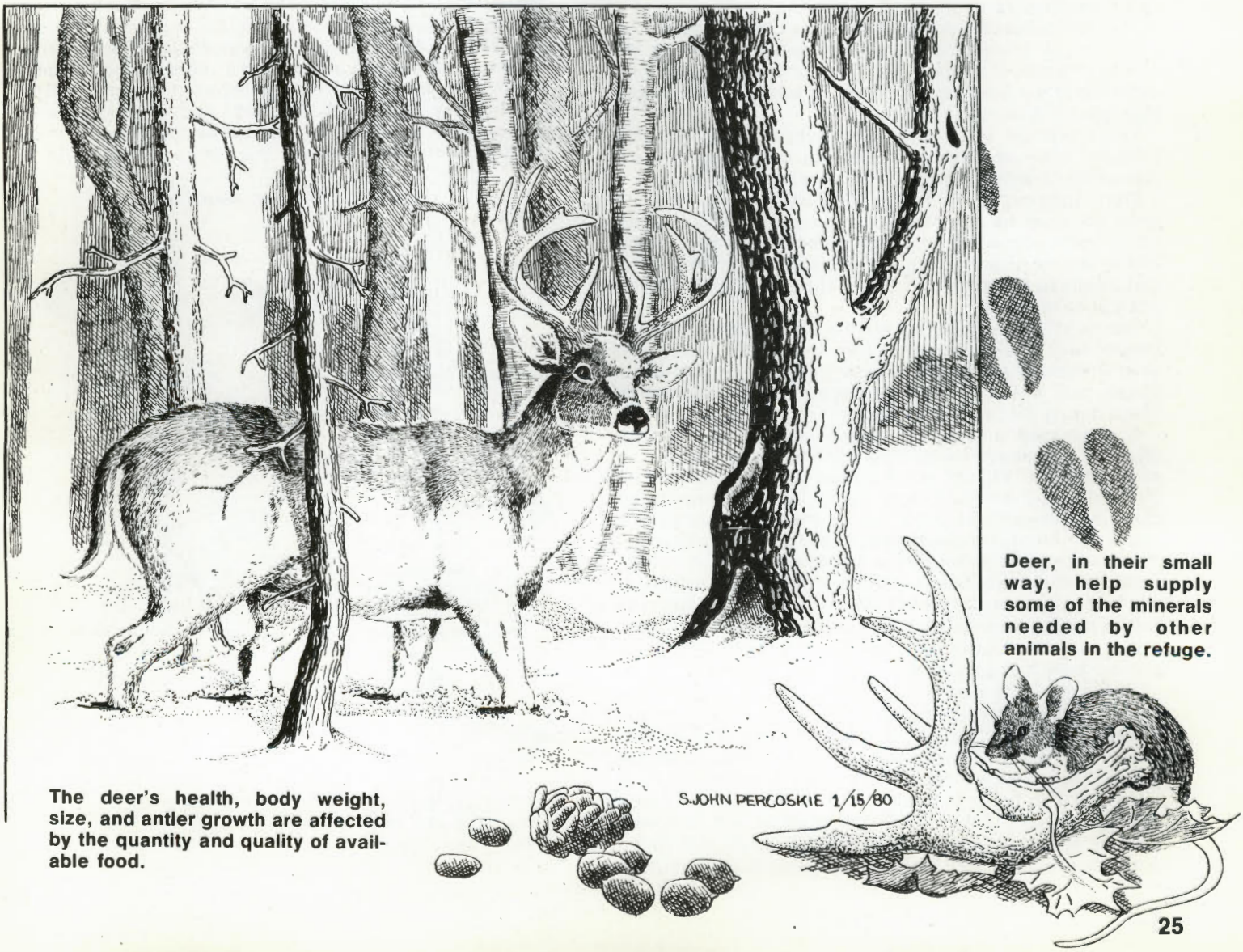
When the spring thaw came, it gave the Refuge Managers a clear picture of the problem they were facing. Deer were found which had succumbed to disease and starvation during the past winter. The following years would take a heavier toll if nothing was done to correct the problem.

develop by stripping vegetative cover as high as they can reach. This not only destroys the deer's food supply, but that of other species as well. Hungry deer then venture into populated areas, raiding ornamental and nursery plants.

