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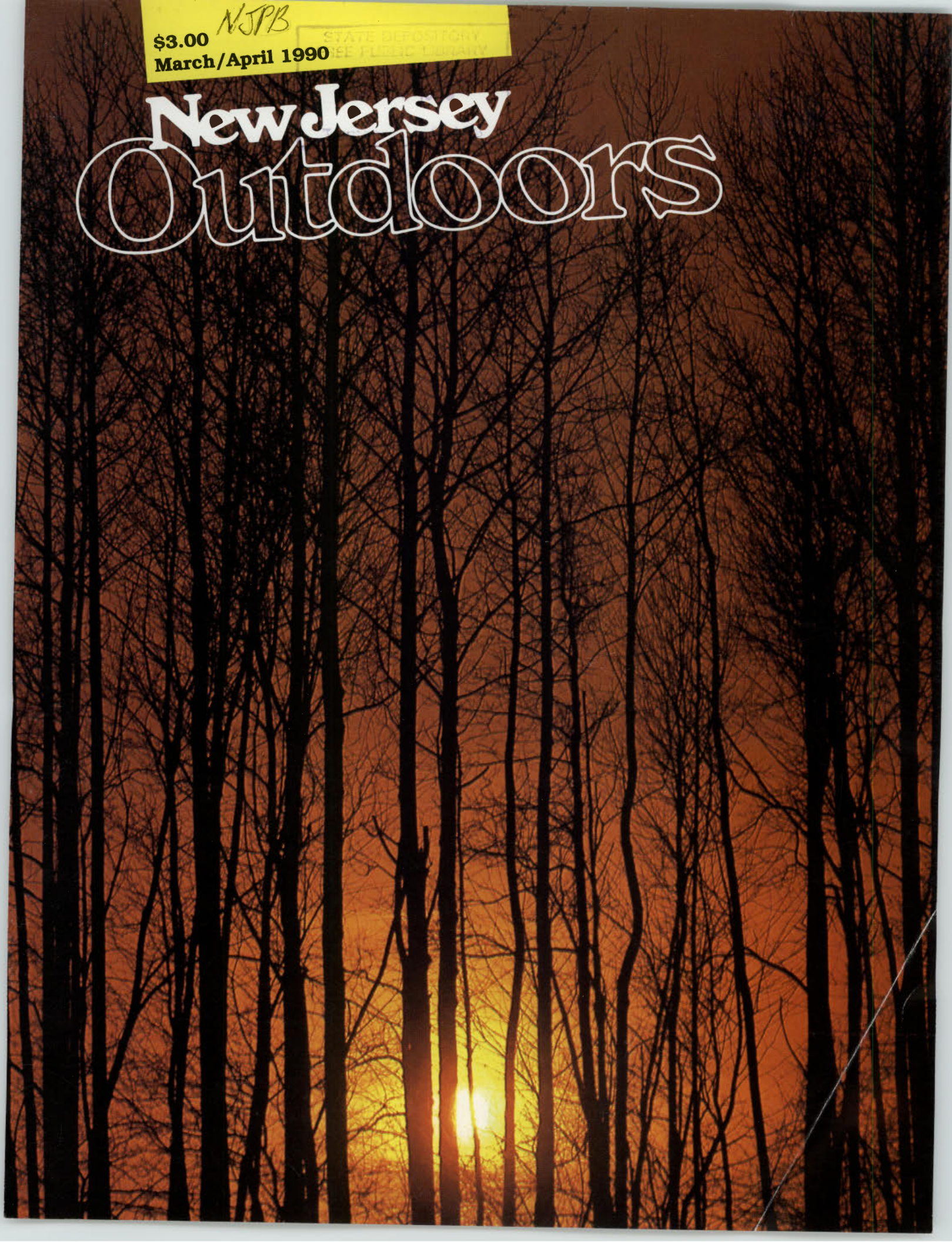
March/April 1990

New Jersey Outdoors




SMOKEY
Wolfe
ONLY YOU

Vol. 17, No. 2 • March/April 1990

New Jersey Outdoors

Features . . .

Departments . . .

Covers . . .

Front: The winter sun silhouettes a Burlington County forest. Photograph by Tony Bellisario.

Inside Front: Smokey's 1989 (and 45th birthday) forest fire prevention message. Forest Service, U.S. Department of Agriculture.

Inside Back: *Eastern Wild Turkey.* Original acrylic painting by Carol Decker.

Back: "Earth Day Every Day — You Can Make a Difference!" National Wildlife Federation 1990 Wildlife Week theme poster.

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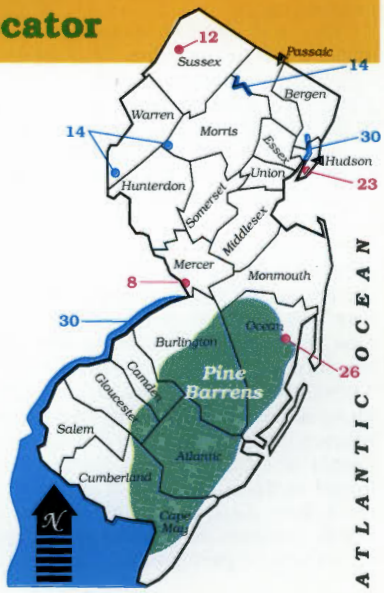
Story Locator



Editorial

It's a story you helped write. You've read chapters on the successful restoration of the bald eagle, osprey and peregrine falcon, on vitally needed wildlife research and management being done for the first time, and on investigative results showing the need for immediate attention to save certain species from extirpation.

This year a new chapter is being written on the bald eagle. Since 1968 New Jersey has had only one nesting pair of eagles. In February, a second pair produced eggs in a Cumberland County nest. Shortly thereafter, a third pair was observed with eggs in a nest on state land. For the first time in 23 years, New Jersey is home to three nesting pairs!

In cooperation with the landowner, Endangered and Nongame Species Program (ENSP) biologists are monitoring the second nest with great optimism that the eggs will hatch before the income tax filing date. A fourth pair is suspiciously active and may also be nesting. State biologists plan no egg swaps this year, and on Earth Day we may celebrate the first unaided hatching of bald eagles in New Jersey since 1976.

This year's wintering population of bald eagles, which includes birds from New Jersey and other areas, reached 70, more than double the 30 eagles observed in 1988. This increase points out the recovery of our national symbol in all areas and for the state's resident population of eagles. The ENSP will continue to release orphaned eagles at the Tuckahoe Wildlife Management Area to improve the chances of eagle nesting along the Atlantic Coast and educate people about the effects of disturbance and habitat destruction on New Jersey's six territorial eagle pairs. The program is also increasing nest protection efforts to prevent disturbance at any new nests and maintain conditions at existing nests.

The next chapter, however, is likely to strike a discordant note. Studies on osprey eggs from Delaware Bayshore nests show significant eggshell thinning. They also produce fewer young than their Atlantic Coast counterparts, and peregrines nesting on the Delaware coastline have failed to fledge any young in the last three years.

Osprey, peregrine and bald eagle populations crashed in the 60s and 70s due to the effects of the pesticide DDT on eggshell thickness. Although these birds were successfully reintroduced into the state, they now appear to be showing the effects of environmental contaminants such as DDE, a breakdown product of DDT. Peregrine eggs show severe shell-thining and higher contaminant levels than they did five years ago. Levels of DDE up to 14 parts per million found in these eggs could cause reproductive failure. As funds become available, laboratory analyses for environmental contaminants will be performed on additional eggs and on the raptor's prey species.

Entitled "A Rat Worth Protecting," the third new chapter reveals that the eastern woodrat has disappeared from four of its five New Jersey locations. The only known active site for this hairy-tailed rat is in the talus slopes of the Palisades, where their numbers may also be declining. New York state once had 32 woodrat sites. Almost overnight it has none. Pennsylvania has witnessed similar declines and population disappearances. Without additional studies and regular monitoring (four years went by before the ENSP biologist was able to conduct follow-up field studies) of the woodrat's status, an entire species may be lost in these three states in less than 20 years. Around the world, an estimated 100 species become extinct every day.

Your contributions to the Wildlife Tax Check-Off Conservation Fund have supported the work of nine biologists and four support staff on a small percentage of the nearly 400 nongame species that call New Jersey home. Your gifts of life account for nearly 95 percent of the program's budget. The annual giving averages $450,000 but is far short of the $3 million needed to conserve, protect and manage endangered and nongame wildlife. And when inflation is factored in, the purchasing powers of those contributions is declining.

Additional donations of time and materials from individual volunteers and corporate sponsors have also enabled the research and restoration to be done. Hundreds of volunteer hours at hacking towers were instrumental in the bald eagle and osprey recovery. But osprey restoration planned for North Jersey this year can not get underway unless volunteers come forward.

Thanks to your support of the program, we can again watch these magnificent birds soar over the Garden State. You can be proud of what these donations have achieved. Less than four percent of all New Jersey taxpayers due refunds contribute to the tax check-off. If you failed to check-off line 39B on this year's state income tax form, consider a donation now. Ask 10 friends to do likewise. You can make a contribution at any time. If being a volunteer would enrich your life, contact the Friends of Nongame or the Wildlife Conservation Corps.

Newcomers to endangered species protection have a priceless opportunity to join us in saving wildlife in New Jersey. Rather than have children look at a dust-covered stuffed owl or a pickled turtle in a museum jar, let a groundswell of citizen conservationists preserve the habitat we share with wildlife. Your participation in the Decade of the Environment will preserve an outdoors for *all* species to "eNJOy!"

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

Let's protect our earth

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

Only You!

By Joe Hughes

At the beginning of World War II, the United States was facing a formidable enemy. An average of 210,000 forest fires were destroying 30 million acres annually. This represented a severe drain on our natural resources and, consequently, the war effort.

Worried public managers approached the newly organized Wartime Advertising Council and asked it to sponsor a nationwide forest fire campaign. The rest is history. Out of this campaign came the Smokey Bear Program, one of the most successful and popular public advertising campaigns ever run. Since 1942, the program has reduced the number of fires by 50 percent and acreage burned by 80 percent. The Smokey Bear Program is credited with saving America more than $10 billion in losses.

However, despite the program's success, forest fires continue to cause significant losses and represent a serious threat to the country's and state's natural areas and resources. A total of 112,000 forest fires still burn more than five million acres in this country every year. In 1988, the area burned was 5.7 million acres, an area equivalent in size to

This wartime slogan appeared on a 1943 poster. The following year, Bambi and Smokey became the nation's forest-fire prevention symbols.

Education and parental supervision can reduce the number of fires started by children.

New Jersey and Rhode Island combined. And speaking of New Jersey, the state continues to experience an average of 1,500 wildfires and 6,800 acres burned each year.

In 1947, the Foote, Cone and Belding advertising agency came up with the "Remember — Only you can PREVENT FOREST FIRES!" slogan. It became the cornerstone of the Smokey Bear Program. True today as it was then, most fires are preventable. In fact, nine out of 10 wildfires can be prevented. This statistic illustrates the tragic irony of the situation.

Among the major industrialized countries, the United States has one of the worst fire records. That distinction includes not only forest fires but structural fires, damage to improved property, and fire deaths. When one considers the country's tremendous wealth, education and advanced technology, America's fire record is appalling.

The reasons for this dismal record are many and varied but can be reduced to an "it can't happen to me" attitude and an ignorance of or failure to practice fire-safety procedures and use simple common sense. People smoke in bed, run electric cords under rugs, plug several extension cords into a single outlet, and place kerosene and electric heaters right next to the curtains. And then these individuals wonder why or how a fire could ever happen to them.

Additionally, few of us live in rural areas. The majority of today's society live in the city or suburbia. However, on days off or when they go on vacation, these city dwellers and suburbanites often go to a county, state or national park. In addition to all the camping, fishing and hunting gear they tote, they also bring along their poor fire-safety habits.

Unfamiliarity with the outdoor environment and the factors that affect it can lead to disaster. The individual who drops a match, throws a lit cigarette, uses a motorcycle or chainsaw without a spark arrester, or leaves a campfire unattended is amazed and surprised that a fire could result.

These same visitors to our forests are equally shocked when informed that they are criminally liable for their actions and can be assessed fines, the cost of extinguishment, personally sued or imprisoned. This reality after the fact is an especially hard lesson. If America is every going to bring the forest fire problem under control, it must overcome the public's general apathy toward fire safety.

Improperly maintained railroad equipment or careless smoking habits could have caused this fire.

Adding to this problem is a growing element of society that sets the woods on fire for fun, hate, revenge and a variety of other unknown reasons. Arson is on the rise and now accounts for nearly half of all wildfires in New Jersey. "Man-made" forest fires represent a major problem, but a problem that can be solved because nine out of 10 fires are preventable!

Basically, forest fire prevention means keeping all unwanted "man-made" wildfires from starting. Let's start with a simple equation and analyze it.

RISK + HAZARD = WILDFIRE

The definition of risk is the chance of a fire starting as determined by the presence, absence or activity of a causative agent (people or lightning). More simply put, a risk is something that starts fires.

A hazard is a set of conditions suitable for starting a fire. This includes the availability of a fuel, such as grass, brush and forest fuels, with the probability of fire enhanced by weather conditions, such as a prolonged dry spell. The fuels may also be man-made, including a house in the woods, dumped tires or sawdust piles. Prevention programs are designed to reduce the risk or eliminate the hazard. If you do away with one or the other, you will not have a fire.

Hazard reduction is generally concerned with vegetative manipulation, fuel modification and fuel reduction. In New Jersey, this is accomplished through fire management programs and the practice of prescribed burning. Fires are less likely to start and are easier to control in areas where there has been a controlled burn that eliminates the undergrowth as a forest fuel.

Risk reduction entails reducing or eliminating human-caused forest fires. In order to design an effective risk reduction program, you must analyze the various causes of fire. This begins with the investigation of each fire to determine its cause and, if possible, the responsible party.

