

NSPB

NEW JERSEY Outdoors

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A Turn-of-the-Century Look at the Jersey Shore • On the Trail of a Wildlife Tracker
Organic Farming: The Nature-Friendly Way
Sludge: Fertilizer of the Future • Adventures in Rock Climbing

Changing leaves, such as these at Batsto, and other colorful sights await hikers in the fall. See Page 43 for advice on what to take and some safety precautions.



CORNELIUS HOGENBIJK

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Tom Brown (right) teaches students how to track wildlife at his tracking, nature and survival schools outside of Phillipsburg. See Page 16 for the story of "The Tracker."

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Hand-painted vintage photo by Howard Michaels

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Hand-painted vintage photo by Howard Michaels

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Editorial

From the Commissioner



Scott A. Weiner
Commissioner

New Jersey is entering a new era of environmental protection. Under the leadership of Governor Jim Florio, the state Department of Environmental Protection is moving ahead to design and implement environmental protection strategies that will meet the challenges of the next century.

All of our preplanning and forward-thinking won't help us achieve the level of environmental protection that New Jerseyans deserve if DEP is not organized internally to operate efficiently and cohesively. In April, I named members of a new management team who are helping me plan an evolutionary restructuring of DEP.

The department needs to be restructured so we can implement the programs that will help New Jersey's environment continue to improve in the future. Throughout DEP's brief history, the Legislature has conferred vast responsibilities on the department. These responsibilities have been assigned to many individual programs. The department grew to meet the growing legislative mandate, but unfortunately, the growth of DEP was explosive rather than managed.

The result has been a DEP that is a confederation of divisions, rather than a coordinated, unified department. In some cases, inefficiency and unresponsiveness have led to an erosion of public confidence.

DEP can protect the environment more effectively by functioning as an integrated department focusing on pollution prevention, permitting, enforcement, cleaning up contamination and preserving our natural resources. To achieve this, I have set several goals for the way business should be conducted at DEP. As we meet these goals, we will become more open, accessible and efficient, and set environmental standards that are fair, predictable and above all firm.

This is essential because DEP will be counting on active public participation as environmental strategies are developed, and that input needs to be nurtured in an atmosphere of openness and accessibility.

DEP welcomes public input on vital initiatives such as pollution prevention, a revolutionary philosophical approach that is fundamentally shifting the focus of the state's environmental protection efforts. Instead of retroactively controlling pollution that already has been released into the environment, pollution prevention concentrates on reducing the amount of hazardous substances generated at the source — *before* contamination can take place.

Another important initiative closely tied to pollution prevention is called facility-wide permitting, which deals with pollution at the level of an entire industrial facility rather than focusing on individual discharges.

Facility-wide permitting also takes into account the cumulative effect of *all* pollution discharges, making us better able to achieve *real* reductions of the overall toxic load on the environment.

Three industrial facilities are voluntarily participating in a facility-wide permitting pilot project that is designed to yield great benefits as the companies find new manufacturing processes that improve efficiency and don't pollute. As part of this project, the three companies are working to incorporate detailed pollution prevention strategies into their permit applications, meet approved pollution prevention goals and comply with the same — or tougher — standards that have always been enforced.

Air, water and hazardous waste discharges always have been regulated individually by independent enforcement units assigned to separate divisions in DEP. During the pilot project, however, only one permit will be issued to cover an industrial site, and the state for the first time will regulate facilities by a new system designed to improve internal communication and coordination among regulatory programs at DEP.

Pollution prevention and facility-wide permitting are among the programs that will help shape New Jersey's future environmental protection efforts for years to come. More will be developed and implemented.

But at the same time, DEP will continue to make sure it is structured in a way that helps meet statewide environmental protection goals and objectives as thoroughly and efficiently as possible, and to increase public awareness about what each of us can do to improve the environment.

State of New Jersey
Jim Florio
Governor



Department of Environmental Protection

Scott A. Weiner
Commissioner

Wendy Kaczerski
Director, Office of Communications and
Public Education

New Jersey Outdoors
Summer 1991, Vol. 18, No.2

This publication is dedicated to promoting and encouraging the wise management and conservation of our natural, cultural and recreational resources by fostering a greater appreciation of those resources, and providing our residents with the information necessary to help the Department protect, preserve and enhance them.

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The views and opinions of authors do not necessarily represent the opinion or policies of the Department of Environmental Protection or the State of New Jersey.



Mailbox

Ethical Differences

Concerning the article "Making an Ethical Kill" (Spring 1991), I cannot believe that anyone could write: "...This is the true story of a New Jersey hunter who, like many, made an ethical decision not to shoot. He cared more about the possibility of wounding the other bird than about a 'bird in the hand...' Ethical! What's ethical about killing animals just for the sport of it?"