An extensive study of the refuge deer herd indicated that the population was too large for the area to support in good health. Body weights were dropping and parasite level increasing. A solution had to be found to prevent further deterioration of both the Great Swamp and the deer herd.

In 1970, a decision was made to hold a controlled deer hunt to help reduce the population. Owing to opposition and legal action on the part of some "protectionist" groups, the hunt was not held until 1974. Since this initial hunt, the deer hunt on Great Swamp Refuge is now an annual event. As a result of these annual hunts, the deer herd is far healthier, and overbrowsing is now minimized. However, the herd continues to increase as the land is being developed outside the refuge's borders. A sound management program, including the use of annual controlled deer hunts is essential to the maintenance of the Great Swamp ecosystem.

In the wet areas there are a number of small islands or knolls which provide the deer with a place to give birth and a protected area in which to take refuge from the dogs which roam the wooded lots at night.



Deer, in their small way, help supply some of the minerals needed by other animals in the refuge.

The deer's health, body weight, size, and antler growth are affected by the quantity and quality of available food.

Stuff it! Amateur Taxidermy– Try it!

BY RICHARD E. McKEEBY

Many sportsmen would like to have their small-game trophies mounted, but change their minds when they find out how much it costs or how long the wait may be when they check in at a professional taxidermist. But don't despair—good results can be obtained by the "stuff-it-yourself" technique, using simple household tools and materials, which I will explain here. Your very first attempt should give you a nice specimen to display proudly.

The technique is one of the oldest and simplest taxidermy methods ever used—yet a reliable and long-lasting one—the "Borax rubbing technique." It can be used for all small and medium-sized gamebirds, such as quail, grouse, pheasant, woodcock, and ducks, and also on small mammals such as rabbit, squirrel, raccoon, and woodchuck.

The photo accompanying this article shows one of the hundreds of specimens I have prepared for use in my Zoology classes at Union College and which have also been exhibited in N.J. Sportsmen's shows, as well as in college and high school showcases.

This article will describe how to mount a bird in the flying position. Birds are easier to do than mammals—a good reason for choosing a bird as your first try at taxidermy.

From specimens shot in the field, choose only those in good condition for mounting; any blood should be cleaned off at home with a rag and *cold water.* Stuff cotton in the mouth and nostrils then put the whole specimen in a twist-tied plastic bag and freeze it. Keep it frozen until the day you attempt to mount it.

The night before mounting, remove the specimen from the freezer, take it out of the plastic bag, and lay it in open air on several layers of newspaper to thaw. (Newspapers and paper towels near heads of birds help absorb water or dripping blood during the thawing process.)

Give yourself a large workspace covered with several layers of newspaper. Have on hand the following materials: a *sharp* penknife; #10, 12, or 14 copper wire (four feet will do the whole job); a small box of regular laundry borax; side-cutter and needlenose pliers; some small wire staples or a staple gun; strong household thread and a medium- to large-sized needle; one screw eye; a three-inch piece of 1″ x 2″ wood; glass eyes (or beads or buttons that can be painted to use for eyes); a hand or electric drill; and household cotton or cotton stuffing from an old couch or chair cushion.

Lay your bird out on the newspaper with its wings outspread, belly facing upward, head turned to one side.

First remove the eyes but cutting around their outer edges with a thin knife blad or a sharp probe. Once cut loose, the whole eyecup will lift out with a knife or can be pulled out with needlenose pliers. Do this carefully and try not to break the eyeball, which would cause it to lose its jellylike vitreous humor. If this happens, clean the bird's head with paper towels and cold water. Once the eyeballs are removed, sprinkle some borax powder into the eyesockets and stuff a small rounded ball of cotton into each socket. Artificial eyes will later be pressed into the sockets and glued in place on the cotton balls.

Remove the tongue by grasping it firmly with pliers and pulling forward. Sprinkle borax powder into the throat region and insert a cotton ball to keep any blood from leaking out of the mouth while further work continues. Keep small cotton plugs in the nostrils to prevent blood leakage also.

Now begin the skinning procedure: with a penknife in one hand, spread the chest and belly feathers apart down the middle of the bird and make a cut just through the skin from the chest to vent (anus) (Fig. 1).

Lift the skin on one side and cut sideways with the knife to loosen the skin from the underlying muscle. Once you can get your fingers between the skin and muscle, most of the skinning can be done without using a knife since the skin of most birds is quite loosely attached in most places.