There were nine general causes for New Jersey forest fires in 1989. Fires that are intentionally set for revenge, gratification, enjoyment, personal gain or an urge to destroy have increased dramatically over the last 10 to 15 years. In many areas of the country it is a major cause of fires. In New Jersey, arson is the number one cause, accounting for 50 percent of all fires. In 1989 there were 508 arson fires in the state, set

Assistant State Fire Warden **Joe Hughes** first appeared in *NJO* 10 years ago. Joe's duties include extinguishment and prevention training for the Bureau of Forest Fire Management staff, along with statewide fire-prevention and education programs.

with anything from a simple match to very complicated incendiary devices.

Fires started by children, usually playing with matches, ranks second. Most of us, especially children, have a natural fascination and curiosity with fire. Although some fires set by children are intentional, most are accidental. Child-caused fires can be overcome with a good education program and parental supervision. Responsible for 184 fires last year, or 18.2 percent of the total, children need to be taught that fire is a tool that has no magical or mystical qualities.

Fires attributed to careless smoking habits, such as throwing matches or cigarettes out car windows or not properly extinguishing them, have been decreasing in recent years due to better investigation but are still the third most frequent cause. Fires once classified as "smoker fires" have been placed in more appropriate categories. However, 92 smoker-caused wildfires still accounted for nine percent of last year's conflagrations.

Miscellaneous fires are those that cannot be grouped into any of the other categories or did not cause enough fires by themselves to justify a separate category. These include building fires that spread to the woods, fires resulting from automobile crashes and fireworks. The miscellaneous category's 89 fires represented 8.8 percent of the 1989 total. Uncategorized fires have been on the increase. As the state becomes more populated and facilities more crowded, more "miscellaneous" fires are started.

Debris burning used to be a major cause of forest fires in New Jersey and continues to be in other states, such as Pennsylvania. New Jersey banned the open burning of leaves and garbage in 1972, resulting in a dramatic drop in debris-burning fires. Although only 55 debris-burning fires occurred in 1989, this 5.4 percent represented an increase over 1988 when it ranked as the sixth most frequent cause.

Improperly built or unattended campfires accounted for 38 fires (3.7 percent), ranking it sixth. Using power equipment in wooded areas accounts for up to three percent of wildfires annually. The use of chain saws, welders, heavy equipment and motor bikes have all set wildfires. With 29 fires (2.9 percent) last year, the seventh most frequent causative agent was equipment use.

Railroads used to be a major cause of forest fires in New Jersey and still are in some states. The old locomotives belching steam, soot and carbon particles caused many forest and range fires. Today, carbon particles from improperly maintained spark arrresters, hot boxes and hot brake shoes are the major culprits. The development of the diesel locomotive has cut down but did not eliminate the problem. Fourteen railroad fires occurred in 1989, representing 1.4 percent of the statewide total.

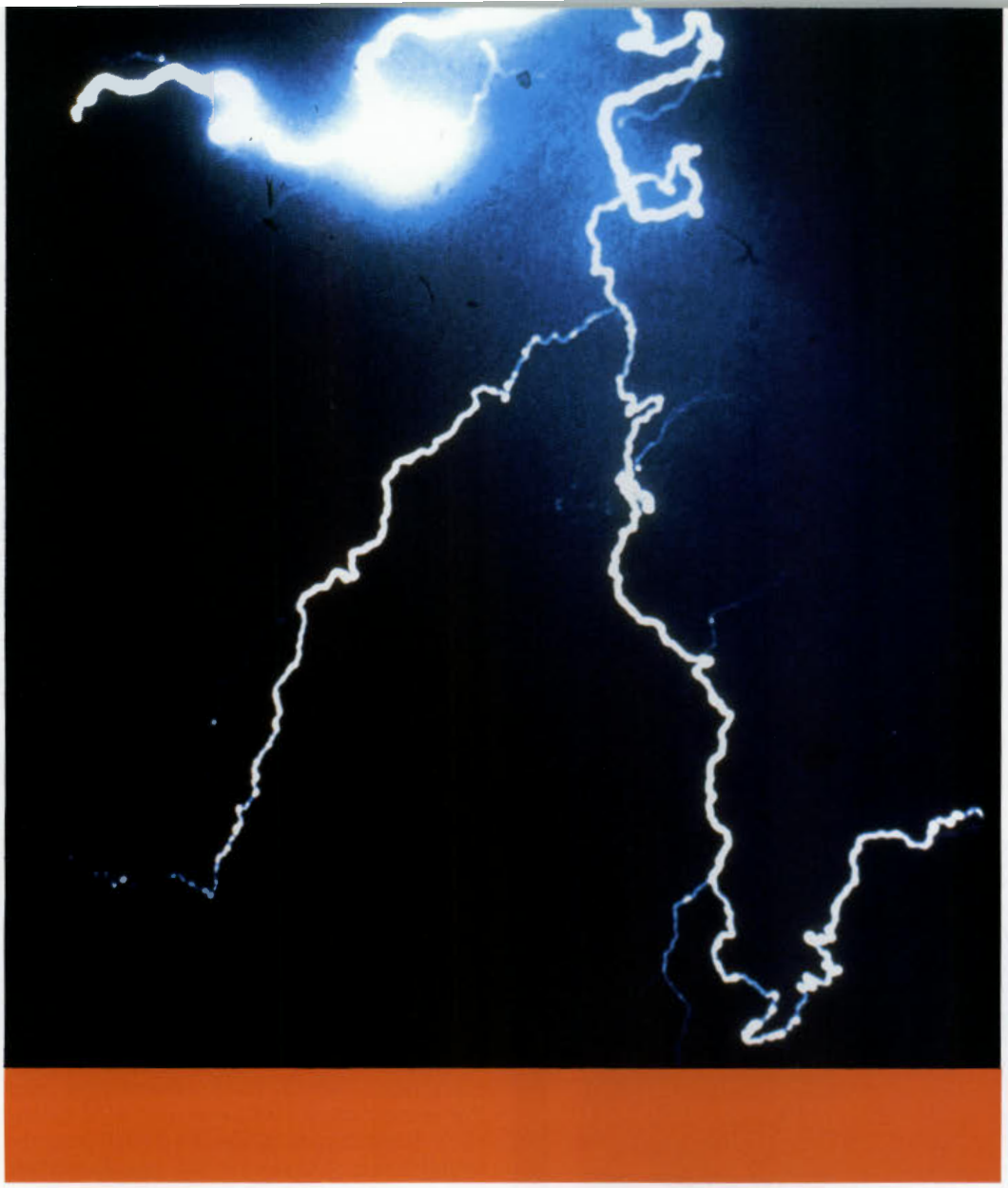
Lightning is the only fire cause that can not be prevented. In the American Southwest, it is a major cause of fires and may account for up to 45 percent of all fires. There are from 7,000 to 10,000 lightning fires annually in this country, and the fires are usually caused by dry lightning storms. In the East, lightning storms are usually accompanied by rain, making lightning fires rare. New Jersey averages less than six lightning fires each year, except during drought years when fire starts are higher. The summer of 1988 was especially dry and 18 lightning fires occurred. In 1989, lightning caused only two fires (0.2 percent), making it the least frequent of the nine categories.

The common thread running through all but one of the causes is people. The culprit has been identified. Nationwide, people are responsible for nine out of 10 forest fires, and last year in New Jersey it was 99.8 percent.

Since people are the cause, they must also be the solution to the problem. The three primary methods of achieving or attempting to "fireproof" the public are education, engineering and enforcement. Education starts with a basic awareness. Making people aware there is a problem is the first step. Educating them about proven fire safety practices can be accomplished in a variety of ways.

Personal contact is probably the best. Catching someone in the process of an unsafe act and showing them the correct method works every time. Effective use of the media is becoming more important. Public service announcements, carried in newspapers and on radio or television, get the message across. The use of celebrities for fire prevention posters has become popular. The New Jersey Forest Fire Service has produced four of these posters, featuring Pat Cooper in 1986, Dom DeLouise in 1988 and Rip Taylor in 1989. Dom DeLouise will also appear on this year's fire prevention poster.

School programs and sportsman or outdoor shows provide an excellent medium for educating the public. In 1988, state Forest Fire Service employees conducted 464 such programs. Through the 434 events in 1989, the fire prevention message reached an estimated 680,000 individuals. Information and educational materials, such as brochures, coloring books, pamphlets and other publications produced by the Bureau of Forest



Wildfires caused by lightning are rare in New Jersey.

Fire Management, are distributed year-round.

The second method of fire proofing the public is engineering. This can be simply designing, changing or modifying an item or an area to reduce or eliminate the chances of a forest fire starting. This can be accomplished by removing fuel from a heat source as in prescribed burning and clearing brush from around campfires and campsites. Fuel breaks or fire breaks can be established by building roads, constructing actual fire breaks, mowing or pushing back brush from along roads and prescribed burning.

Removing a heat source from the fuel is accomplished by installing spark arresters on chainsaws, motor bikes and diesel engines. The state also restricts access into wooded areas during high fire danger and does not allow people to have open fires when fire danger or risk of escape is high. You can also place screens on fireplaces and wood stoves to reduce sparks, improve outdoor fireplaces and stoves by constructing them of masonry, moving the fire off the ground, and providing pits for the ashes.

The third method of fireproofing the public is through effective law enforcement. A method of last resort, it nonetheless is necessary when all else fails and consists of assessing for the costs of extinguishment, fines and jail terms. It is the most effective means of deterring arson fires. New Jersey law provides for a fine of up to $5,000 for a non-willful violation and up to $100,000 for a willful one.

Every fire in New Jersey is investigated to determine its cause. If the responsible party can be determined, the individual is liable for suppression costs. Annually, the state collects from $3,000 to $10,000 for these, with the number of violations ranging from 80 to 120 per year. For a single fire, the state has collected as much as $29,000.

Prevention does work. The number of fires has been reduced both nationally and in New Jersey. However, there is still much that must be done. Preventing forest fires is an environmental problem where solutions readily exist. An educated populace has to practice what is already known. But knowing and doing are two different things. Our basic attitudes about fire and fire safety practices still need to be changed if the problem is to be solved and the forest fire problem finally brought under control.

It's up to you. Remember, only you . . . !

Photographs by State Forestry Services, Division of Parks and Forestry

A Time for Renewed Commitment

New Jersey Outdoors

By Greg Johnson

Twenty years ago the New Jersey Department of Environmental Protection did not exist. Since July 1, 1945, conservation and the environment had been managed by the state Department of Health (DOH) and the Department of Conservation and Economic Development (DCED).

Within DOH were the Division of Clean Air and Water, the Radiological Health Program, and the Bureau of Shellfish Control. The DCED included the Bureau of Navigation and the divisions of Fish and Game, Forestry, Parks and Recreation, Shell Fisheries, and Water Policy and Supply. As a result of a 1961 bond initiative, the Green Acres Program was added, but no major changes occurred until April 22, 1970. On that day a new movement began, one that would forever change the way we viewed the world or as we began to call it, the environment.

On the first Earth Day, I was a college freshman. On my campus, we buried an automobile engine, the ultimate symbol of obsolescence, inefficiency and pollution. Our environmental consciousness was briefly raised for about 45 minutes, and then we went back to our studies. Nothing had changed. We had simply saved an engine from the scrapyard.

New Jersey, by contrast, achieved a more lasting change. Earth Day 1970 was marked by the formation of the Department of Environmental Protection (DEP). New Jersey thus became the third state to form a governmental organization to deal with all aspects of the

environment. In a state such as ours, this was no small task. Not only did New Jersey possess a varied landscape of mountains, the Piedmont and Coastal plains, and the Pinelands but its traditional role as an industrial powerhouse had also left a legacy of tainted soil, contaminated water and excessive development. The new DEP was designed to manage and preserve the state's natural and historic resources and to mitigate the effects left by years of neglect and abuse.

In the years since, the DEP has risen to the challenge of the increasing demands on New Jersey's environment. Radon has become a household word, while an increasing number of people fight daily battles with fellow commuters. New Jersey is part of an ever-shrinking world, where what one neighbor does could dramatically impact on another neighbor's existence.

Twenty years ago, burying a combustion engine seemed like a bold statement. Today, I have a colorless, odorless, deadly gas invading my home. I'm worried about the diminishing rain forest in Madagascar, habitat for several unique species. I wonder if the water from my tap is safe or has its purity been compromised? As Earth Day 1990 nears, we find ourselves buying bottled water, checking the air pollution index, and wondering if the greenhouse effect will increase global warming to the point where melting glaciers will cause the oceans to rise and inundate our coastal areas.

Positive change is happening in New Jersey, one of the country's most aggressive states in protecting the environment. Renew America is a non-profit organization working toward a sustainable future by promoting a safe and healthy environment. It provides information on environmental concerns to state and federal policy makers and ranks the efforts of all 50 states in its "The State of the States."

In 1987, 1988 and 1989, New Jersey was ranked first for its solid waste and recycling program, hazardous waste management and elimination of indoor pollution. The state also received a second place ranking for its ground and surface water protection programs and third places for air pollution reduction, implementation of mandatory recycling, and in a growth and environment category that covered six policy areas. The environmental categories evaluated changed each year. For the parameters rated in each of those years, New Jersey programs were ranked third best in the nation in 1987, third again in 1988 and sixth in 1989.

There is hope for the future. Recycling has become such an overwhelming success that municipalities are realizing considerable savings on solid waste disposal costs. The marketplace is being retooled to manufacture more products from recycled materials, including some plastics which have been used for fences and benches. Polyethylene reclaimed from discarded milk containers is being made into wood-duck nesting boxes.

Our own thinking must also be retooled. In the fall and spring, leaves can be used to start a backyard compost pile. If your municipality doesn't have a collection program, you can also take them to farms where nature's product can be recycled as a natural fertilizer. Often, what you consider a throw-away item and put out for collection is valued by someone else. Clothes, dishes, books, toys and appliances might be welcomed by

(facing page)
Students from four schools whose environmental clubs were recognized for their outstanding activities participated in last year's Earth Day/Environmental Education Week ceremony.