I know that this type of story will be repeated in future issues of **New Jersey Outdoors** because it is published by an agency that isn't too interested in preserving wildlife. According to the Fund for Animals of New York, "It's a fact that the prime function of state wildlife agencies is not to protect individual animals ... but to propagate game species populations for hunters to shoot ... On average they spend well more than 90 percent of their funds on game species projects." Is that why the New Jersey Department of Environmental Protection has a Bureau of Revenue?

I will tell you what's morally correct — my decision to cancel this publication today. I do not want to have anything to do with a magazine or state agency that promotes killing animals for sport.

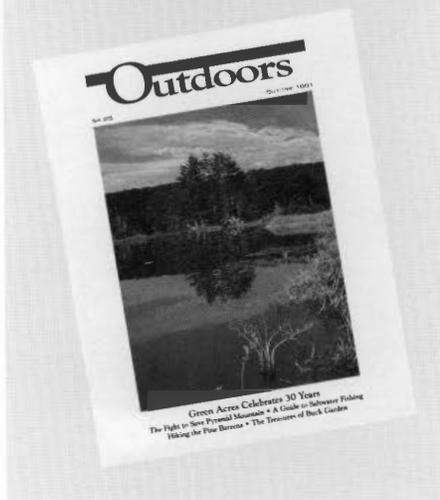
Marian Wig
Yardville

Editor's Note: It is the responsibility of the DEP's Division of Fish, Game and Wildlife to manage our valuable wildlife resource for the enjoyment of a variety of groups, including hunters, birders, hikers and fishermen. The division considers hunting an essential management tool and of prime importance in maintaining a balance between wildlife needs, limited available habitat and human activities.

New Jersey Outdoors welcomes letters to the editor. Please include your name, address and daytime telephone number. Our address is NJO, NJDEP, CN402, Trenton 08625. We reserve the right to edit letters for length and clarity.

Spring and Summer Issues Available

Limited numbers of the Spring and Summer issues of **New Jersey Outdoors** are still available at a discounted \$3 price. To order copies, call (609) 292-2477.



Numerical Solution

In your article "Conservation: Before and Beyond Earth Day" (Spring 1991), you offer a number of "Everyday Solutions to Global Concerns." I agree that every one of these items alleviates the cited concerns. However, they are not solutions. There is only one solution, and that is to reverse population growth.

The benefit of a 10 percent gain in automobile fuel efficiency is eliminated by a 10 percent growth in population. I've seen a doubling of the population of the United States in my lifetime. If we don't start talking about this, I'm sure that my grandchildren will also see a doubling of the population of the United States in their lifetimes. It will be hard to accommodate that by turning off lights and similar approaches.

Frederick A. Saal
Colts Neck

Good Job

It is wonderful to receive your magazine again. We missed it. We love any fishing news, articles about birds and especially news of South Jersey. Keep up the good work!

Margaret H. Ham
Mount Holly

On Second Thought

I wish to advise you of a correction to be made to your caption on Page 36 for the picture at the top of Page 37 of the Spring 1991 issue of **New Jersey Outdoors**. The waterway shown in Branch Brook Park is not the Morris Canal, but is Second River. The Morris Canal left the park farther south at Clara Mass Hospital. Later, in Bloomfield, it crossed Second River on an aqueduct.

I am happy that **New Jersey Outdoors** is back and am looking forward to reading it.

Bill Moss
President of the Canal
Society of New Jersey

We're Recycled

Beginning with this issue, **New Jersey Outdoors** will be printed with soy ink on recycled paper that includes at least 10 percent post-consumer waste. This will help New Jersey meet Governor Jim Florio's goal of a 60 percent recycling rate by 1995. You can do your part by keeping the magazine as a resource, or passing along NJO and other magazines to libraries, schools, hospitals, nursing homes or doctors' offices. Where possible, include them in your local recycling program.

Gardens



PRISCILLA HAYES

Farming the Organic Way

Jim Kinsel, one of two farmers at the Stony Brook-Millstone Watershed Association's Organic Farm, picks up a handful of field soil for inspection.

"You can see the pieces of organic matter all through here," Kinsel says. "We mixed 40 tons of composted leaves and horse manure into this soil. See how much darker and richer it makes it than that soil there, where nothing was added. We're building up the fertility of the soil here, not just using it as a mechanical medium to hold growing plants."

Kinsel goes down the rows of plants with Jeff Schahczenski, who co-manages the farm with him. They discuss each plant as if speaking of a friend they know well. Is that one getting a bit sunburned? Is this one spending too much time on foliage and not enough on producing vegetables?