Once most of the body skin is loosened, push up on a leg (like unfolding a sock) so that the large thigh muscles push through into the skin cavity and "unskin" down to knee area. Use sidecutter pliers to cut the knee bone. Do the same for the other leg and for the wings at the elbow joints (Fig. 2). Some strong tendons at the wing joints will have to be cut with the penknife to make your work easier here.

After cutting through the muscle at the tail-vent region the whole body can be lifted upward with only the neck still being attached. Sprinkle borax on both the skin of the bird and its body, to absorb blood and prevent soiling of the feathers and their sticking to the body.

Now let the bird skin and body lay until you make a neck and body frame support out of wire. Cut a piece of plastic-coated #10 or 12 copper electrical wire about 16″ long. Strip 2″ of plastic off one end and make a 1″ tight backward bend on itself. This part will later be inserted into the bird's skull to hold it in place (See Fig. 3). Fold a 6″ pad of cotton around the body-neck wire starting just below the stripped end. Wrap thread or string around the cotton to hold it in a

SKINNING AND BODY FRAME CONSTRUCTION

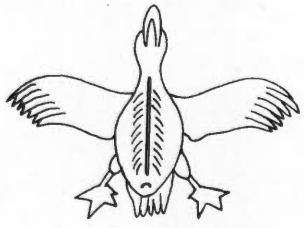


Fig. 1 First Incision

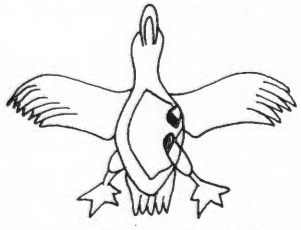


Fig. 2 Knee and Wing Cuts

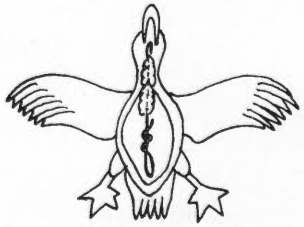


Fig. 3 Neck-Body Frame

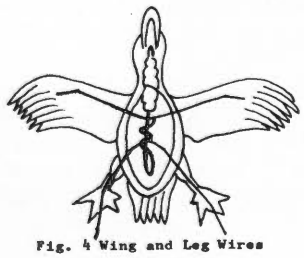


Fig. 4 Wing and Leg Wires

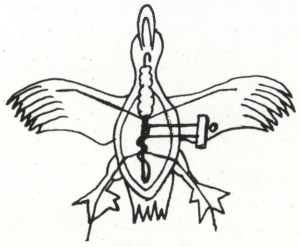


Fig. 5 Wall Support

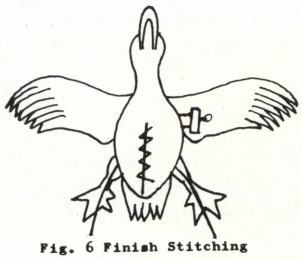


Fig. 6 Finish Stitching

Photo provided by author

A close up of the teal on its temporary grooming and shaping board in the workshop vise.

cylindrical shape for the artificial neck.

Returning to the partially skinned bird, carefully with fingers and thumb separate the skin of the neck up to the base of the skull by folding it backward as you go. Cut the neck off at the base of the skull with the knife or sidecutters. Try to remove the brain tissue through the hole in the base of the skull, but if you can't it will dry out in a couple of days anyway. Discard the bird body, which is now completely free, and sprinkle dry borax powder in the unfolded neck skin region.

If the bird you are preparing is a duck it may have excess yellowish fat on the skin. Remove this carefully by scraping with a spoon or cutting sidewards with scissors. Remove all you can without damaging or cutting through the skin. If enough fat is not removed, oil may later leak through onto belly feathers. Give the whole skin a good final borax powder rub and shake off excess.

Now unfold the neck up to the base of the skull. Insert the stripped portion of copper wire firmly into the skull. Fold the neck skin down over the cylindrical neck portion of the body wire.

With the bird wings spread outward and the body skin lying opened but natural, bend the lower end of the body wire upward at the tail region and the wrap the rest of the wire around itself several times inside the body skin region to provide a body frame (Fig. 3).

For wing supports, cut two pieces of #12 or 14 gauge uncoated wire (copper or other), each about 10″ long. Thread one piece inside one wing bone from elbow to handwrist as far as it will go (Fig. 4). Now wrap the free end around the main body frame with the wing in the outstretched position. Do the same for the other wing.