At the time of the DEP's formation, the state's largest public utility announced converting two generating stations from coal to oil would reduce sulfur dioxide and fly ash emissions by more than 40,000 tons per year.

Hackensack Meadowlands Development Commission

charitable organizations.

Plastic bags touted by some as biodegradable may, in fact, not be. Rather than contribute to the generation of more plastic, bring your own sturdy canvas or nylon bag with convenient handles. Still used in many countries around the world, it will cut down on the number of bags brought home that must be thrown away. If your grocery order is large, insist on paper bags.

Last summer was one of the wettest on record, and the practice of saving water washed away with the topsoil. However, the fact remains that our water supply is finite, fragile and overused. To conserve, install low-flow fixtures and water-saving toilets. Run only fully loaded dishwashers and clothes washers. For other water-conservation tips, see "One of Our Most Precious Resources is Going Down the Drain!", *NJO* J/A 1989.

Get involved. Support environmental organizations as best you can, whether it be time or money. Be an environmental watchdog. If someone is despoiling a wetland or natural area, report it to state and local officials. "Adopt" a stream, woods or a field. Use cotton diapers whenever possible. They can be reused and recycled, while disposables are a serious landfill problem.

Lifestyle changes may be inconvenient at first, but over time they become matter-of-fact habits. You're never too old, or too young, to start. Look for a list of "Do's" and "Don'ts" to be published soon by the DEP.

When the Exxon Valdez split open, it spread its cargo over miles of Alaskan coastline and sent shock waves through the nation. Media coverage brought the specter of dead, oil-covered otters into our living rooms. An outraged public cut their Exxon credit cards in half, and membership in groups such as The Nature Conservancy and the Wilderness Society surged. The overwhelming reaction to a tangible, terrible act garnered more public support than 19 Earth Days combined.

Unfortunately, the new decade was kicked off by a 567,000 gallon heating oil spill in the Arthur Kill between New Jersey and Staten Island. The January 1 spill from a cracked pipeline threatened vital breeding and nesting grounds for at least 1,200 pairs of migratory birds, including egrets, herons and glossy ibises. Close to 400 wading birds were found dead.

Why does Earth Day 1990 take on such significance? It kicks off the last decade of a century, which saw an already shrinking world further threatened. New Jersey is not just a neighbor to Pennsylvania and New York but part of a global community, affected by Japan's 30-mile, deep-sea fishing nets and Brazil's unabated destruction of its rain forest. Conversely, we jeopardize our neighbor's welfare with the emission of ozone-destructive chlorofluorocarbons. All members of the world community are responsible for their own actions and the environmental consequences.

Children tend to mimic adults. If they see a can or bottle tossed on the ground, chances are they will do likewise. However, if environmental education courses are introduced into the schools, saving nature will become second nature.

What will Earth Day 1990 do to save nature? The American Forestry Association plans to plant hundreds of millions of trees to help reverse global warming. These should be planted in spring and again in early fall

when they have the best chance of surviving. This could become an annual event with a goal of a billion trees by the year 2000.

In 1970, huge crowds gathered in cities across the country to promote environmental education and political action. We've seen what large demonstrations have accomplished in Eastern Europe. Let the crowds this Earth Day call for increased environmental legislation. "Teach-ins" that seemed appropriate in the decade leading up to the first Earth Day can be effectively used as part of an environmental curriculum or to help put the environment in the curriculum, from the elementary grades through high school.

The media will play a major role in spreading the Earth Day message. Norman Lear is urging the producers of major television series to include environmental themes in their scripts. Public service ads will echo the message on radio and television and in newspapers and magazines.

Earth Day 1970 was filled with hope and promise as a new Department of Environmental Protection was created in New Jersey. This year's celebration is still filled with hope and promise but is tempered by the prospect of a planet in serious trouble.

An oil spill is a tangible tragedy that receives extensive media coverage and generates immediate public reaction. Global warming may seem like a vague and distant issue, but it may have serious consequences in the near future.Today's felling of the rain forests, emission of chlorofluorocarbons, and failure to preserve open space will dramatically impact the future of this fragile planet. A global temperature increase of two to five degrees by the middle of the next century could turn our productive Midwest into an agricultural wasteland.

Consider the words of the eminent zoologist David Attenborough as he concludes his book and television series "Life on Earth."

"First, we must not exploit natural stocks of animals and plants so intensively that they are unable to renew themselves and ultimately disappear. This seems such obvious sense that it is hardly worth stating. Yet the anchoveta shoals were fished out in Peru, the herring has been driven away from its old breeding grounds in European waters, and many kinds of whales are still being hunted and are still in real danger of extermination.

"Second, we must not so grossly change the face of the earth that we interfere with basic processes that sustain life — the oxygen content of the atmosphere, the fertility of the seas — and that could happen if we continue destroying the earth's green cover of forests and if we continue using the oceans as a dumping ground for our poisons.

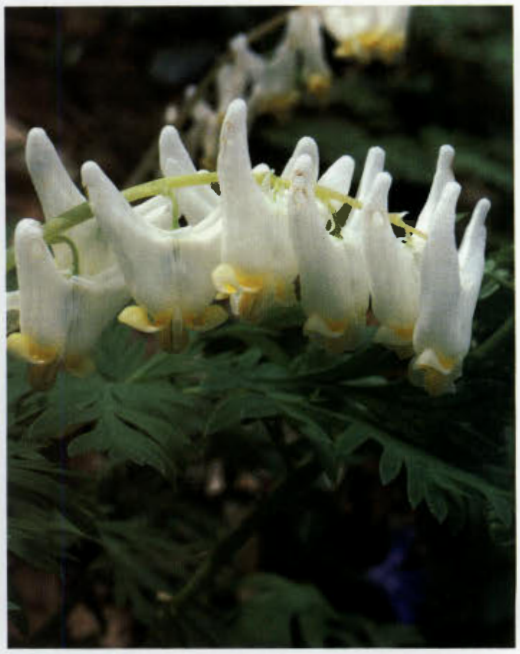
"And third, we must do our utmost to maintain the diversity of the earth's animals and plants. It is not just that we depend on many of them for our food — though that is the case. It is not just that we still know so little about them or the practical value they might have for us in the future — though that, too, is so. It is, surely, that we have no moral right to exterminate forever the creatures with which we share this earth.

"As far as we can tell, our planet is the only place in all the black immensities of the universe where life exists. We are alone in space. And the continued existence of life now rests in our hands."

Let us dedicate the twentieth anniversary of Earth Day not just to the survival of *the* species but to the survival of *all* species. NJ

A principal planner with the Green Acres Program, **Greg Johnson** oversees public participation activities and serves as the program's photographer. Articles and photographs by the 10-year DEP employee have appeared in *NJO* frequently.

Wildflowers and Waterfalls



By Nancy Wolff
Photographs by author

Stokes State Forest beckons to the outdoor person in every season. In winter, cross-country skiers swoop and glide along its paths. In summer, swimmers, campers and walkers enjoy the forest's natural features. In fall, hikers share with hunters the beauties and bounties of this generous place.

But in spring . . . ah! That's when my adrenalin pumps at the idea of a day in Stokes State Forest. Wildflowers herald spring. Waterfalls surge. Wildlife comes out of hiding — chirping, cheeping and chattering gaily at this five-legged human concoction: my tripod and me.

It starts in March, when through the melting snow peep dark reddish points. The skunk cabbage sneaks upward, helping the snow melt away into the swampy earth. By April, entire wet areas will be carpeted with lush, green, leafy cover as the skunk cabbage spreads its wide, lettuce-like growth over the marshy fields.

By then, other, more flower-like residents have appeared. Anemone blossoms peer through April's early underbrush. Tiny ballerinas with leaves like green tutus, they seem to dance in the sun's slender rays. Hairy-stalked white, pink or lavender flowers with liver-shaped leaves, hepatica blossoms

hugging the cool ground in early April are hard to find.

Trout lily, or adder's-tongue, shyly peek out of the dried leaves left over from fall. Sometimes the anthers of the trout lily are reddish, rust-colored; other flowers of the same species have yellow anthers. Obviously, this calls for more research into the reproductive habits of this beautiful creature.

Stokes is where I saw my first *yellow* violet. In April, violets proliferate here. The standard blue-colored, assorted white and several yellow violets cheer us as we tread carefully through their beds. Every time I visit my favorite Dutchman's-breeches haunt in the forest, the insects have found their tiny blooms before me. They suck out the nectar and leave a tiny hole in each otherwise perfect blossom.

By mid-May, the bloodroot appears. My favorite Stokes bloodroot bed was shown to me by a seasoned hiker who knows the forest well. Hidden among briars, grey boulders and a babbling brook, each bloodroot blossom was more inaccessible than the last. Inadvertently I bruised a stem as I maneuvered my gear and slid off a slippery rock. At once, a red juice stained my finger. Aha, the "blood" of the bloodroot! Myth says bloodroot has medicinal value.

On the Appalachian Trail, a few red-and-yellow columbine blossoms droop languidly near the rocky path in May and June. Their fragile beauty makes us pause on the steady uphill push. We are reminded of the delicate balance among the flowers, the rocks, and the human intruder.

The lady's slipper is a rare find. This endangered "moccasin flower" hides in the deep woods. A good rule to follow is to never pick protected flowers; leave them for others to enjoy. We certainly don't want to lose the few we have left.

When I first saw Buttermilk Falls in the mid-60s, I was suitably impressed. Just drive right up, folks; park the car, step out and click your shutter. Be sure the kids and dog are posed. In any season, Buttermilk Falls is a lovely waterfall.

Silver Spray Falls is harder to reach. But after a brief climb, it's yours. The falls never seem to end. As you climb higher and higher, the gurgling, giggling cascades continue. The good exercise and great view of the falls are rich rewards.

Haney's Falls is more subtle. A longer drive, a couple of tricky turns, a short hike, and there it is. Never in good light to photograph, of course, Haney's is hidden in a dark, dark dell, rushing toward some distant sea.

This trio of waterfalls make Stokes special. They underline the beauty of this spot. And the lovely wildflowers underfoot add the punctuation to an exhilarating spring day.

(left to right)

Buttermilk Falls.

Dutchman's-breeches.

Bloodroot.

Columbine.

In real life, **Nancy Wolff** is a training consultant, helping people write business correspondence and manage their time better. On weekends, Nancy and her tripod (and often Dick Wolff, her spouse) appear in New Jersey's wild areas, recording the beauty of this great state.

Return to the Wild

New Jersey's New Wild Trout Stream Program

Allen G. Eastby

By Robert H. Soldwedel

In every outdoorsman's dream there is a secret place untouched by man, unchanged except by the forces of nature. More often than not a cold, crystal-clear mountain stream is the centerpiece of this idyllic landscape. Closer examination of this paradise finds the stream inhabited by perfectly formed, colorful *wild* trout, eager to rise to the first dry fly they have ever seen.

Wake up, buddy! The daydream is over. We're going to level these hills, cut down the trees and relocate the stream off to the side so we can fit in a few more lots in our 150-unit housing development. Quit crying! Do you think that you've got exclusive rights to your dream? The 150 families that plan to live here have dreams too. Don't worry about your fishing. The state will throw in several hundred trout from their hatchery, and the fishing will be as good as ever. In fact, better than ever.

Most of the state's trout fishermen accept and support the high-quality, hatchery stocking program as the sum total of trout fishing

In 1989, more than 31,600 brook, brown and rainbow trout were stocked in the South Branch of the Raritan River.

(facing page) Wild trout populations could never produce the number of 10-inch plus rainbow trout stocked in the state's streams.

in New Jersey. This program is a good one. It provides days of angling enjoyment that would make you wonder why, at least on a "catch per unit effort per dollar" basis, anyone would bother to go out of state to catch trout. However, even among the most rabid hatchery-truck followers, the dream of wild trout in a pristine environment persists. To make this dream a reality, many of these anglers are willing to give something back to the resource and accept a fishery based primarily upon the release of hooked trout, especially if it means the preservation of a natural trout population.

This willingness of sportsmen to restrain, or even deny, themselves to preserve the resource on which their sport is based brings dignity to them and ethics to the sport. Invariably, when faced with the choice, the sportsmen choose a protective, conservation alternative over an exploitative one.

In the late 60s and early 70s, the DEP Division of Fish, Game and Wildlife undertook a statewide survey to identify all of the state's trout waters. Obviously one cannot protect a resource without knowing what is there to protect. On the basis of these inventories, and subsequent updates and refinements, all New Jersey trout waters were classified as either "trout production" or "trout maintenance." This classification system was implemented throughout the DEP, and for the last 20 years special considerations have been given to these trout waters under New Jersey's surface water quality standards and stream encroachment regulations.

The first step in creating a Wild Trout Program for New Jersey took place in the mid-70s with the designation of Van Campens Brook in the Delaware Water Gap National Recreation Area and Mulhockaway Creek, in Hunterdon County, as Natural Trout Fishing Areas. Both streams had sufficient populations of wild trout to support fisheries. In addition, Mulhockaway Creek had a sizable fall-spawning run of big browns out of Spruce Run Reservoir. The key to managing the fishery in these streams was to protect the wild trout from overexploitation, along with protecting its habitat.

In fisheries science, few subjects have been studied in such detail as the management of wild trout populations. Three basic rules have emerged: set creel and size limits that will protect the spawning population, restrict the angler to the use of artificial lures to minimize hooking mortality, and do not stock hatchery trout on top of the wild trout population.

Division of Fish, Game and Wildlife

Allen G. Eastby

This angler believes debarbing hooks is a good idea to make sure some of the trout caught today will live to fight again tomorrow.

Hooking mortality has been extensively researched. Invariably, it has been found that the use of live or dead bait results in a significantly higher mortality rate of hooked-and-released trout than the use of artificial lures. The debate on hooking-mortality rates between flies and spinners, single or treble hooks, and barbed and barbless hooks still rages.