As a fall visitor to the organic farm in Pennington, you probably won't catch Kinsel and Schahczenski with time to introduce you personally to their enriched soil or their plants. But you can meet the fruits of their labors at the farm's produce stand and farther afield at the green market in downtown Princeton that the farm started last year. When the farm was specializing mainly in tomato production last year, *The New York Times* published the results of a poll on tomatoes served in New York City restaurants. The tomatoes grown on the Watershed Organic Farm, served in salads at the Four Seasons Restaurant, were ranked as among the very best by restaurant patrons who were not even aware that they were eating organic tomatoes.

This year, the farm is growing several types of tomatoes, along with beans, broccoli, all sorts of mustard greens, other greens such as kale and Swiss chard, and various lettuces, including a red-leafed romaine. The farm is producing melons, squashes, berries, onions and peas, as well as at least six varieties



HANK SAYEN

of fresh herbs, and that's just a sampling of the dozens of types of vegetables being grown. The free-range chickens are fed a diet of grain laced with nothing more than vitamins. The farm's beehives provide organic honey. You can pick your own flowers or walk over to take a peek at the sheep.

As organic farms in New Jersey go, the Watershed Organic Farm in Mercer County, founded about eight years ago,

“The main reason to buy organic produce is not to avoid (pesticide) residues, but to avoid supporting the further degradation of our environment and water supplies.”

— Pat Reed Begel
former association director

isn't one of the largest or most commercially successful. But it shows that organic farming, which relies on no pesticides and fertilizers that may affect water and wildlife, can coexist with a delicate nature preserve, and can even further the goal of protecting the Stony Brook-Millstone watershed.

Why might you be looking for organic produce? Everyone knows the obvious answer — to avoid pesticide and other chemical residues in your food.

But Pat Reed Begel, former director of the Stony Brook-Millstone Watershed Association and a longtime supporter of organic farming, says there really are much more pressing reasons.

“In truth, there are studies that say residues in general are not such a big thing, or that you need to eat an incredible amount of a certain vegetable with known residues in order to be harmed,” she says. The point isn't your ingestion so much as what the pesticides and fertilizers used did to the nearby land and water body where the produce was grown.

“The main reason to buy organic produce is not to avoid residues, but to avoid supporting the further degrada-

tion of our environment and water supplies,” she says.

And Helen Atthowe, formerly the farm manager at the Watershed Organic Farm and currently writing a book on organic gardening for Rodale Press, feels that organic farming will have to have certain crucial characteristics if it is to survive in New Jersey. It will have to be able to coexist with commercial and residential areas in ways that agriculture relying on chemicals increasingly cannot.

This points to a need for organic farming, but that farming will have to be able to support its farmers in a state where the cost of living is extremely high. Only if the public and consumers work hand-in-hand with growers and support agriculture that they can live next-door to on a long-term basis, says Atthowe, will New Jersey continue to be a “garden state.”

The Watershed Organic Farm is drawing the community into its efforts through a new program called the Community Supported Agriculture Association. Under the program, individuals and families may purchase



PRISCILLA HAYES

Jeff Schahczenski (opposite page, right) and Jim Kinsel plant a variety of crops.

Athena Krell (opposite page) picks her own flowers at the Stony Brook-Millstone Watershed Association's Organic Farm.

Visitors can walk over to the barn (left) to visit the sheep or chickens.

Gardens

shares in the farm prior to the growing season. They then are entitled to a share of all the farm's diverse types of produce, honey, flowers and herbs. Each week's bounty may be picked up at the farm itself or in Princeton. A few items, such as flowers or some berry varieties, are pick-your-own only.

Visitors are always welcome, but the Watershed Association hopes that they will respect the goals of the farm and not expect a guided tour by the hard-working farmers. One time the farm will be open to all sorts of questions and tours is during the Organic Country Fair on September 14 and 15. Farmers and craftspeople, among others, will demonstrate their skills, and organic produce and meat will be sold, all in an old-fashioned country-fair atmosphere meant for the whole family.

The Watershed Organic Farm is located on Wargo Road in Pennington. The telephone number for the farm is (609) 737-6853; to contact the Watershed Association, call (609) 737-3735.

By Priscilla E. Hayes of Robbinsville, a freelance writer and a former deputy attorney general in New Jersey



MEG CADDOUX

Produce grown on the Stony Brook-Millstone Watershed Association's Organic Farm is sold at the farm's stand in Pennington.

How to Tell If It's Organic

How do you know if a certain farm is really organic or whether produce labeled organic really deserves that label? In 1989, the certification board of the New Jersey chapter of the National Organic Farmers Association (NOFA) established formal criteria to certify organic farms in the state.

To be recognized as a "transitional" organic farm by this organization, a farmer must show that food is being produced without the use of any synthetic fertilizers or pesticides, using agricultural methods that enrich soil fertility — or as the organization puts it, promote its biological health. The addition of organic compost material, such as composted leaves and manure, is considered an essential element in enriching soil fertility and helps improve the soil's ability to hold nutrients, water and heat for the use of crops.