Next make the leg wires. Use a 10″ length of #12 or 14 gauge copper wire and insert one behind the lower leg bone and skin toward the foot (Fig. 4). Wrap the free end around the main body wire. Do the same for the other leg. Stuff a little cotton wadding into the thigh region to fill out the skin and form an artificial thigh muscle.

Run a short piece of wire (about 6″ long) from the main body wire out the vent to serve as a tail support. This can later be bent in any direction to produce the desired tail position.

Wrap two 6″ wires around the main body support at its midpoint and poke 4″ of each wire out through the skin under one wing (Fig. 5). These will enter two holes drilled through the 1″ x 2″ woodblock wall support (to which the screw eye has been attached). They support the whole specimen from the main body wire to the wood block. Bend about 3/4″ of each wire over the back of the wood block and staple them in place.

Now place larger pads of cotton beneath the main body wire and the leg and wing support wires. Keep adding cotton pads to the chest cavity, the sides of the belly region and over the front of the belly support wire. Squeeze and mold these with your hands to give a natural body shape to the specimen. When you are satisfied that the body isn't "too fat" or "too lean," fold the skin together over the cotton body mold, and starting at the chest, sew it up with strong thread and a medium-sized needle (Fig. 6). Keep the feathers separated as much as possible while sewing, but let them fall in place as you finish stitching a region.

Take a scrap piece of wood about two feet long, drive a nail near its upper end and clamp it in a vise.

Hang the specimen on the nail via the screw eye attached to the support. Start shaping the bird by putting in natural-looking neck curves, wing positions, and backward-swept legs. The copper wires are very flexible and the cotton wadding can still be shaped.

Carefully groom the feathers, glue in the artificial eyes, and line them up evenly from side to side. Paint the beak and legs if they have faded from their brilliant natural colors (this happens with mallards and wood ducks).

Use field guides or nature magazine photos to help you with poses and in restoring natural colors, if necessary.

Masking tape may be used to keep wing feathers and tail feathers spread until the bird is completely dried. Use tape on the back surfaces of wing feathers and on the underside of the tail. It can later be removed.

Let your specimen dry for three days to a week before you hang it in your den, bedroom or recreation room. A very slight odor may be noticeable during drying, but it is nothing overwhelming and completely disappears within a few days.

Borax is a mild poison and should be kept out of reach of children. It will not harm your hands in small amounts such as used here, but wash up well when finished.

Be sure to use only legally killed game animals for your specimens. If you don't hunt yourself, you may be able to obtain specimens from hunters by asking around.

If you wish to buy special glass eyes, write to either of the following suppliers for a catalog:

A.V. Burkley Co., Box 3507, Omaha, Nebraska 68103

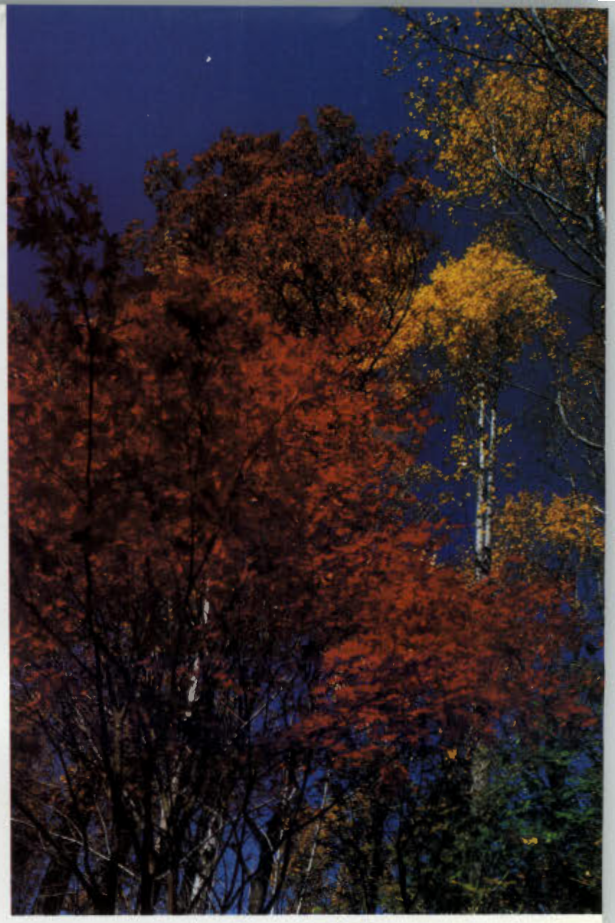
Van Dyke's, Woonsocket, South Dakota, 57385