However, to date no data indicates that there are any significant differences in hooking mortality between any of these artificial lures. Some fishermen contend that a barbless dry fly fished by an experienced angler would be least likely to result in the death of a hooked-and-released trout, while others counter that a wet fly or nymph fished by other anglers is as bad as worms and salmon eggs in that regard. The division elected to follow the research findings and chose an artificial-only restriction, as found in most states, with no single, barbless-hook specification.

For those born and bred on hatchery trout, the cessation of stocking might be hard to accept, but studies around the country have found dramatic increases in the number and size of wild trout once stocking was discontinued. In most of New Jersey's streams, the wild trout population could never produce the number of 10-inch-plus trout that were being stocked in them. However, the success of the program is not to be measured in the number of pounds of trout harvested per surface acre but by the promotion and maintenance of the quality of the natural trout population and its habitat.

Stocking trout is counterproductive to this objective because the hatchery trout suppress the native trout population. While competition between hatchery and wild trout is part of the problem, of greater detriment is the predation which the abundance of hatchery trout attracts to these streams. Besides the anglers, this includes turtles, snakes, raccoons, otters, kingfishers and herons. Once the hatchery trout have been consumed, it's the wild trout's turn to be eaten.

Under the earlier regulations, the wild trout population did well at Van Campens Brook, and the brook will continue to be managed for its wild trout population under the new program. The trout did not fair as well at Mulhockaway Creek, and the cause of that failure is clearly evident.

The Mulhockaway's downfall came about as a result of the inability to protect the creek's drainage waters. While there was protection for the trout population, its habitat could not be protected from siltation, deforestation and short, violent, peak stream flows resulting from development in the upper drainage basin. Nor could the water level and water quality of Spruce Run Reservoir be controlled as it was transformed from a major holdover-trout lake into a marginal resource. As the reservoir's trout-holding capacity faded, so did the spawning runs up the Mulhockaway Creek.

Environmentally, the Mulhockaway was damaged both upstream and downstream, and all the fishing regulations in the world couldn't save it once the habitat was compromised. There are laws now in place which could have prevented the downfall of the Mulhockaway Creek. Hopefully this tragic scenario will not be repeated.

With so many environmental safeguards and restrictions based on a stream's "trout production" classification and with the sportsman's increasing interest in the welfare of wild trout, the division's responsible course of action was to do everything in its power to preserve these wild trout populations. With the concurrence of the Fish and Game Council in their adoption last October of the Wild Trout Program and the support of

New Jersey's sportsmen, the program took effect January 1, 1990.

Having defined the resource in earlier inventories, the division selected 29 streams, or portions thereof, for inclusion in the Wild Trout Stream Program. They are Bear Creek (Southtown), Bear Swamp Brook (Mahwah), Black Brook (Clinton Wildlife Management Area), Burnett Brook (Ralston), Cold Brook (Oldwick), Dark Moon Brook (Johnsonburg), Flanders Brook (Flanders), Hance's Brook (Penwell), Hickory Run (Califon), India Brook (from source downstream to Mountainside Avenue in Mendham), Ledgewood Brook (Ledgewood), Little York Brook (Little York), Lomerson Brook (Pottersville), Merrill Creek (Stewartsville, upstream of reservoir), Mill Brook (Montague), the North Branch of Rockaway Creek (Mountainville), Parker Brook (Montague), Pequannock River (Newark Watershed, Oak Ridge Road bridge downstream to railroad bridge immediately upstream of Charlottesburg Reservoir. NOTE: A Newark Watershed permit must be obtained to fish this stretch.), Rhineharts Brook (Hacklebarney State Park), Rocky Run (Clinton Township), Stephensburg Creek (Stephensburg), Stony Brook (Stokes State Forest), Stony Brook (Washington Township, Morris County), Tetertown Brook (Tetertown) Trout Brook (Hacklebarney State Park), Turkey Brook (Mount Olive), Van Campens Brook (Delaware Water Gap National Recreation Area), West Brook (from source downstream to Windbeam Club Property) and Willoughby Brook (Clinton Township).

Most of these are relatively small streams and may be known locally by several different names. The names listed have been taken from topographic maps of the U.S. Geological Survey. Unless otherwise specified, the "wild trout stream" designation applies to the entire length of the stream.

These 29 streams represent the *creme de la creme* of New Jersey's trout production streams. There are other streams throughout northern New Jersey that could be included, and additional streams may be added to the program in the future. Any attempt, at this time, to include all of the state's more than 100 trout production streams in the Wild Trout Stream Program could have resulted in a "trout-stocking withdrawal syndrome" that might have undermined the entire program.

There was concern that listing these streams might lead to their overexploitation and would, therefore, be self-defeating. This feeling arose primarily from those few adventurers who had already discovered one or

Division of Fish, Game and Wildlife

Division of Fish, Game and Wildlife

(top) The West Brook is one of 29 streams included in the Wild Trout Stream Program.

The program's success will not be measured by the pounds of naturally produced trout caught but by the quality of the population and its habitat.

Supervising biologist **Robert Soldwedel**, a frequent *NJO* contributor, is in charge of research and management of the state's freshwater fisheries resources.

more of these streams and had them pretty much to themselves. As a rule, these secretive fishermen were very careful to release most of what they caught, because they knew their future fishing depended on preserving the wild trout population. Their greatest fear was that other, less conscientious fishermen would find out about these streams and clean out the resource.

Unfortunately, in order to accomplish the main goal of this program, it was necessary that these streams be singled out as being special. This designation would make it possible for local governments to realize they had something of unique value, worthy of protection and acquisition. I apologize to those whose secret spots were revealed; I lost a few myself.

Many of the streams included in this program are not stocked, and many are on private land. The listing of these streams does *not* convey the right to trespass on private land. Since the program's basic goal is the preservation of the state's wild trout resource and not necessarily to provide public fishing opportunities, land ownership was not a consideration in stream selection.

One stretch of water, the Pequannock River between the Oak Ridge and Charlottesburg reservoirs, had been previously closed to the public. It will now be open for the first time on a trial basis as a result of its inclusion in this program. Entry to this stretch of river will be on a permit basis only, with a limited number of daily permits available from the Newark Watershed Conservation and Development Commission.

With a clear objective and so much background information and research results available, it was relatively easy to develop a management strategy for this program. Stocking has been terminated in these streams, although there may be some movement of trout into them from adjacent trout-stocked waters. Anglers are restricted to artificial lures only, including flies, spinners and spoons, with no requirement for single or barbless hooks. The daily creel limit is two trout, except that no trout may be kept between September 15 and opening day the following April to protect them while they are spawning.

Fishing is permitted year-round, except where designated to the contrary by the stream's administering agency. A minimum size limit of seven inches applies on most waters, with a 12-inch limit on Van Campens Brook and the designated portion of the Pequannock River. Size and creel limits on species other than trout must comply with statewide regulations.

One might think that casting into a previously closed stretch of quality river would be a guarantee of success. However, just the opposite might be true. Brown trout abound in the Pequannock River, but catching them is far from easy. Wild trout, especially wild brown trout, can be very wary and selective in their feeding. Hooking one can be a real challenge for the average angler. In fact, just getting close enough to cast to them can be challenging.

The Mulhockaway Creek was loaded with big browns, but few were ever caught except when the stream was discolored. When the stream was running clear and low, as it did most of the time, the browns would spot the fisherman long before his first cast. Once spooked, nothing short of dynamite could coax them out of their hiding place.

For some anglers, it is the challenge and the aura surrounding wild trout in their natural habitat that are most important. They prefer the act of fishing more than bringing home fish. This program is tailor-made for these fishermen. However, the real beneficiaries are the trout themselves, those who love the outdoors, and those who appreciate clean water. Secret fishing locations may have been exposed, but hopefully the program will preserve them and keep the dream alive forever. NJO

One of New Jersey's most famous trout streams, the Big Flatbrook was stocked at regular intervals throughout the 1989 season.

Allen G. Eastby

9 Remove dead limbs from trees adjacent to or overhanging your home. Keep lower tree branches at least 10 feet from chimney or stove outlets.

10 Clean roof surfaces and gutters regularly of accumulated leaves, needles and twigs.

11 Have the power company clear branches from electric lines. Electric and telephone lines should be placed underground wherever possible.

12 Establish and maintain a minimum firebreak of not less than 30 feet around all structures by selectively removing and thinning trees, brush and ground cover.

13 Post the name of the street at intersections, the name of the occupants at the driveway entrance, and house numbers to identify the property.

14 The area around barbecues should be cleared to bare soil in a five-foot radius in all directions.

15 Foundation plantings should be non-resinous and well watered. Do not plant mountain and sheep laurel or other highly flammable evergreens.

16 Green lawns that are well watered and mowed regularly make good firebreaks.

17 Exterior structures and the roof should be constructed of fire-retardant or fire-resistant materials, such as asphalt, tile, slate, stone, asbestos cement shingles, aluminum, brick, or rag-felt roofing. Avoid cedar-shake roofing and wood siding.

18 Porches, balconies and all projections (decks or gables) should be constructed of fire-resistant or treated materials.

19 Porch, foundation, eaves and attic openings should be screened to prevent sparks from entering.

20 In the event of a wildfire emergency, park the car facing out and be ready to evacuate at a moment's notice. Plan at least two different exit routes from your home.

l Protection • Division of Parks and Forestry • Forest Fire Service

Smokey and Dom DeLuise Hope Your Home is Not a Recipe for Disaster

Protect Your Home from Wildfire!

New Jersey Department of Environmental Protection • Division of Parks and Forestry • Forest Fire Service

Protect Your Home from Wildfire

Improved transportation to once rural locations, the pressure to develop open land, an increased desire to escape the noise and pollution of the state's urban areas, and more leisure time to enjoy the outdoors have resulted in a proliferation of wildland residential subdivisions. Many of these have been planned and built without due consideration of forest fire protection.

The potential for wildfire disaster in New Jersey has been dramatically illustrated in years past. Large conflagrations occurred in 1930, 1954, 1963, 1971 and 1977. The most notable of these was the weekend of April 20-21, 1963, when a series of wildfires destroyed 183,000 acres, consumed 186 homes and 197 buildings, and were responsible for the loss of seven lives! The estimated loss to improved property exceeded $8.5 million!

When a fire does get started in forested areas, it is quite different from a city fire where discovery and response are usually prompt. The light construction of many homes, the use of flammable building materials, and an extremely flammable forest cover adjacent to the property create a difficult situation. The relative inaccessibility of fire-fighting equipment and the lack of a central water supply may also add to the problem.

An increasing number of homes are being lost to forest fires each year as development expands outward from urban areas. Don't let your home be a wildfire statistic. If you live in a forest or wildland residential area, to insure a reasonable amount of protection for your forest home take preventative actions now.

1 Put fireplace and stove ashes in a covered metal container. Soak with water and let sit for two days until all hot embers are extinguished. Dispose of ashes with trash pickup or at a legal disposal facility. Do not dump ashes in the woods, on leaves or dry grass, or on other flammables.

2 Do not store flammable materials near or under the house foundation. Stack firewood 30 feet from all buildings, and keep flammables in safety cans.

3 Propane tanks should be well clear of the house. A fuel break around the tanks should be maintained by selective removal or thinning of trees, shrubs, brush, ground cover and dead plant material.

4 Have fire-fighting equipment, including 100 feet of garden hose, a nozzle, shovel, rake, bucket and an extension ladder, on hand and connected to an exterior water supply.

5 Keep matches away from children. Teach them about the dangers of fire and that it has no mystical qualities. Children should also be trained in how to report a (*forest*) fire and what to do in an emergency.

6 Incinerators and the burning of debris are illegal in New Jersey.

7 Clean up rubbish and debris around the property.

8 Install an approved spark arrester or one constructed with mesh openings no larger than ½-inch in diameter on your chimney flue or stove pipe.

New Jersey Outdoors

New Jersey Department of Environment

Earth Day is Everyone's Day

By Tanya M. Oznowich

On the fourth Sunday in April, some people in New Jersey might be enjoying a refreshing morning walk led by a local park naturalist. Some families may participate in an educational festival or community ceremony encouraging a commitment to preserving the environment. Some churches in New Jersey may offer a unique environmental ecumenical service to their congregations, and television will broadcast environmental documentaries, adding flavor to a sports-filled afternoon.

Why is this particular day different than any other Sunday in spring? Because April 22, 1990, is the twentieth anniversary celebration of Earth Day.

Years ago, the concepts of protecting the earth and conserving its resources were not apparent to many people. Earlier generations did not consider their cumulative usage of, and impact on, the air, land and water, once considered infinite.

The Earth Day 1970 celebration evolved from a growing public outcry against air, water, and noise pollution and other environmental concerns. Demonstrations, concerts, classes and festivals held nationwide highlighted the awareness and involvement of millions of Americans and coincided with the formation of the United States Environmental Protection Agency (EPA) and New Jersey's Department of Environmental Protection (DEP).

As New Jersey has grown, so too have the

Smokey, Woodsy Owl, and representatives from a number of state and local organizations participated in the DEP's 1989 Environmental Education Week celebration.

New Jersey Outdoors

demands for its air, water, land and other natural resources. The need to balance maintaining and protecting the state's natural resources with a growing and spreading population, a burgeoning, convenience-oriented society and a thriving economy presented a formidable challenge to the DEP.

Over the past 20 years, industrial and automotive emissions have been reduced, wastewater treatment plants constructed and upgraded, public open space and recreational land preserved, and hazardous waste sites remediated. However, current environmental issues dealing with solid waste and hazardous waste disposal, nonpoint pollution, groundwater contamination, and the loss of undeveloped land require an even greater commitment from government and the people of this state.

International attention has been drawn to global warming, rain forest deforestation, ozone depletion and acid rain, stimulating scientific research regarding the future health of the world environment. We must overcome political boundaries and ideologies to work together and overcome worldwide, environmental threats that respect no border. Repair and maintenance of a healthy environment rests not only with the decisions and actions of environmental agencies and groups but also with businesses and industry, municipalities and schools, and families and individuals. An environmental awakening among the residents of this state and the rest of the planet's inhabitants is one of the Earth Day goals.