To be certified in whole or in part as a full-fledged organic farm, the acres sought to be certified must have been farmed organically for at least three years. In 1990, the New Jersey chapter of NOFA certified 17 farms in the state as organic, and will provide a list of those farms on request. More than 30 farms have applied for certification this year.

NOFA's certification covers most of the organic farms in the state, but some farms still are certified with a somewhat older organization, the Organic Crop Improvement Association. A few farms rely on produce testing as a substitute for certification while they await a federal certification program.

NOFA's New Jersey chapter also offers for sale two new guides to help both consumers and farmers find organic products. The Consumer Guide to New Jersey's Organic Markets 1991 lists all retail and mail order outlets in New Jersey where organic food products may be purchased. The listing includes not only farm stands, farmers markets and health food stores, but supermarkets that have chosen to carry organic food products.

The Industry Guide to New Jersey's Organic Markets 1991 is designed for businesses already in, or seeking to enter, the organic marketplace. Its comprehensive set of listings includes minimum orders and terms of sale, as well as all services provided by a supplier.

Jennifer Morgan, executive director of the National Organic Farmers Association of New Jersey, can be reached at the Watershed Association, RD 2, Box 263-A, Titus Mill Road, Pennington 08534, (609) 737-6848.

Volunteers

Deputies' Role to Protect

The sound of a shotgun rang out from a wooded area in Holland Township last fall just as it had every Friday and Saturday night for the previous two weeks.

But a resident in the Hunterdon County town had alerted state authorities, and this time Deputy Conservation Officer Rich Goszka and Conservation Officer Walt Pettigrew were waiting — Goszka in a car parked on a hill where he could spot violators, and Pettigrew on foot in an adjacent field.

When they reached the site of the shooting, they found the suspect, but no gun.

"I questioned him for over an hour while Walt went looking for the gun," says Goszka. "Finally, he admitted that he had been shooting."

The violator apparently became intoxicated every Friday and Saturday night and climbed into a tree stand to shoot deer and raccoons, Goszka says. He later was nabbed again for a similar offense and his hunting license was revoked.

"That could have been a dangerous situation if someone had been out walking around at night," says Goszka, 23, a deputy conservation officer for the Division of Fish, Game and Wildlife. "This is what our job is — to protect the wildlife resource and to protect the people."

Goszka is one of 70 volunteers who currently serve as deputy conservation officers. Another 20 are scheduled to graduate from training this fall. The division's Bureau of Law Enforcement maintains high standards for acceptance into the program. Last year, it received more than 800 inquiries; only 29 people were selected for training.

The training covers all facets of law enforcement as well as deer and fisheries management, hunter education and fish and game laws. Federal statistics show that

the work of the wildlife resource officer is among the most dangerous in law enforcement. Therefore, prospective deputy conservation officers must successfully complete an approved basic firearms training course and requalify on a quarterly basis.

Deputy conservation officers must patrol a minimum of 80 hours each year to remain in good standing, but some of the more active deputies well exceed this. Goszka, who works mostly in Warren and Hunterdon counties, has volunteered 800 hours in his one-and-a-half years with the program, and recently received the division's Outstanding Service Award.

When he's not volunteering, Goszka is a full-time wildlife control representative for the division, responding to calls about problem animals. About one-third of the deputy force is made up of division employees who devote some of their free time to law enforcement. The remainder includes auto mechanics, scientists, carpenters, policemen, teachers and medical professionals.

Deputy conservation officers perform basically the same work as conservation officers. Deputies, however, must be in the

company or under direct supervision of a conservation officer, and are not permitted to issue summonses. They can serve as witnesses to violations and testify in court.

Their year-round duties include checking hunting and fishing licenses, making sure sportsmen abide by bag limits and patrolling private and state wildlife management areas.

"If people are illegally taking wildlife, they know what they're doing," says Goszka. "It's a challenge to catch them."

For example, some fishermen who want to exceed the limit place some of their catch in plastic bags, which they hide in their waders. Goszka sometimes poses as a fisherman and fishes alongside other anglers to catch violators in the act.

Capt. Glenn Hawkswell, supervising conservation officer in the northern region of the state, says the common bond among deputies is the desire to protect the state's wildlife resource.

"They hate to see people abuse it and want to see the wildlife there for the use of all sportsmen, not just a few," he says.

Lt. Mike Boyle, training officer for the Bureau of Law Enforcement, contributed to this article.

Deputy Conservation Officer Rich Goszka checks a fishing license as Conservation Officer Don Cole looks on.