A few other helpful hints:

1. Keep the specimen's nostrils and throat region well plugged with cotton to prevent blood leakage during thawing and during the skinning process.
2. Always use cold water to remove bloodstains.
3. Once the specimen is thawed, it should be completely skinned out and borax rubbed. It can then be put back into a freezer or refrigerator until another more convenient time for completion of mounting.
4. Freezer storage until day of mounting should be with specimen in a twist-tied plastic bag to prevent dehydration and "freezer burn." Specimens can be kept frozen for many years before thawing and mounting.
5. Sandpapered red felt "fuzz" glued on a pheasant's cheek provides realistic looking "cheek feathers."
6. Amateur mail-order taxidermy courses are also quite helpful and inexpensive. One of the best is the Northwestern School of Taxidermy, Box 3507, Omaha, Nebraska 68103.
7. If you wish to eat the meat of a bird you want to mount, use corn meal instead of borax during skinning the same day the specimen is killed. Once the body is removed, disembowel it and wash the meat. *Do not* use any borax on meat to be eaten.

Well, folks, you are on your own now. Give it a try and good luck! □

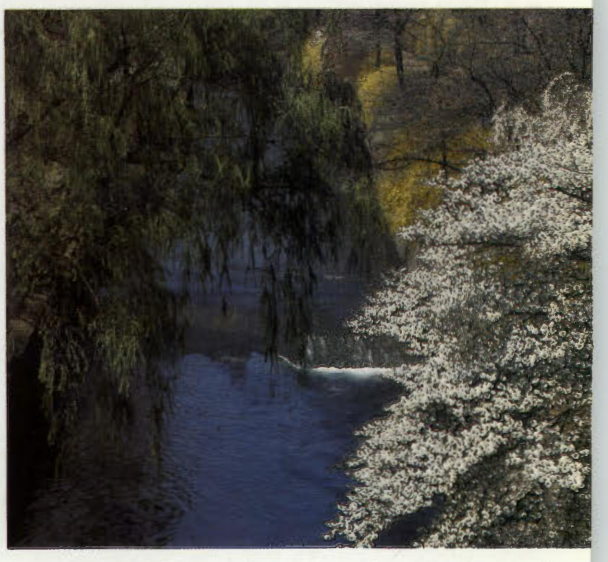
Barnegat Inlet from the Beach at Barnegat Lighthouse State Park—By Jeanne Quinn