Though the actual event is only one day, its purpose is long-term. Earth Day 1990 will stimulate and renew an awareness of the environment, explore environmental concerns confronting society, and call for decisions and actions by all citizens to prepare for the incoming decade and beyond.

American engineer and inventor Charles Franklin Kettering once stated, "We should all be concerned about the future because we will have to spend the rest of our lives there." The future of the quality of life on earth is supported by the existence of a healthy, sustainable planet. That, in turn, is dependent upon the decisions and actions of its inhabitants. No one is pardoned from making sound decisions and taking appropriate actions regarding the environment.

Anyone who drinks water, breathes air, eats food, travels outdoors and reaps earthly privileges can have a positive effect on the resources, but it may necessitate changes in our lifestyle and our daily routines. You can reduce the amount of carbon dioxide, a pollutant that contributes to global warming, released into the atmosphere if you carpool, use mass transit, ride a bicycle or walk, thereby reducing the use of fossil fuels. The consumption of such nonrenewable resources as oil, coal and natural gas can be reduced by conserving energy at home or at the workplace. Insulate, lower the thermostat a degree or two, use electric lights and appliances in a conservative fashion, and close off unused rooms.

You can produce less solid waste by recycling, using reusable food containers, using cloth napkins rather than paper, and by not purchasing containers and disposable goods that cannot be refilled or used for a long time. As featured in the January/February issue, encourage wildlife into your area by planting fruit trees and bushes. Leave some grassy areas uncut to provide shelter and food sources for wildlife. Supplement that with feeders, houses and water.

These environmental suggestions, if practiced *en masse*, would make a difference. They, coupled with information and involvement, describe the slated agenda for Earth Day 20 efforts in New Jersey.

The DEP will celebrate "New Jersey Environmental Education Week" from Sunday, April 22 through Sunday, April 29. A family-oriented, large-scale Earth Day celebration will kick off the week at Liberty State Park from 11 a.m. to 3 p.m. It will focus on pollution prevention and "environmental suggestions" for the home. Exhibits, entertainment, seminars, demonstrations, children's games and programs, food and gifts will highlight the day's program, which will be held rain or shine.

Other daily events during New Jersey's Environmental Education Week, for which student groups must pre-register, include:

Monday, April 23:

The Division of Environmental Quality will sponsor an open house and program at ~~the DEP's environmental labs, located in the Sierra Office Park at 380 Scotch Road in West Trenton,~~ Liberty State Park for students and the public. Its focus on New Jersey's air quality and emergency response programs conveys the message that environmental quality depends on you.

Tuesday, April 24:

The Division of Fish, Game and Wildlife and the Green Acres Program will present an environmental "play" about wildlife needs

Tanya Oznowich has been project coordinator for the DEP's environmental education program for two years. Previously, she was director of education at the Weis Ecology Center in Ringwood. This is her first *NJO* feature.

and habitat. This program at the Pequest Natural Resource Education Center in Oxford will have an audience of local students.

Wednesday, April 25:

An exhibit by the divisions of Coastal Resources and Water Resources on water pollution and conservation will be held at the New Jersey State Museum on West State Street in Trenton.

Thursday, April 26:

The DEP divisions of Solid Waste, Hazardous Waste Management and Hazardous Site Mitigation are sponsoring a Trenton litter march and a "waste fair." Students and the public are invited to participate.

Friday, April 27:

The Division of Parks and Forestry is sponsoring several nature center and museum "open houses" around the state, along with school programs and tree plantings to celebrate Arbor Day.

Saturday, April 28:

The divisions of Water Resources and Coastal Resources are assisting in the planning of a statewide waterways and coastal litter clean-up. Volunteers are welcome!

Sunday, April 29:

The DEP encourages participation in the many local programs to be held at nature centers and environmental education facilities. A format for an environmental ecumenical service is available.

Speakers, displays, teacher kits, training workshops and environmental materials are available through the DEP for Earth Day-related projects, as well as for year-round environmental programs. Other national and state organizations are supporting Earth Day by providing projects, conferences, festivals, speakers, materials and advertising assistance. Earth Day offers something for everyone. To help you learn more about these organizations and what is happening on the spring calendar of events, a special "Earth Day 1990 News In New Jersey" is being published.

New Jersey boasts a number of private, nonprofit nature and education centers, museums and zoos. Celebrating Earth Day can mean not only attending their programs and events but becoming an active member, purchasing or borrowing environmental books from them or libraries, and volunteering to help with programs.

Celebrating Earth Day can mean joining and supporting national, state, and local environmental organizations. Getting involved can also mean participating in public hearings, hikes and camping trips, clean-up and construction projects, lectures, letter-writing campaigns and rallies. Donate your own special skills and talents in support of these year-round efforts.

Celebrating Earth Day can mean reading the newspaper, visiting the library, and asking a lot of questions. It can mean signing up for an ecology or wildlife biology class or sponsoring a seal and an acre of rain forest.

Celebrating Earth Day can mean taking a monthly walk in a natural area, starting an environmental club, or learning from a weekly environmental television show. Celebrating Earth Day in New Jersey means feeding yourself new information, learning to appreciate the world around you and getting involved in positive activities to preserve this small planet for a very long future.

Earth Day is everyone's day. For further information about Earth Day and Environmental Education Week or to receive copies of "Earth Day 1990 News in New Jersey," contact:

Earth Day 1990
DEP Office of Communications
and Public Education
Trenton, NJ 08625-0402
609/633-1317.

The author, who writes and performs original songs on the environment, prepares to sing one of her works for the audience at last year's Environmental Education Week ceremony.

By Cornelius Hogenbirk

Getting Sand in Their Shoes

Photographs by author

(facing page) This sand trail leads from the site of the former mining village at Crossley.

For many of the Paterson students, meeting Stumpy was their first opportunity to touch a live snake.

Ask city children what wildlife is, and they might conjure up an image of a lazy bear at the zoo, trapped behind thick iron bars. A forest could be the cluster of trees at the park. Pigeons, squirrels, cats and dogs make up the list of native urban fauna, and most of the flora are likely referred to as grass or weeds on vacant lots.

For urban or suburban-bound children, nature — large forested tracts and the indigenous wildlife — may be an alien concept. Although school children don't have enough opportunities for out-of-the-classroom educational experiences, a visit to a nature center or a field trip can be unforgettable for these young urbanites.

The last week in April is designated as New Jersey Environmental Education Week by the DEP and the Alliance for New Jersey Environmental Education. It is an effort to make state residents aware of the need to protect their state's natural resources. Last April, among the various events held was a field trip sponsored by the New Jersey Natural Lands Trust, an agency created by the Legislature to find new ways of securing land for the preservation of natural diversity.

The outing brought students to the 251-acre Crossley Preserve, a tract donated to the trust in 1984 by a mining subsidiary of the Amoco Corporation. The preserve, which straddles the borders of Berkeley and Manchester townships in Ocean County, is rich in Pine Barrens flora and a significant habitat for pine and corn snakes.

Crossley is named for its original owners, a Trenton family who mined the clay pits there from the 1800s until about 1920. At one time the operation was manned by more

Assistant State Forest Fire Warden Joe Hughes (wearing green cap) explains the purpose of prescribed burning in the Pinelands.

than 100 miners, many of whom lived in a small company village. A rail spur of the Pennsylvania Railroad once ran to a loading platform, and though the tracks are gone, the unused railroad right-of-way still exists.

The class selected for the Crossley field trip was Richard Buntzen's sixth-grade "Challenge Class" from Public School No. 5 in Paterson. The "Challenge Class" concept offers the brighter students from inner-city schools an opportunity to achieve a higher degree of learning. Of 80 schools in the Paterson district, five "Challenge Classes" have been formed, one each in the fourth through eighth grades.

April 25th, the day of the trip, arrived along with threatening rain clouds. That did not seem to bother the 26 excited classmates. This was a rare opportunity to see "the other" New Jersey, and nothing could dampen their spirits.

On the school bus, they chatted and gazed as the commotion of hectic city streets was left behind. After passing the Asbury Park toll plaza on the Garden State Parkway, the scenery changed to pine trees. Soon, there would be plenty of pine trees to see at Crossley, and a few surprises as well.

After exiting from the parkway and flashing past clusters of homes, the bus turned onto a sandy road. All signs of development ceased. Stands of pitch pines, fields of scrubby thickets and sand surrounded the students.

The group assembled under their teacher's leadership for a welcoming address by DEP employee Thomas F. Hampton, executive director of the trust. "This is almost wilderness, yet thousands and thousands of people live within a short walk of here," Hampton told the excited sixth graders. "We need to understand the value of our environment and our responsibility to protect it."

The group was then turned over to volunteer guides Elizabeth Morgan and Dorothy Breen, members of the Ocean Nature and Conservation Society. Elizabeth, a noted local historian and naturalist, started the day's activities.

Donning her "history hat," she told of Pine Barrens' ghost towns where many of the gravestones are made of clay, like that found at Crossley. The legends described clay-mining villages, bog-iron furnaces, saw and paper mills, charcoal pits and the brave, seafaring "East Jersey" men who ventured forth in sailing ships from coastal towns to go whaling. The youngsters also heard stories of the native "Pineys" who eked out their living selling medicinal plants found in the woods, collecting pine cones, gathering sphagnum moss or harvesting salt hay.

The historian showed the children how they could use clues to trace the outlines of the former mining village. She then remarked about the high value the clay miners had for education. "School was important. They knew that without it their children would never get anywhere. Maybe their fathers dug up clay, but they wanted something better for their children."

Replacing her "history hat" with a "botany bonnet" as the curious and animated youngsters gathered closer, she pointed out various species of Pine Barrens' plant life, giving their names and identifying features. Coming upon some bearberry, she described its features, usefulness, and how the gathering of this plant for medicinal purposes was once a considerable industry in southern New Jersey. Elizabeth challenged the students saying, "You will never be able to say its scientific name, *Arctostaphylos uva-ursi.*" Instantaneously, a chorus of voices echoed back, "*Arctostaphylos uva-ursi.*" These students were paying attention.

Dorothy then led the children to a small patch of wintergreen, or teaberry as some

call it. She crushed a leaf to release its aromatic fragrance and passed it around so that everyone could get a sniff. The last youngster popped it in his mouth for a pleasant chew. The gathering of wintergreen berries was another of the natural resources that locals once collected for income.

Dorothy stopped when she came upon a cluster of pixie moss in bloom. She suggested that anyone who wanted to get a good look at the lovely, but tiny, blossoms of this spring favorite should get down on their hands and knees. With the aid of a magnifying glass, she explained that this ground-hugging plant was not a moss but actually a prostrate shrub.

Time did not permit a long venture on the seemingly endless trail, and so the group was put in reverse. By now, most of the children had sand in their shoes, "Just like a native Piney," as Elizabeth put it.

The Assistant State Forest Fire Warden, Joe Hughes, took charge now. He briefed the attentive gathering about fires in the Pinelands and explained that they were going to visit a fire site for a firsthand observation. Leading the anxious following, he ventured down yet another mysterious sand trail that led to a recent controlled burn. All greenery gone, the charred and blackened pine trunks stood in stark desolation.

On that spot, Hughes gave a talk on fire safety in the woods, the ecology of natural fires, and the purpose of prescribed burning. Near the end of his talk, the "whoop-whoop" of a distant fire siren disturbed the quiet woodlands. A 250-gallon forest-fire pumper broke into the clearing looking for action. From the passenger seat emerged Smokey Bear. The students went wild! Shaking hands as he went, the big, burly bear lumbered about, and everyone wanted their picture taken with Smokey.

Awaiting the group's return was Peggy Vargas, from Herpetological Associates of Beachwood. She held a mysterious cloth bag that seemed rather squiggly. At her feet was a five-gallon plastic pail; another mystery. When everyone had gathered around, she reached into the bag and pulled out a multicolored, banded corn snake, one of the many endangered species found at Crossley.

As some of the youngsters shrank back in fear, others crowded for a closer look. The frightened snake nibbled on Peggy's wrist, perhaps seeking some reassurance about its well-being. From the pail, Peggy brought forth a five-foot pine snake. Named "Stumpy," it had lost a bit of its tail in a roadside encounter. Stumpy did a lot of wriggling and slithering, showing little appreciation for its moment of honor. Many of the junior scholars reached out to stroke its smooth skin. Others gave it a nervous pat and jumped back, content with just a touch.

Stumpy was safely returned to the seclusion of its comfortable, old pail, and the Paterson guests were treated to refreshments. All too soon the day was over, and it was time to board the bus for the trip back. By then, the sun had ventured forth, and a few pine warblers tuned up in the woods.

Before departing, teacher Buntzen assessed the field trip and concluded, "To learn about nature is to experience it first hand. To experience nature is to understand it and develop an attitude toward protecting and preserving it. I feel the students appreciated today and became more educated about their environment. Hopefully, they will apply this knowledge in future years."

The Paterson scholars had gotten some sand in their shoes, learned what *Arctostaphylos uva-ursi* was, saw wintergreen growing wild, had posed with Smokey Bear and touched live snakes. They were taking with them a little of the ecology of the Pinelands and its heritage, knowing that there was something unique in the history of their state still lingering in the foundations of the ghost towns of the Pines.

JoAnne Ruscio, management assistant of the DEP-administered trust, summed up the day's outing. "One of the most important things was the students' firsthand contact with nature and the history and ecology of the area, hearing it from people who really love and appreciate it. Hope for our environment lies with these students and others like them. They will be in charge in the future, with an understanding of their natural resources and the problems to be addressed."

After hearing the forest fire prevention message, everyone wanted their picture taken with Smokey.

Septuagenarian **Cornelius Hogenbirk** developed his "Brownie Hawkeye box-camera syndrome" (interest in photography) when very young. He served as a Signal Corps photographer during the Yokohama War Crimes Trials in 1945-46 and now enjoys nature photography and writing about the experiences of people in their local environment.