Laurie Pettigrew

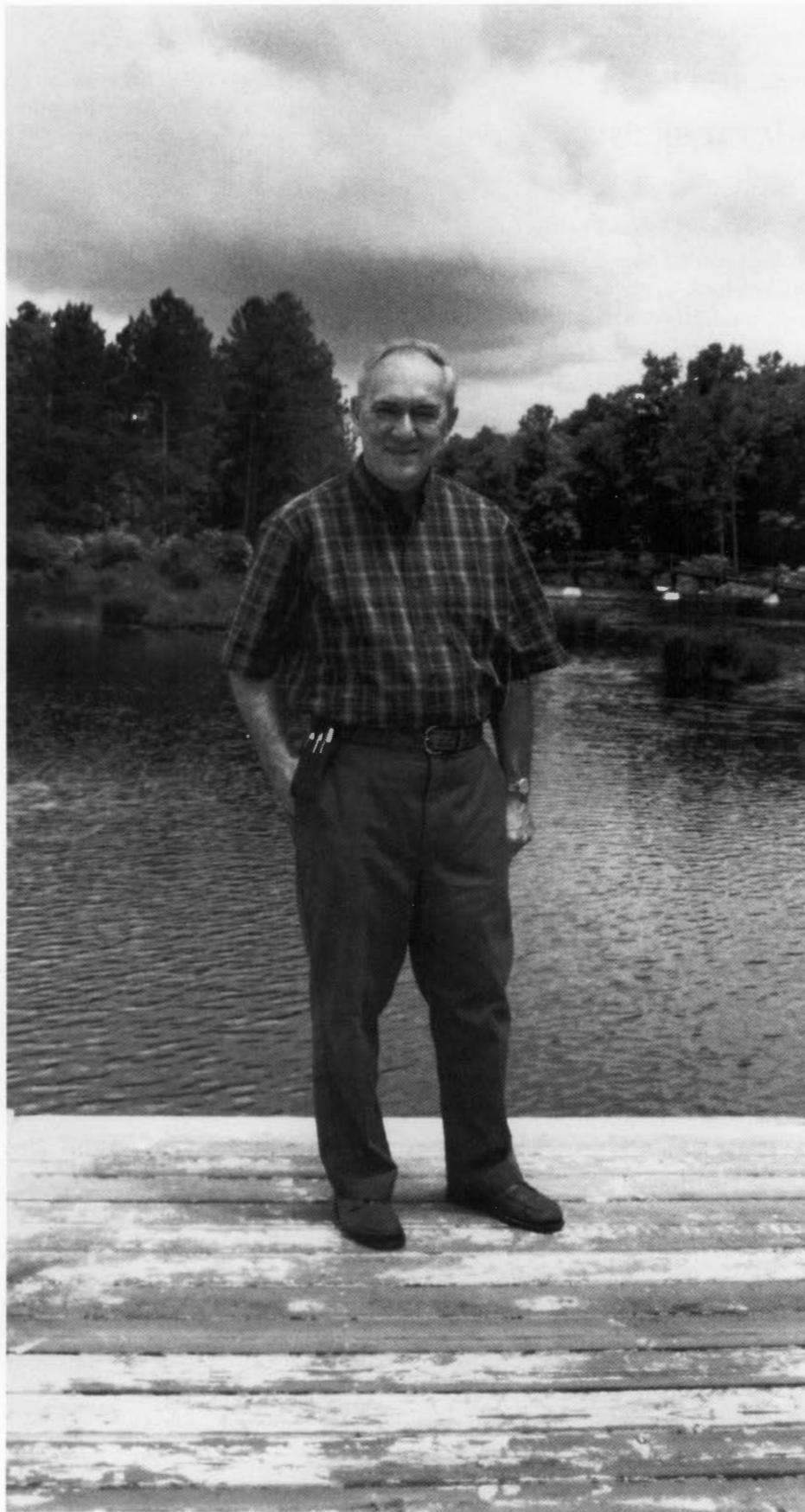
Profile

The Man With the Global Reach

For nearly 30 years, John J. Kirk has run the New Jersey School of Conservation in Branchville with ethics, literature, nature, pollution, education and religion on his mind.

The school, a division of Montclair State College, has grown into the largest college residential center for environmental studies in the world, a place where annually more than 11,000 students — from third-graders to doctoral candidates — spend several days to a month strengthening their ties with the natural world. While most of these students are from the Northeast, the school's reach extends to hundreds of thousands of people worldwide. Under the auspices of the United Nations Environment Programme, with Dr. Noel Brown as director, Kirk reaches this panoramic audience through spiritual leaders such as the Dalai Lama, the pope and the president of the World Jewish Council. Kirk believes that the best way to instill environmental responsibility is to make it part of the moral lessons learned at home, in school and in places of worship.