Colors—By Patricia Kingsland Daly

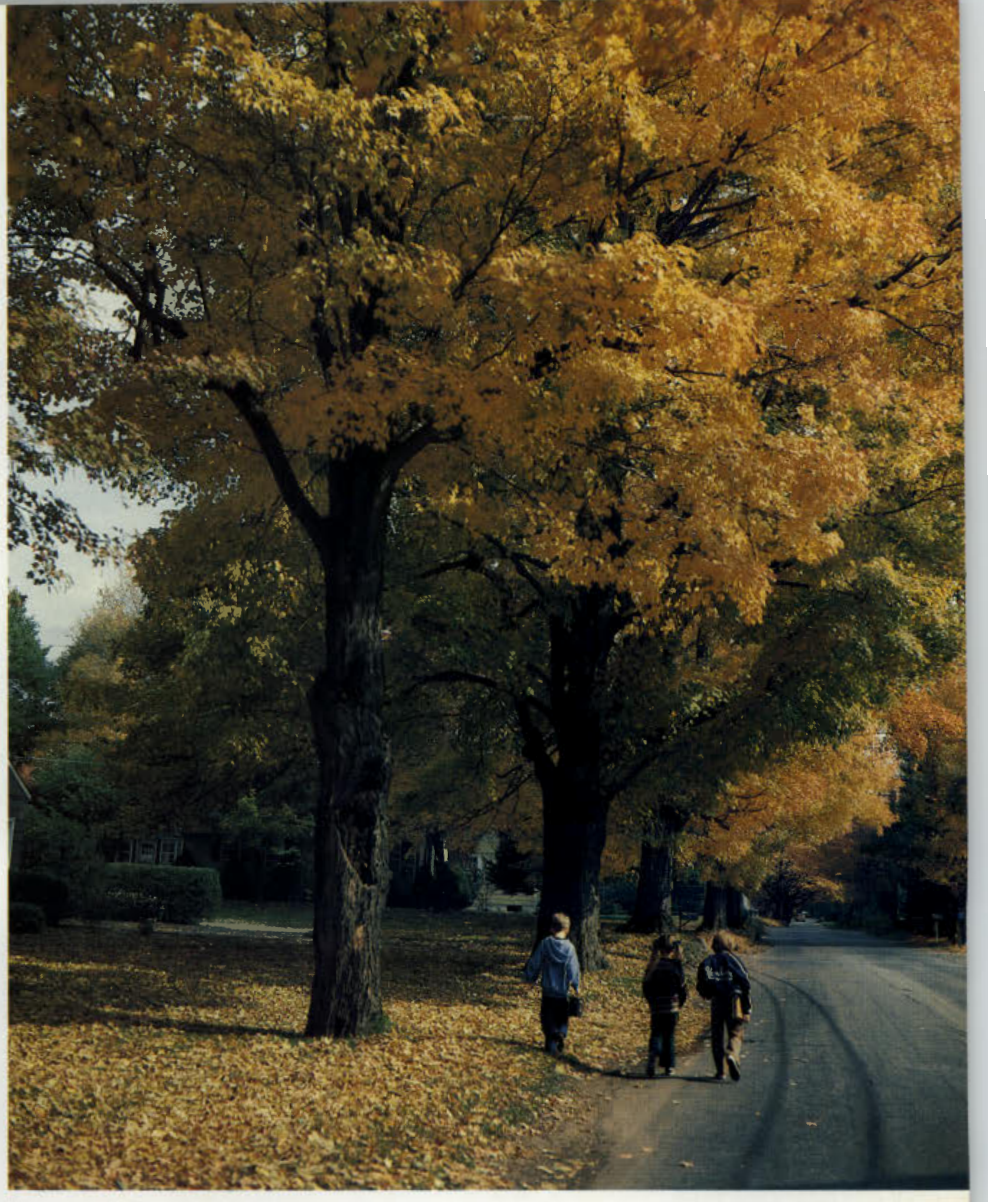
NEW JERSEY A STATE FOR ALL SEASONS

"Muddy Foot Ginger" with 1977 Season Bag Limit—By Lance L. Casper



Early Spring in Bound Brook Park, Newark—By Carol A. Zbuska

"Old Barney" from the Dunes on Long Beach Island —By Joseph DeCaro



Homeward Bound—By David A. Bast

Long-earred Owl—By Tom J. Koellhoffer

A Snow-covered Field Near Allamuchy—By Robert McDowell

Gerri Butcher with her 9-point buck—bagged in Hunterdon County —one of many Gerri has taken in 22 years of hunting.

Report No. 7
will be available in December.

New Jersey's White-Tailed Deer

The seventh in a series of annual reports on New Jersey's white-tailed deer will be available during December at deer checking stations and from DEP's Division of Fish, Game, and Wildlife. The report highlights deer research and management activities of the Division and includes information for anyone interested in the deer resource.

As in the past, sections on last year's *deer harvest,* the *trophy deer program, deer condition* and *non-hunting deer mortalities* will again be covered. Additional topics to be contained in this year's report include:

- Results of the 1980 muzzle loader survey.
- Deer hunting at Great Swamp Wildlife Refuge.
- Description and brief life history of the white-tail
- Other activities of the deer research project.

Copies of the report may be obtained free of charge by writing to the Division of Fish, Game and Wildlife, P.O. Box 1809, Trenton, N.J. 08625.

T. J. HORVATH

CROSS-COUNTRY SKIING

Continued from page 3

ing for cross-country skiing is that you want to keep your body temperature comfortable. To insure this, include a 100% wool item in one of the five layers. Even when wet, wool is warm. And next to the skin, wet wool will dry quickly and keep you warm.