Water Quality Perspectives —

Twenty Years Later

By Priscilla E. Hayes

This spring, around Earth Day, you may spot a group of men on the Delaware River wearing identical red tee shirts. Chances are it is a group of friends known as the "Fraternal Order of the Shad," who, once a year, migrate to the Delaware for a shad-fishing weekend. They usually camp at Bulls Island or the Delaware Water Gap between casts from a boat rented for the occasion.

Unfortunately, the group has seen more shad caught around them than they have caught. Their yearly pilgrimage, like that of the shad, would be virtually impossible without the great improvement that the Delaware, particularly the estuary portion, has shown in the past 20 years.

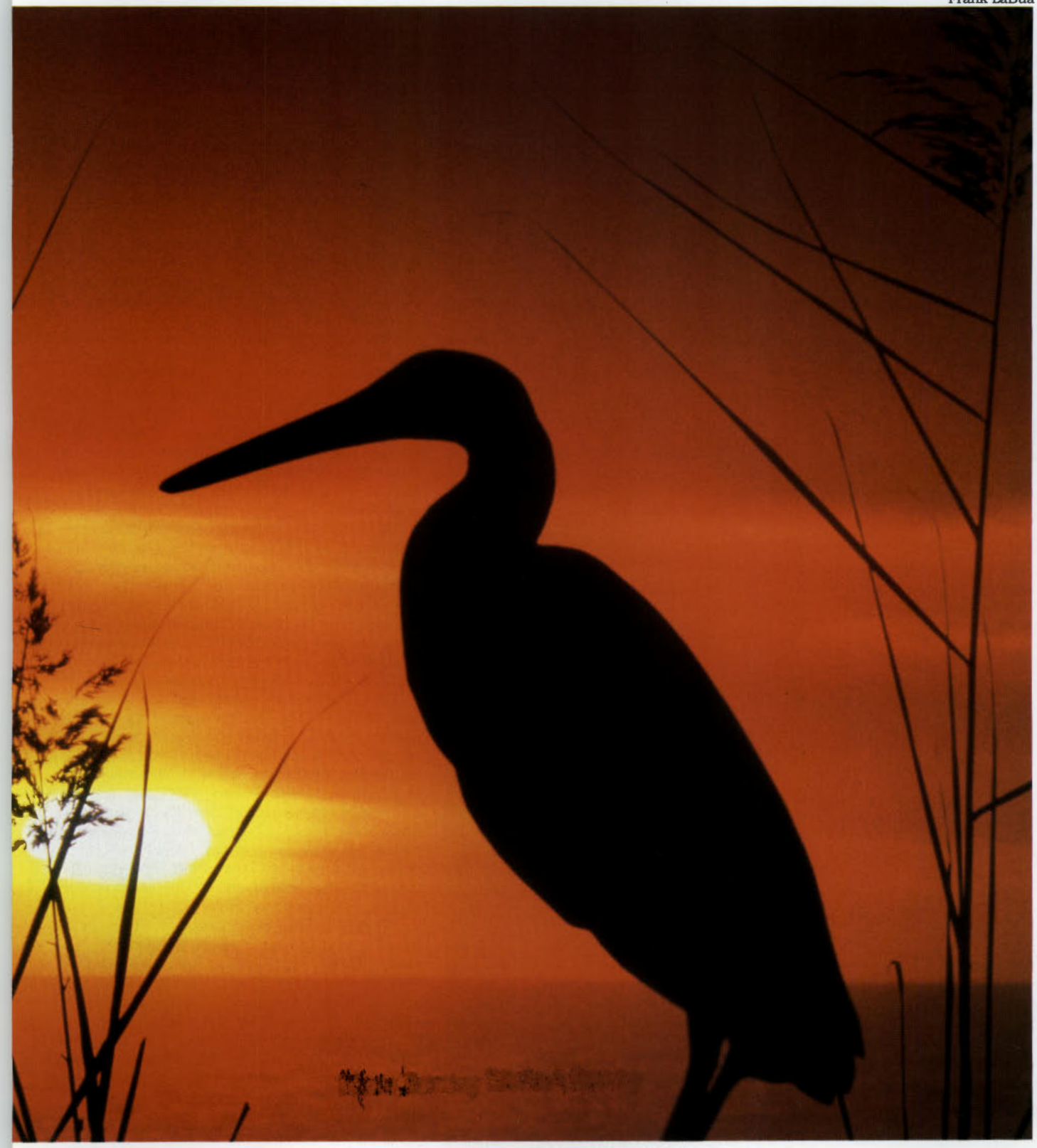
The most marked changes have been in the levels of dissolved oxygen, which is absolutely essential for the survival of fish and other aquatic life. Without it, they would suffocate. During the warmest days of 1945, dissolved oxygen was measured at zero for approximately 20 miles of river, roughly between the Commodore Barry Bridge near Bridgeport and the Palmyra area. Poorly treated organic material from sewage treatment plants serving major population areas such as Camden and Philadelphia was decomposing in the river and consuming all the oxygen in its waters.

The resulting "dead zone" not only virtually eliminated all life within it but essentially turned away all migratory fish such as shad or striped bass and blocked young fish from returning to the ocean. What few shad or striped bass did reach the Atlantic or portions of the Delaware above the estuary did so only when the river [illegible] naturally retained more dissolved oxygen.

Major improvement started in the 1970s, after the 1961 formation of the Delaware

Herons call the Meadowlands home, in part due to the Hackensack River's improved water quality and its ability to support food species.

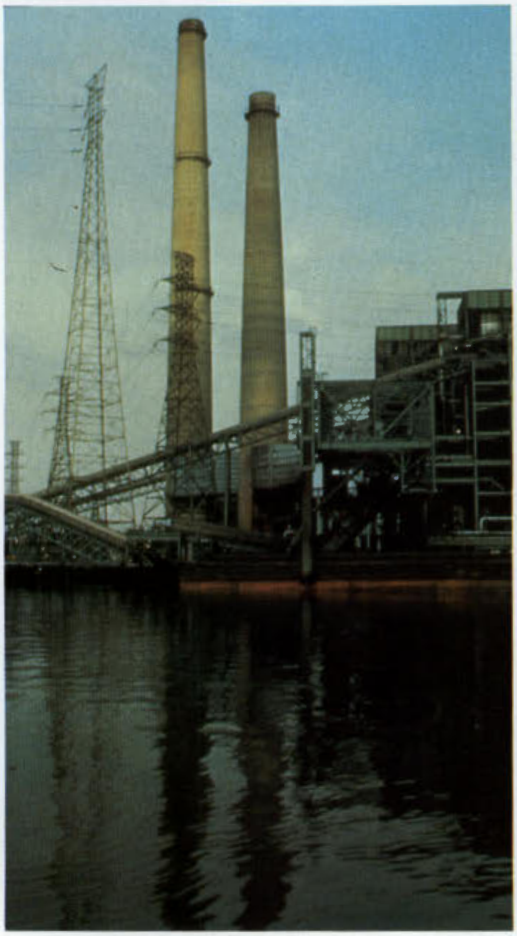
Frank LaBua



HMDC

(top) A number of raptor species, including this young marsh hawk, are found in the Meadowlands.

Three power-generating stations have permitted discharges into the Hackensack River.



HMDC

River Basin Commission (DRBC). Under the terms of a federal-state compact, the DRBC relies on the powers of adjoining states to protect the Delaware. Between the early 70s and today, sewage treatment plants discharging into the Delaware from Trenton south to the mouth of Delaware Bay have undergone statutorily mandated upgrades or regionalization of substandard plants.

In 1986, even before a regionalized sewage treatment system for Camden and its suburbs was completed, the DRBC measured warm-weather levels of dissolved oxygen at 3 mg/l or higher over the same 20-mile stretch of river. The improvements have been realized in a nearly eight-fold increase in shad found annually in the river.

Richard Albert, a water quality specialist for the DRBC, spent a day in 1986 with members of the Pennsylvania Fish Commission (PFC), which had conducted a fish population study from 1984 to 1986. Albert was surprised at the amount of fish found even in the worst parts of the estuary and by the number of fishermen tucked behind trees and on rotting docks near every old industrial plant.

His somewhat informal observations were confirmed by the results of the survey's last year, which was repeated to assure that the previous results were not a fluke. The PFC found even more fish and more species than in 1985! The Delaware and its estuary are no longer lethal to aquatic life, nor do they serve as their own barrier to migratory fish species such as shad and striped bass.

On another estuarine coastline, humans and wildlife, like the peregrine falcon and osprey, have started returning to the shores of the Hackensack River. Mark Kraus, a naturalist for the Hackensack Meadowlands Development Commission (HMDC), an agency charged with planning the development of and protection of the Meadowlands, does not claim that improvements in Hackensack River water quality have increased bird populations, but he notes that "the river is the lifeblood of the system."

"The birds are here because the river is healthy enough to support their food species," Kraus said. Asked for water-quality test results to back up the river's apparent improvement, Kraus was optimistic over a slight improvement in dissolved oxygen levels, especially since the river has seen increasing human use in one of the country's most densely populated areas. In addition to the Hackensack's use as source of residential and commercial water, it is a discharge point for three major power-generating plants,

four municipal sewage plants, countless combined sewer overflows, and a host of industrial dischargers. Due to development planning by the HMDC, as supported by protective legislation, humans in this region have only recently alotted the birds enough space to share the river.

Unlike the Delaware, the Hackensack's improvement does not show up in test result numbers but in less quantifiable ways, such as the return of birds and fish. The HMDC has just completed the first river study of a threatened fish species, the Atlantic tomcod, which will allow the commission to make tomcod population predictions for the future. Like the Delaware's shad, the Atlantic tomcod uses the river as a spawning ground and nursery.

The Hackensack River's fragile success attests to advanced sewage treatment and tighter controls on cooling water and landfill discharges. Nature also played a role when a major storm in 1950 breached the dikes that blocked tidal flooding of portions of the river estuary. For years, the dikes had prevented the return of oxygen-rich saline waters to the estuary.

The river's relative improvement can still be reversed by drought or its human equivalent, the overuse of the waters, and by the return of too much wastewater. The Delaware faces similar potential threats.

The steady improvement and potential problems of the Delaware and Hackensack reflect the state of water quality across New Jersey. The original impetus for ameliorating the discharges came from the federal Clean Water Act of 1972. New Jersey followed the federal lead with legislation such as the 1977 Water Pollution Control Act and amendments to it.

Since Earth Day 1970 and passage of the federal Clean Water Act, New Jersey has added over 650,000 new residents and lost 180,000 acres of farmland and open space, largely to additional residential development. New Jersey residents today draw over 100 million more gallons of water per day from public water supplies than in 1973.

Historically, it had been assumed that the waters of the state would provide for such diverse uses as drinking water, industrial purposes, cooling water, mining and irrigation. Then it was illogically assumed that those same waters could serve as repositories for all manner of waste, treated and untreated, including sewage, garbage residues, a vast number of toxic substances, and nonpoint-source pollutants such as motor oil, pesticides, fertilizers, road salt and sediments dislodged by careless development that all find their way into storm sewers and surface streams.

Although charged with the responsibility of assuring that our waters can support uses such as swimming and fishing, the Department of Environmental Protection (DEP) and other agencies have not, in some citizens' views, moved quickly or strictly enough. Industries and municipalities, on the other hand, have deemed some of department's programs as too tough. The DEP has been forced to make unpopular decisions, such as disallowing increased sewer usage by overloaded municipal systems, including several that served South Jersey shore communities. The DEP is currently seeking millions of dollars in penalties from municipalities still discharging in excess of their permitted limits, due to their failure to upgrade sewage treatment plants.

The continuing problems in water quality have also forced the DEP to move beyond these actions, which are steps in controlling

HMDC

The New Jersey Turnpike passes through the Saw Mill Creek Wildlife Management Area, 700 acres of salt marsh used extensively by shorebirds in spring and late summer.

discharges of the so-called conventional pollutants. Among them are biochemical oxygen demand, bacterial quality, suspended solids, and the phosphorus and nitrogen-based nutrients. In the wake of the 1987 amendments to the federal Clean Water Act, New Jersey has moved into the arena of strict control of discharges of toxic substances. The mechanism for control, the New Jersey Pollutant Discharge Elimination System (NJPDES) permit, is the same as for the conventional pollutants and nutrients. But much of the process is far more complex.

Toxic substances range from known carcinogens such as benzene or acetone, used in countless industrial processes, to heavy metals such as lead, which can cause brain damage and even death. New Jersey includes such substances as chlorine and ammonia in its delineation of toxics, along with the "priority pollutants" listed in the amended federal Clean Water Act. These include carcinogens, mutagens and teratogens.

This pair of roe shad was taken from the Delaware in the Bull's Island area.

Joe Kasper

However broadly defined, identification and control of toxics is far more complicated than for the conventional pollutants and nutrients, in part due to the sheer number of compounds potentially present in any discharge stream. Moreover, each individual compound might potentially interact with others in the industrial or municipal effluent carrying it or with substances naturally occurring in a water body or placed there by other dischargers. The interactions, or synergism, lack predictability and may cause the formation of more lethal compounds or even create compounds more resistant to degradation than the original components were.

It is virtually impossible to identify by chemical analysis every toxic substance in any single effluent, and such chemical-specific testing would not necessarily show the toxicity of the effluent as a whole. New Jersey has relied primarily on a "whole effluent" approach to regulate toxic discharges. Water quality appropriate for protection of aquatic life, and indirectly for recreational uses such as swimming or fishing, is safeguarded through the use of bioassay testing.

In a bioassay test, a species of aquatic life either indigenous to a given water body or similar in sensitivity to the native species is subjected to a specific dilution of the effluent being tested. The test is performed for a fixed time period, during which fresh, diluted effluent may replace the original to simulate actual in-stream conditions.

An "acute" bioassay is designed to test for short-term, immediate, and severe effects such as death. Most acute tests are 48 to 96 hours in duration. A "chronic" bioassay test, generally seven days long, looks for long-term effects such as the inability to reproduce or lack of growth.