Wrapped around Lake Wapallane deep within Stokes State Forest along the ridge of the Kittatinny Mountains, the school's 240-acre campus has 54 rustic buildings that house offices, classrooms and dormitories. The forested grounds serve as the primary textbook and laboratory as well. Courses are taught outdoors, utilizing the lake, the grounds and the myriad of natural phenomena all around. And the curriculum stresses the interrelatedness of all things and the need to see the natural world through the lenses of the humanities, the sciences and the social studies, as



BRIAN MCLERNON

John Kirk, at the New Jersey School of Conservation in Branchville

well as the familiar outdoor pursuits, Kirk says. Day to day, these connections play out in different ways:

□ Jim Merritt, coordinator of therapeutic recreation services at the Head Injury Technical School in Milford, Pa., uses the outdoors as a sensory classroom to stimulate the senses of his patients and to foster within them a reverence for nature. Merritt spent 17 years as a staff member at the Stokes school where he observed Kirk "living and working the environmental ethic." He learned that for any population, special, ethnic or minority, the environment serves as common ground.

□ Students in the Conerly Road/Franklin Township schools have been returning to the School of Conservation for three decades. Teacher Charles Clinton says that many of his former students who now hold corporate jobs take a week off from work, shed their business suits, don blue jeans, and assist with the camp programs that they used to attend.

□ In his role as senior adviser for Conservation and Religious Affairs for the United Nations Environment Programme, Kirk and Dr. Brown in 1986 initiated Environmental Sabbath Day, an annual weekend event on which the religious leaders of all the world's denominations devote their sermons to the necessity of preserving the planet. The Reverend Christina del Piero says she asked the congregation of St. Paul's Evangelical Lutheran United Church of Christ in the Bronx to bring "something of creation that brings them pleasure . . . to place on the altar . . . The elderly Germans and young Hispanics (with some other diversity as well) had one thing clearly in common — a love of the earth. I could see that the city has not taken away the garden-growing spirit of a people who loved to grow things 'in the old country' or 'back on the island'. . . (They) brought flowers; an apple; squash; corn; seeds; containers of barley, lentils and rice; petrified wood; stones; shells; sand; a tiny maple tree; and more."

In a dramatic sermon, the reverend

spoke about toxic waste and acid rain and threw a bag of plastic containers, Styrofoam cups, junk mail and other garbage onto the floor by the altar.

"People gasped at desecrating this holy space, the altar, but in that process they seemed suddenly to recognize that we are doing just that — desecrating the holy space called earth," she says.

These examples reflect, not coincidentally, the background, the character and the vision of the school's chief architect. Born and educated in Massachusetts, Kirk attended Boston College for two years where he majored in English literature before transferring, after two years in the service, to Boston University, where he combined work in health and physical education with biological sciences and the speech arts. He then moved on to the University of Michigan, where he earned a master's degree in educational administration and supervision and a doctorate in environmental studies.

The diversity of Kirk's educational background testifies to a temperament that is restless and creative. He is, first of all, an innovator. Not content to simply oversee outdoor activities as supervisor of camping services for the state of Michigan, he established the first youth rehabilitation conservation camps for socially maladjusted boys, and developed a new concept in camp medical care by developing a course of study to train camp health directors.

Further, John Kirk has, from early on, had an international perspective. For 20 years, starting in 1960, he served as a consultant to six provinces in Canada on the development and implementation of outdoor education, environmental education and camping programs, a period throughout which he lectured and wrote for audiences in Mexico, Japan, India, Ireland, the United Kingdom and South Africa, as well as the United States and Canada.

But it is in his roles as historian and philosopher of environmental studies that Kirk has made his most significant contributions to date, and which account

for the unique and flawless symbiosis between the man and his school. Both came of age in the late 1950s, when environmental education was centered on the study of nature. But within a few years, the environmental movement was to take on an added dimension, as concern over urban problems — air pollution, water pollution, energy production, noise and overpopulation — shifted the focus from nature to the causes of its destruction.

"We could see the storm clouds coming," remembers Kirk, "but we didn't know how to get out of the rain. Today we do." Kirk feels that now there is no environmental problem, no matter how serious, whose causes and solutions we don't know. We simply have to develop the awareness and the commitment to do something about them. And that is why John Kirk devotes his life to environmental education.

For more information on the New Jersey School of Conservation and its programs, call the business office at (201) 948-4646.

Research

Combating the Lead Threat

A silent epidemic of lead poisoning continues to exist in this country despite substantial reductions of lead in paint, food, milk, water, air and gasoline.

Exposure to high doses of lead can lead to irreversible brain damage, behavioral impairment, coma, convulsions and even death. Even at levels once thought to be safe, lead can impair the functions of the nervous system, including the brain, and can affect red blood cells, the kidneys, bones and reproductive organs.