Mittens and hats are a must, also. If you can't get 100% wool, try a combination of nylon and wool, for warmth and durability. For the baby in the pack, use mittens with a cord that runs through the snow suit. Commonly known as "idiot mittens," these save Mom and Dad countless pennies in mitten money, plus insure baby's comfort. An ideal hat for children is a balaclava, a hat that pulls down over the face. Kids will love looking like Spiderman, but more practically they'll be protected from frostbite and sunburn. As much as fifty percent of your body heat is lost through your head, so by all means, carry an extra hat or two in your pack just in case one gets lost.

Dressing your child for cross-country skiing on the bottom half may be a little more difficult than layering on the top. As hard as this may sound, try to dissuade your kids from skiing in jeans. When wet, jeans are not only wet, they're cold, especially in January. And they shrink. Jeans may be comfortable and warm to start out in, but they soon turn into icy pants that won't bend. And since the whole idea of skiing is to bend the knees (just like walking), avoid jeans. Any warm, loose-fitting-at-the-knee pants will do. Wear long underwear beneath if the outer layer is thin.

For everyone's feet, baby to grandpa, wear a thin layer of socks under one thick one. Cotton or silk under wool is perfect. But be sure you put on no more than two pairs since any more than this will stop circulation and may cause your feet to perspire. For children who are not yet wearing the ski boot, rubber boots with lightweight shoes under them are best. Don't weigh your child down with huge hiking boots inside rubber boots. But make sure the rubber boots fit properly since the boot is fitted into the binding—he'll be frustrated if his foot pulls free of the boot while he tries to ski.

Since the littlest ones in the pack won't be working up a sweat, swaddle them in warm snow suits, rubber boots or wool booties, and maybe a blanket over this depending on the weather. Infants in cuddler packs that go under Mom's windbreaker will need less protection than those in packs worn on the back since they'll be absorbing Mom's heat.

One extra word about the baby: don't forget the extra hat, and tie his favorite toy to the pack frame. *He* may be thrilled about lobbing his ni-doggie through the sparkling winter air, but you'll soon tire of plucking it out of the snow or down from a hemlock tree. You'll also want to take diapers with you, but change the baby in the car where it's warm.

Midway into your family outing—one of the times you're all cooling down and adjusting your layers—you'll want to stop for lunch. Look at your watch when you stop to make sure you allow plenty of time for the return trip since you'll probably be skiing back at a slower pace. For your lunch break, pick a site in the sun out of the wind, far enough off the trail where you can spread out without getting skied over by other enthusiasts. If the snow is deep, tramp down the area with your skis. Once you've taken off your skis, prop them up against a tree together. This is a good time for the older children and Mom and Dad to re-wax or make adjustments. Try to impress upon the younger ones the importance of

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NORTHWEST NEW JERSEY SKI TOURS 1980-1981

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izes in water resources. This five mile tour is suitable for novices and intermediates. Meet at the ski touring area across from the Stokes Forest Office on Route 206 at 9:30 AM.

For details, contact Steve Johnson;
(609) 292-0424 (office)

Jan. 31, 1981
Saturday

MORRIS CANAL—Ledgewood, N.J. Discover one of the last barge planes of the historic Morris Canal. Ski along a stretch of the original canal bed. This two mile tour is suitable for novice and intermediate skiers. Meet at 9:00 AM outside the Ramsey Outdoor Store on Route 46 in Ledgewood.

For details, contact Les and Debbie Guile;
398-9424 after 6:00 PM.

Feb. 8, 1981
Sunday

HEMLOCK POND—Delaware Water Gap National Recreation Area, N.J. A park ranger will lead the group along abandoned roads to this remote wilderness lake. This five mile tour is recommended for intermediate and advanced skiers. Meet at the District Ranger Office in the Park at 9:30 AM.

For details, contact Jim Merritt;
(201) 948-4646 (office)
(201) 948-6507 (home)

Feb. 15, 1981
Sunday

TWO WATERFALLS TOUR—Delaware Water Gap National Recreation Area, N.J. Ski (hike if there is no snow) to the base of two beautiful waterfalls in the Park. This five mile tour is suitable for novice skiers and above. Meet at the Wallpack Inn in the Park at 10:00 AM.

For details contact Steve Spafford;
(201) 948-3895 (home)

Feb. 21, 1981
Saturday

KUSER NATURAL AREA—High Point State Park, N.J. This five mile interpretative tour, suitable for novice skiers, takes the group along the edge of a unique cedar forest. Meet at 10:00 AM, at the High Point State Park Office on Route 23.