Usually, chronic bioassay tests yield a stricter permit standard when an effluent will cause long-term effects at a lower dilution than that which causes acute effects. New Jersey originally based its whole-effluent toxicity limits on acute bioassay test results, using a mathematical formula designed to make the derived limit reflect both acute and chronic effects. Presently, either an acute or chronic limit may govern, depending on which is more stringent, given the mixing capacity of the receiving water for a specific discharge.

Certain chemical substances carry special hazards. Under guidance from the U.S. Environmental Protection Agency (EPA), the DEP is increasing the number of chemical-specific limits and testing for these when

issuing a permit involving a potentially toxic discharge. Testing for individual chemical compounds allows a discharger to fashion treatment methods that successfully control or eliminate the substances actually present instead of treating a toxic mixture with unknown components.

Finalizing toxics requirements today in a NJPDES permit generally involves an initial round of broad-based testing which includes acute and chronic whole-effluent bioassay tests, as well as an array of chemical-specific testing designed to identify what must be dealt with. A final permit will eliminate any unnecessary limits and tests.

The task of incorporating toxics limitations into all appropriate NJPDES permits, chiefly for industrial and municipal discharges, is an arduous one. As of 1987, New Jersey was second only to California in the number of permits with toxicity limits, approximately 275, at a time when 35 states still had no such permits. Yet hundreds of New Jersey permits still needed toxicity limits, of one kind or another.

Since the process of incorporating final permit requirements often takes several years, the permit holder can generally predict whether there will be significant problems associated with making an effluent sufficiently nontoxic before the limits go into effect. Technology for reduction or removal of many toxic substances just prior to discharge may be problematic or extremely costly, especially where discharges reflect a changing chemical composition.

Water quality specialists agree that the better course of action is to reduce or eliminate the use of toxics at the source during the industrial, commercial or household processes. Protecting our waters, and our environment as a whole, against toxic waste products may demand a change in the way business is done and, perhaps, a change in our culture. If toxic materials are separated from discharge waters only at the end of the pipe, those toxics still have to be disposed of as waste.

On the first Earth Day, Arlo Guthrie came to our school and taught us "consciousness-raising" songs. I remember the anti-litter campaigns starting on television at about the same time made me feel that littering was a crime, if not a sin, and how each of us could make a difference.

Individuals can use "home remedies" to cut back on toxic pollution. Using a plunger instead of bathroom-bowl chemicals can eliminate dangerous chemicals from our sewers and our homes. Chlorine bleach and many disinfectants can lead to the creation of chlorinated or halogenated hydrocarbons, which bioaccumulate in living tissue and are very resistant to breaking down into less lethal compounds. Disinfectants, in general, interfere with microbial sewage treatment processes. Oil-based paints and materials such as turpentine are more toxic than latex paints and the water used for cleanup. Buying washable clothing avoids excessive dry cleaning and cuts back on the industry's use of toxic chlorinated solvents.

Old containers of herbicides, pesticides, insect repellents, flea powder, household cleaners and other similar substances should be disposed of at county-sponsored cleanup days. This will assure that their contents are not discharged into our waters by careless household disposal. Likewise, used oil may be recycled at specially designated gas stations and other locations.

Such measures can keep only a fraction of the toxic by-products from today's lifestyle out of waste streams. Industries must be encouraged to avoid using toxic substances in their processes. Newspaper ink containing heavy metals has been successfully replaced with soybean-based inks by some printers. Others have been able to recover and reuse up to 87 percent of the organic solvents used in ink or use water, rather than organic solvents, as a raw material. Electronics manufacturers have found they can use special scrubbing machines and pumice rather than highly toxic acids to clean materials.

Perhaps increased regulation of toxics in industrial discharges will prompt similar innovations or citizen pressure will result in change. The DEP has recognized the benefits of such activities and recently established the Office of Pollution Prevention.

"Some people have been tempted to say that the easiest work is behind us," Albert noted, speaking both of the Delaware and of New Jersey in general. "But we have to remember how much hard work it was." His agency has joined with the DEP, the states of Delaware and Pennsylvania, and the EPA to develop a comprehensive toxics management strategy for the Delaware Estuary.

Someday we may look back and think that reducing or eliminating toxic discharges and toxic waste was "easy" too. But at this early point, it sometimes seems impossible.

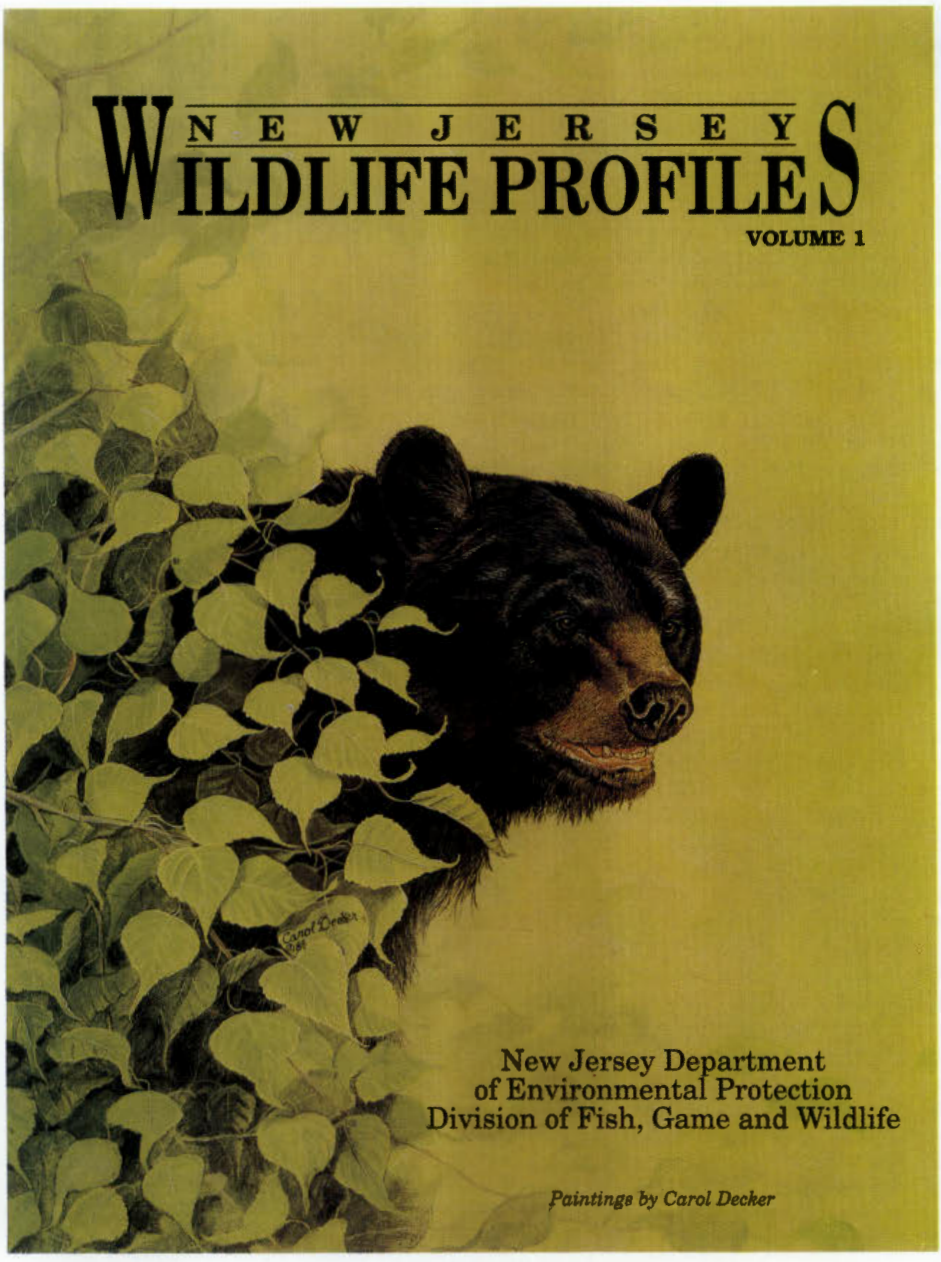
In the Delaware, 1990 should be another great year for shad, given their steady progress. Join the "Fraternal Order of the Shad" in enjoying the vastly improved river this spring. NJ

Priscilla Hayes, a deputy attorney general for seven years, handled civil rights and environmental protection cases. The Princeton University graduate also worked for New Jersey PIRG and is making her *NJO* debut.

The osprey, listed as a threatened species in New Jersey, has established nesting populations along Atlantic coast marshes and in the Meadowlands.

HMDC

Editor's Desk



In the Skylands

Stokes State Forest, the subject of "Wildflowers and Waterfalls," is located on Route 206 along the Kittatinny Mountains in Sussex County. The Appalachian Trail runs through the 15,000-acre forest and over Sunrise Mountain.

Administered by the DEP Division of Parks and Forestry, Stokes features some of the best trout-fishing waters in the state and also offers camping, swimming, boating and winter sport activities. For further information on Stokes and fee schedules, contact:

Stokes State Forest
RD 2, Box 260
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201/948-3820.

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609/296-1114

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609/884-2159

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Leonardo Marina
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Trenton Central Office
CN 404, Trenton 08625-0404
609/292-6441

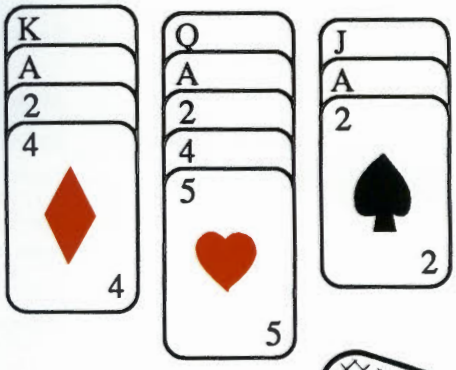
State Park Service • Division of Parks and Forestry • New Jersey Department of Environmental Protection

New Jersey Outdoors

Explorer

March/April 1990 Issue Number Four

For the game below, draw your own, trace or photocopy the example of play money above.



Natural Resources — Sharing is Caring

You and two friends go to the local grocery for a snack. One friend buys a granola bar, the other an orange. As you walk to the park to eat your snacks, you pick the last apple from a tree. There you meet three more friends. They are hungry but have no money to buy any snacks. You and your two friends with the snacks decide to share. How will you divide the snacks so everyone has an equal part?

This problem is very similar to what is happening around the earth with natural resources. Natural resources are things provided by nature, like water, air, soil, minerals and living things. Not only are we natural resources, we cannot live without the others.

In the United States we have had nearly all the natural resources needed to support us. And when we didn't, we had the money to purchase what we needed from other countries. As a result, we have used more than our share of the earth's natural resources on things we really didn't need.

Many countries are not as fortunate as America. Some don't have the natural resources to support their populations and the money to buy what they need.

As the population of the United States and the earth grows, so does the need for natural resources. Two ways to guarantee there will be enough natural resources for everyone in the future are to USE THEM WISELY and to SHARE. Can you think of any others?

A Natural Resources Card Game

Ask a friend to join you in playing this card game. The purpose of this game is to provide a small population of people with the natural resources they need to survive. You will need:

❑ **two decks of playing cards** ❑ **cutouts of paper money (eight $1.00 bills)**

1. From one deck of cards take out 2 Kings, 2 Queens and 4 Jacks. Called "face cards," these represent the men, women and children in a population. From the two decks of cards take out all the aces, twos, threes, fours and fives. These represent five natural resources - **aces are air, twos are water, threes are soil, fours are living things, and fives are minerals. Do not use the other cards.**
2. Each player takes one king, queen and jack and places them face up in front of him. Take the remaining cards and scramble them into a heap. Each player then selects 10 cards from the heap.
3. Distribute the money. One player takes $3.00, the other $5.00.
4. In any animal population, the female is the most important because she produces the young. Place one of **each** natural resources card on top of each face card beginning with the queen. Do the same for any additional jacks you may have picked up. Do not let the other player see any extra natural resources cards you may have in your hand. Above is an example of how the cards should be placed if you have one king, queen and jack and pick up four airs, three waters, two living things and one mineral.
5. Decide who will go first. Player One asks Player Two for a natural resources card. Player Two has the option of giving Player One the natural resource, **which is sharing**, or making Player One pick from the heap. Every time a player picks a card from the heap he puts $1 on the table. After Player One has received his natural resources card, he places it on one of the face cards or, if it is a natural resources card he doesn't need, holds it in his hand. It is then Player Two's turn.
6. If after three turns a player does not have one of each natural resources card on a jack, the player turns the jack face down. The player does the same to the king after four turns and the queen after five turns.
7. The game is over when a player has lost his entire population or has provided each individual (king, queen, and jack/jacks) with one of each natural resource.

Calendar

April

1 to JULY 3 DINOMIGHT, THE GREATEST PREHISTORIC SHOW ON EARTH. Fourteen animated, nearly life-size Mesozoic giants. Hands-on learning center. M to F, 1:30-5 pm; Sa, 10 am-5 pm; Su, noon-6 pm. $6 adults ($4 seniors and children). Monmouth Museum, Brookdale Community College campus, Lincroft. 201/747-2266.

17, 18, 19 WHAT GOES BUMP IN THE NIGHT. Learn more about our native nocturnal animals. Explore the outdoors at night to see whooo's out there and what they are doing. $10 fee. 10-11:30 am (19, 6:30-7:30 pm). Somerset County Park Commission Environmental Education Center (SCPCEEC), Lord Stirling Park, Basking Ridge. 201/766-2489.

21 EARTH DAY CELEBRATION. Natural resources mini-workshops throughout the day. Free seedlings to everyone in attendance. EDUCATORS WELCOME. 10 am-4 pm. Pequest. 201/637-4125.

21 AMPHIBIAN AMBLE. Explore the Pequest area in search of frogs, toads, newts and other misunderstood creatures. Waterproof footwear recommended. 10 am-2 pm. Pequest. 201/637-4125.