A study completed in 1980 showed that 9.1 percent of all preschool children in the United States had elevated levels of lead in their blood. Among black preschoolers, the number was 24.5 percent.

A major contributor to the worldwide buildup of lead in the environment has been tetraethyl lead. In the early 1920s, organic lead compounds began to be added to gasoline to prevent or minimize knocking in engines.

Although blood levels of lead in the U.S. population have dropped considerably with the decrease of lead in gasoline, scientists estimate that about 5.6 million children residing in our 100 largest cities potentially are exposed to lead from combusted gasoline. New Jersey, with the

highest population density and more highway miles per square mile than any other state, has been particularly subject to contamination from lead in gasoline.

The Department of Environmental Protection's Division of Science and Research has begun an extensive reevaluation of environmental sources of lead exposure in New Jersey, focusing on the following:

Lead in Air

In addition to gasoline, atmospheric lead originates primarily from the burning of fossil fuels or from industrial sources. In 1981, the Division of Science and Research began research on toxic contaminants in New Jersey's air. Researchers found that differing atmospheric conditions and use patterns can cause seasonal variations in lead levels.

In 1978, when the National Ambient Air Quality Standard for lead was adopted, three New Jersey urban areas — Trenton, Jersey City and Newark — had levels above the standard 1.5 microgram per cubic meter. Researchers found that the decrease of lead in gasoline, however, led to a rapid decline of those high levels, and those areas have been in compliance with the standard for several years.

Industrial Uses of Lead

In contrast to the widespread dispersal of lead by mobile sources, emissions from industrial point sources generally are localized, which may result in very high levels of lead contamination in the immediate surrounding area.

There are a number of different industries that can be classified as point sources of lead emissions, including those directly involved in the use of lead and a secondary group that may indirectly release lead in the course of other operations. In New Jersey, most industries have brought their emissions under control in recent years.

However, even in the case of a currently well-controlled industry, past

emissions often were not as well-controlled. Therefore, there may be significant amounts of lead present in soil, street dust or house dust in the immediate area. This historical buildup of lead may contribute to elevated blood levels of lead in those currently exposed.

Drinking Water

Because water is such a good solvent and lead is so widespread, virtually all children are exposed to some level of lead in drinking water. In the past few years, it has become evident that plumbing in homes or schools can be a source of lead in drinking water. Lead-containing solder in the past was used to join copper pipes; under certain conditions the lead may gradually dissolve into the water. Drinking water that has been standing overnight in pipes is more likely to contain high concentrations of lead.

The use of lead-containing solders was banned in New Jersey in January 1987. Homes built before the ban, however, still may have lead solder. People can limit exposure by letting the water run for several minutes in the morning or at any other time that water may have been standing in pipes.

The Division of Science and Research is working with researchers at the U.S. Geological Survey and at Stevens Institute of Technology to better understand the corrosion process that may contribute to high levels of lead in drinking water.

Disposal Practices

Whether directly disposed of in landfills or incinerated first and the ash landfilled, lead-contaminated waste presents the potential for eventually finding its way back to humans. Incineration, if not carefully controlled, may allow unacceptable atmospheric lead contamination.

An estimated 28 million automobile batteries are disposed of in the United States each year, either in landfills or through incineration. This represents 260,000 tons of

Drinking water that has been standing overnight in pipes is more likely to contain high concentrations of lead.

Hobbies Can Be Hazardous to Your Health

Hunters who make their own bullets or practice shooting at poorly ventilated indoor firing ranges, fishermen who make their own sinkers and fishing flies and craftspeople who make stained glass, pottery and jewelry, all are exposed to an increased risk of lead poisoning.

Melting lead in poorly ventilated areas such as the basement or where food is prepared can result in lead in the air or on food.

Those exposed to lead should take precautions. One fisherman who makes his own flies chooses a well-ventilated area away from the rest of the family activities. He changes his clothes after tying the flies and washes his hands to avoid ingesting lead himself.

Children should not be in areas where lead is melted or lead shot stored.

Waterfowl hunters who use lead shot should clean the bird thoroughly to avoid ingesting lead.

lead spewed into the environment. New Jersey is pursuing a vigorous lead battery recycling program. Recent studies show that 90 percent of lead batteries are being kept out of the waste stream.

Crankcase oils from vehicles contain substantial amounts of lead. If such oils are disposed of improperly, this results in a further source of exposure.

Recycling and responsible recovery of lead from batteries, oils and other products make a significant contribution to lessening exposure.

Soil and Dust

The upper few centimeters of soil in urban areas may have elevated levels of lead concentration. It is particularly necessary to measure soil lead levels near drip lines from roofs and next to buildings where paint may contribute to the problem.