For details, contact: Regina Kelly;
(201) 948-4646 (work)
(201) 948-5727 (home)

Feb. 28, 1981
Saturday

WILDLIFE IN WINTER—Stokes State Forest, Branchville, N.J. This is a repeat of the wildlife tour held on Jan. 4, 1981.

For details, contact: Bob Byrne;
(201) 852-2565 (office)

CROSS-COUNTRY SKIING

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keeping snow out of their boots once skis have been removed—cold, wet feet are hard to warm up. But just in case somebody's little feet do get cold and wet, tuck in an extra pair of socks along with the extra hat and mittens in the pack.

After skis and packs are removed, and sweaters or windbreakers put on, time for food. Since cross-country skiing burns up more calories than most recreational activities, you and your family should begin eating for it at breakfast. Eat fatty food like bacon and eggs in the morning rather than a carbohydrate diet, like cereal. Fatty foods will release energy slowly and will sustain you while skiing. However, during your ski break eat carbohydrates for quick energy. Some skiing favorites are granola, chocolate bars, fresh or dried fruit, and gorp (a mixture of nuts, dried fruits, and chocolate bits). Take a thermos of water or hot soup to keep you and the kids from getting dehydrated. Wrap the thermos in something wool or a space blanket to keep it from freezing.

Enjoying your ten-year-old's secret recipe for gorp made especially for the family tour is part of the fun of cross-country skiing together. However, along with his gorp, extra mittens, hat and socks, you should pack a small first-aid kit. Even though fewer accidents occur from cross-country skiing than most other winter sports, it is best to be safe. In your first-aid kit include: tape, roller gauze, first aid cream, and moleskin (for blisters).

Other items you should take with you if you plan a lengthy tour are a pocket knife, twine, an extra ski tip, matches, cup, and whistle (in case you get off track). And, of course, don't forget the camera. You'll find that a whole different winter world will open up for you and your family when you're cross-country skiing together, and you'll want to capture the moments on film. But even if you don't take your camera, you won't forget what it's like seeing your kids through the bright light of winter, hearing only the swish-swish of their skis in the silent snow around them. Mom and the baby will be there, too—the whole family—enjoying a sport you can do together. □

PRECAUTIONS

Fewer accidents occur in cross-country skiing than most winter sports, but in cold, wet wind hypothermia and frostbite can occur if you're not careful.

Hypothermia is the lowering of the body core temperature. The symptoms are loss of coordination, difficulty in speaking (slurred words), inability to think clearly. Stay warm and dry and drink plenty of liquids. If any of the symptoms occur, give victim something warm to drink and remove wet clothing. If symptoms persist, skin-to-skin contact is necessary.

Frostbite occurs when the tissue of body extremities, such as the nose, ears, or toes freezes. The skin turns cold, grayish-white, and there is loss of sensation. To treat, rewarm by cupping a hand over the area (do not rub). If the tissue below the skin is hard, medical attention is necessary.

WILD TURKEY ART CONTEST WINNER

Wildlife artist Walter Wolfe of Concord, California, has won the National Wild Turkey Federation's 1980 Wild Turkey Stamp Contest, held annually in Augusta, Georgia.

Wolfe's entry, titled "Explosion in Corn," was judged best in a field of 126 original paintings from all over the nation. His design depicts two turkey gobblers taking flight from a cornfield, and has been reproduced on the Federation's fifth Wild Turkey Stamp, purchased voluntarily by conservationists, philatelists, and private collectors. Revenues from sale of the stamps are used for education, restoration, and research.

In addition to the limited stamp issue (only 50,000 printed), a signed and numbered limited edition of art prints (6-1/2" x 9") has been produced and is available through most reputable wildlife art dealers.

The 1980 Wild Turkey Stamp is now available for a tax-deductible donation of $5 per stamp and $50 per sheet of 10, while supplies last. A free stamp brochure is available by writing the National Wild Turkey Federation, Edgefield, S.C. 29824. □

Front Cover

Wild Mute Swans in Sands Point Harbor, Forked River—Photographed by David Campione

Inside Back Cover

Black Bear Looking for a Meal—Illustration by Carol Decker (See article on page 16)

Back Cover

Sunset on Lake at Davenport Branch (between Whiting and Bamber Lake in the Pinelands)—Photographed by C. Russell Horner


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