21-22 CIVIL WAR ENCAMPMENT. Fort Lee Historic Park. 11 am-4 pm. $2.50 per car. Palisades Interstate Park Commission (PIPC). 201/768-1360.

22 FLY FISHING FOR BEGINNERS. Experience fly fishing with the experts. 10 am-4 pm. Reg. Req. Pequest. 201/637-4125.

22 SPRING HILL AND THE PYGMY PINES HIKE. A fascinating nine-mile panorama of Pinelands vastness. 10 am. Bring a lunch. Lake Oswego, Penn Forest-Jenkins Road (8 mi S of Chatsworth). Sierra Club. 609/267-7052.

22 EARTH DAY CELEBRATION. Liberty State Park. 11 am-3 pm. NJDEP. 609/633-1317.

22-28 NATIONAL WILDLIFE WEEK.

22-29 NEW JERSEY ENVIRONMENTAL EDUCATION WEEK.

24 NATURE CLASS FOR ADULTS. Four-week course dealing with coastal ecology. 7-8:30 pm. Prereg. Req. The Wetlands Institute, Stone Harbor. 609/368-1211.

28 LEAVE ONLY FOOTPRINTS. "Spring Clean" the trail to Sunfish Pond. 8 am-5 pm. $20 fee. SCPCEEC, Basking Ridge. 201/766-2489.

28 ORIENTEERING FOR BEGINNERS. Fort Lee Historic Park. 10 am-4 pm. $2.50 per car. PIPC. 201/768-1360.

28-29 WORLD OF MINERALS. 18th Annual Gem, Mineral and Jewelry Show. William Paterson College Rec. Center, Wayne. Sa, 9 am-6 pm; Su, 10 am-5 pm. New Jersey Earth Science Association. 201/539-5116 (evenings).

29 3RD ANNUAL STATE FOREST AND PARKS CLEANUP PROGRAM. Burlington County Federation of Sportsmen's Clubs. 9 am-? Atsion Lake Rangers Station, Route 206. 609/654-8564 (after 5 pm) or 609/268-1906.

29 SPRING WARMUP. Leisurely 28-mile bicycle ride along the Delaware and Raritan Canal. 10 am. D&R canal parking lot, Lower Ferry Road, West Trenton. Sierra. 609/890-6661 (7-11 pm).

29 SPIN CASTING FOR BEGINNERS. Learn the basics of spin casting. 1-3 pm. Reg. Req. Pequest. 201/637-4125.

30 SWAMP SNOOPERS. Discover some of the creatures that crawl, fly, slither, swim or scurry in the Great Swamp. 3:30-5 pm. SCPCEEC, Basking Ridge. 201/766-2489.

May

2 SWAMP SNOOPERS (see April 30).

5 WHIPPOORWILL HIKE. 9 miles. 4½ hours of solitude in the Pine Barrens. Whippoorwills should be in full serenade. Bring food and flashlight. 6:30 pm. Atsion Lake Ranger Station, Route 206. Sierra. 609/267-7052.

9 SUNRISE RUN-BIKE-RUN. 4-mile run, 14-mile bike ride, 4-mile run with 400 men and women competitors. Seven Presidents Oceanfront Park, Long Branch. Monmouth County Park System (MCPS). 201/842-4000 Ext. 237.

12 MANASQUAN RIVER CANOE RACE. Annual competition for all ages. Iron bridge, Howell Park Golf Course. MCPS. 201/842-4000 Ext. 237.

12-13 10TH ANNUAL CARVING AND WILDLIFE ART SHOW AND SALE. Over 50 wildlife artists will display and demonstrate. 10 am-6 pm. SCPCEEC. 201/766-2489. Preview Wildlife Art Exhibition runs April 15 to May 10.

19 TURTLE DAY. Family fun honoring the diamondback terrapin. Games, crafts, guided walks, educational programs, and dinner. 10 am-4 pm, dinner at 6 pm. TWI. 609/368-1211.

19 GUIDED BIRD WALK. 8:30 am. HMDC Environment Center, Lyndhurst. 201/460-8300.

24 SPRING SKIES. 7:15 pm and 8 pm planetary programs. $3 adm. HMDC Environment Center. 201/460-8300.

June

2 1990 CANOE AND KAYAK CLASSIC. Over 100 models of canoes and kayaks to paddle. Clinics, contests, traditional cedar canoe repair workshops and antique canoe parade. 9 am-5 pm. Ocean County Parks and Recreation (OCPR). $1 per car. 201/370-7380.

9-10 FREE FISHING DAYS. Classes for beginners in spin casting and fly fishing. Reg. Req. Pequest. 201/637-4125.

9-10 TRADITIONAL SMALL BOAT FESTIVAL. Trailer, motor or sail in to Berkeley Island County Park, Brennan Concourse, Bayville. 10 am-4 pm. OCPR and the Philadelphia Maritime Museum. 201/730-7380.

16-17 GARDEN STATE WINE GROWERS SPRING FESTIVAL. Wine tastings from many of New Jersey's 16 wineries. Tours, food, country music, grape stomping competitions, hayrides and crafters Noon-5 pm. Adm. fee. Tewksbury Wine Cellars, Lebanon. 201/832-2400 or 609/984-WINE.

Eastern Wild Turkey

A 17-year Division of Fish, Game and Wildlife employee, **Bob Eriksen** is supervisor of wildlife services. His work includes wild turkey research, the Rockport game farm, and the wildlife damage control and deer recovery programs.

Carol Decker

By Bob Eriksen

The old gobbler awoke as the gray light of dawn colored the eastern sky. He preened and shook the frost from his feathers. His roost branch in a red oak gave him an outstanding view and allowed him to hear the early morning forest sounds. A cardinal greeted the dawn with a song. More songbirds joined in as the forest brightened.

A barred owl hooted his peculiar call from the wooded swamp below the gobbler's roost. The owl's loud *"Who cooks for you? Who cooks for you — all?"* hoot caused the tom turkey to gobble in response. A quarter mile away, another tom answered his gobble, and a vocal duel began. An exchange of 50 gobbles was an invitation to a territorial battle.

When daylight filled the woods, the old gobbler sailed from his roost tree to a small grassy meadow. Several hen turkeys cackled as they flew down. Their vocalizations caused the tom to gobble and display. He paraded along the meadow edge, fanning his tail and fluffing up his body feathers. His 10-inch black beard and needle-sharp spurs confirmed that the gobbler had seen five springs.

A younger gobbler approached the meadow silently. The sight of several hen turkeys caused him to display in an effort to attract their attention. The older bird perceived this display as a threat to his supremacy. He gobbled and approached the two-year-old in a threatening posture. The two birds circled, challenging each other with loud purrs.

As though on cue, they rushed each other and jumped into the air in a blur of wings. The older bird caught the young tom off guard one time. It was all he needed. With lightning speed he grasped the younger bird's lower beak with his own and pushed with all his might. They circled a few times, necks entwined and wings beating. The crack of their wings hitting echoed through the trees.

The battle was over in 10 minutes. Exhausted, the younger bird lay on the ground in a submissive posture. In another year, his spurs would lengthen and a modest weight gain might shift the odds in his favor. For now, the older bird ruled the hillside. He strutted proudly, showing off his bright red, white and blue head and allowing the sunlight to dance off his iridescent body feathers.

There is perhaps no other bird as uniquely American as the wild turkey. Originating in North America, wild turkeys thrived from southern Mexico to the eastern Rocky Mountains and from Maine to Florida before the European settlers arrived. Inhabiting a wide variety of habitats and climates, the birds probably numbered 10 to 12 million.

Six races or subspecies of wild turkey could be identified, each specific to a certain type of habitat. The eastern wild turkey was the most widespread and numerous of the six. A Mexican subspecies domesticated by the Aztec Indians more than 2,000 years ago is the ancestor of all domestic turkeys.

One of the world's largest game birds, the eastern wild turkey is endowed with superb vision and outstanding hearing. These highly developed senses have earned the wild turkey a reputation for wariness and intelligence among hunters and naturalists. Wild turkeys prefer to flee potential enemies on foot, at speeds of 25 miles an hour. When startled, they often fly at speeds of 50 miles per hour for up to a mile. Keen senses and speedy retreats are the wild turkey's survival strategies. Both are necessary to keep it from becoming a delicacy for a variety of predators.

Adult eastern gobblers stand 36 inches high and weigh between 16 and 22 pounds. Hens are somewhat smaller, weighing only eight to 11 pounds. With blue-gray heads, brownish body feathers and less iridescence, hens are also less colorful. Males are sexually mature at age two, females at the age of one.

Game birds such as the wild turkey have high mortality rates and short life expectancies. The average wild turkey lives less than three years. Their high mortality rate is offset by a large reproductive capacity. Most hen turkeys will attempt to nest each year. After breeding, hen turkeys lay a clutch of 10 to 12 cream-colored eggs camouflaged with small brown spots. The nest is usually in a shallow depression on the ground, hidden by overhead branches from the eyes of predators. Gobblers are polygamous, breeding with as many hens as possible and taking no part in the rearing of young.

Hen turkeys incubate their eggs for up to 28 days. Annually, only 35 percent of the nests will be successful, as many are lost to such predators as raccoons, skunks and crows. It is not unusual for one-third of the nesting hens to be killed by foxes, coyotes or bobcats as they incubate. Hen turkeys which lose their clutches to predators often re-nest.

Young wild turkeys are precocial. They leave the nest within 12 hours of hatching and accompany their mother wherever she goes. Turkey poults are capable of feeding and caring for themselves but learn much from the behavior and example of the hen. Though mortality rates are high, young turkeys hatched in June are nearly full-grown by late summer. They remain in family flocks until late fall when juvenile gobblers depart and seek the company of their peers. Very gregarious and social, wild turkeys communicate with a vocabulary of more than 30 distinct calls.

Wild turkeys are well adapted for survival in the forest habitat they prefer. They were unprepared, however, for the changes colonization of the Americas brought. As the forests fell before the axes and fires of the European settlers, wild turkey numbers dwindled. There was no legal protection for the birds, and our ancestors relentlessly pursued wild turkeys for food and to send to the European market. By 1850, wild turkeys had disappeared from the northeast, and in 1900 only 100,000 remained nationwide. The future appeared bleak.

Fortunately, the downward spiral in wild turkey populations has been reversed. Reforestation efforts have increased the acreage of forest in the east. Development of effective live-trapping techniques enabled wildlife biologists to re-introduce wild turkeys into areas from which they had disappeared. Today these amazing birds are found in 49 states, and populations are going strong at more than 3.5 million birds.

After an absence of more than a century, eastern wild turkeys were reintroduced to New Jersey in 1977. Twelve years of extensive live-trapping and transfer have resulted in more than 5,000 wild turkeys flourishing in 17 New Jersey counties. Restoration efforts funded by sportsmen are rewarding wildlife enthusiasts throughout the state with an occasional glimpse of these wary birds or the sound of a gobble on a spring morning. A denizen of the unsettled New World forest has returned.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earth day every day™

–you can make a difference!

plymouth dump

If the Pilgrims had used aluminum cans at the first Thanksgiving, the cans would still be around today. Help cut waste by recycling your cans.

diaper dilemma

Laid end-to-end, the 18 billion disposable diapers thrown away in the U.S. each year could reach back and forth to the moon 7 times. If you have a baby brother or sister, encourage your parents to use cloth diapers.

roach busters

Americans spend millions of dollars a year to kill cockroaches. And most use poisonous chemicals to do it. See NWF's Citizen Action Guide for safer and cheaper ways to get rid of pests. (See address below.)

fast-food folly

Each year, a leading fast-food restaurant chain uses enough foam packaging to cover Washington, DC, with a foot-deep layer of trash. If you eat at fast-food restaurants, ask for paper packaging.

an open-and-shut case

Americans open their refrigerator door an average of 22 times a day. You can save energy and money by making fewer trips to the fridge and by keeping the door open for only a few seconds.

watt's new?

Energy-saving fluorescent light bulbs use one-quarter the energy that standard incandescent bulbs use. Convince your parents and school principal to make the switch to fluorescent bulbs.

jungle jam

In one event, rock stars and artists raised almost $500,000 to help save tropical rain forests. Organize your friends to raise money for an environmental project you care about.

something to fume about

On the average, a car adds its own weight in carbon to the air each year. Help keep the air cleaner by walking, riding your bike, taking a bus, or sharing a ride with a friend.

shower power

A water-saving showerhead can save 50 gallons of water for every 10-minute shower you take. Help your parents install a water-saver in your shower!

through the grapevine

If you convinced two people to do something for the environment, and the next day they convinced two people, and so on, it would take less than a month to get everyone in the U.S. to take action.

skyscraper scrap

Every 20 minutes Americans dump enough cars into junkyards to form a stack as high as the Empire State Building. Keep cars, bikes, stereos, and other possessions in good working condition so they will last longer.

speak out!

One letter to a member of Congress can change a vote. Let your senators and representatives know how you feel about environmental issues by writing to them: The Honorable _____, U.S. Senate, Washington, DC 20510, or U.S. House of Representatives, Washington, DC 20515.

EXTRA! EXTRA!

It takes more than 500,000 trees to make the newspapers Americans read in one Sunday. Help save trees by recycling. Find out more about recycling by calling the Environmental Defense Fund hotline: 800-225-5333.

the lawn ranger

In summer, up to 50% of the water Americans use goes to outdoor needs such as watering lawns. By planting shrubs, trees, and ground cover in your schoolyard and backyard, you can save water AND attract wildlife.

prime time for recycling

The energy saved by recycling one glass bottle could run your TV set for 3 hours.

National Wildlife Week
April 22–28, 1990
Join and support the National Wildlife Federation and State Affiliates.

For more conservation tips and information, write for:
NWF's Citizen Action Guide
National Wildlife Federation
Earth Day Programs
1400 16th Street NW
Washington, DC 20036-2266

Drawings by Pidgeon