House dust may contain elevated lead concentrations from a number of sources, including paint lead in old housing and lead fallout from leaded gasoline combustion.

The Division of Science and Research has begun a comprehensive study of soil lead levels. The study by the Site Investigation Team is the first statewide effort conducted to evaluate potential areas of land contamination from industrial sources.

Working in cooperation with other agencies as part of the Interagency Task Force on Lead Poisoning Prevention, a subcommittee of the Governor's Council, the division is continuing its investigation of lead sources in New Jersey. Researchers are identifying additional data and are planning to map specific sites to provide a better understanding of potential exposure to this very dangerous metal.

By Dr. Robert K. Tucker, director of DEP's Division of Science and Research, and Dr. Joan C. Luckhardt of the Office for Prevention of Mental Retardation and Developmental Disabilities with the University of Medicine and Dentistry of New Jersey

Lead Can Harm Animals, Too



WILLIAM D. GRIFFIN

Mallards and other waterfowl have been poisoned by lead.

Lead in the water, soil and air can be dangerous to animals as well as humans.

Many waterfowl are exposed to lead in water, particularly in the form of lead shot, which sinks into the mud of lake bottoms and marshes. Waterfowl gather small stones to store in their gizzards, collecting lead shot along with the stones. The shot poisons the birds, placing some species at risk of extinction. Many of the few remaining trumpeter swans have been operated on to remove the lead stored in their craws. Mallards, too, have been found poisoned from ingesting lead, as well as eagles to a lesser degree.

Lead in soil also can harm dogs. A puppy or young dog digging in the dirt next to a frame house may become poisoned by lead if the soil was contaminated by weathering of lead paint. Lead poisoning in dogs is not uncommon. Perhaps the most famous example is President Bush's dog, Millie, which was poisoned by dust during renovations at the White House.

Inside DEP

Patrols Nab After-Hours Polluters

A white four-door sedan inched its way beside an 8-foot high fence outside a sewage treatment site. With each revolution of the tires, the lingering odor gradually grew more detectable to the two men sniffing from the car window.

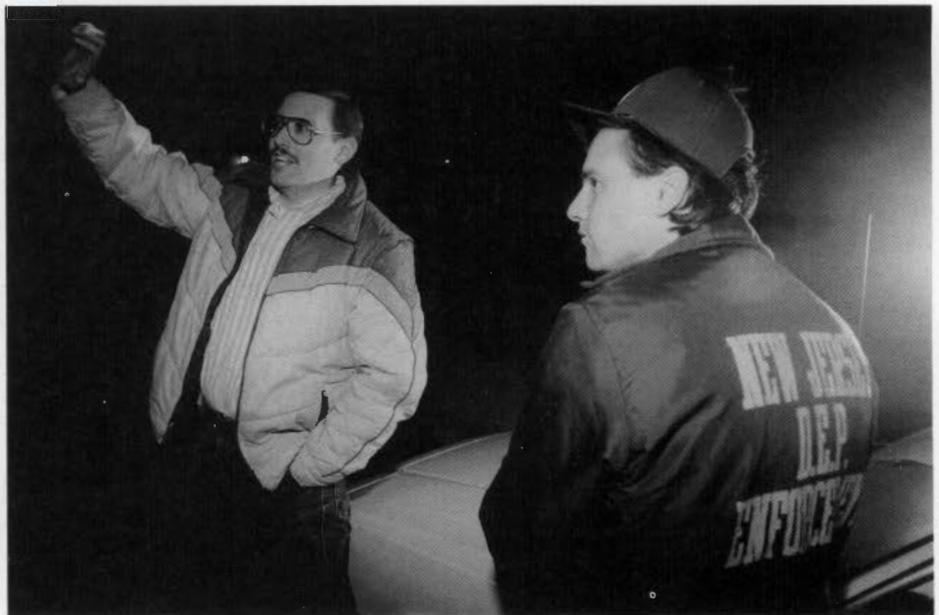
"The odor isn't even bad tonight, compared to what it's been like in the past," driver Ken Lembo said to his partner Greg Walker as he brought the car to a halt in front of a chained gate. "The wind is carrying it out over the ocean."

The two men, field investigators with the New Jersey Department of Environmental Protection's Evening Surveillance Program, were responding to a complaint of a foul odor that had been reported to a DEP hotline. The program was initiated in 1988 as an experiment in response to odor complaints that seemed to increase at night, apparently because violators assumed that environmental enforcement by the state stops at 5 p.m. Two or three nights a week, investigators in four enforcement regions around the state — Central, Metro, Northern and Southern — respond to complaints made to the DEP hotline and radioed to patrol cars.

Despite the complaint this particular night, the field investigators for the Central Region were unable to take any enforcement action because they could not verify the odor on the homeowner's property at their time of arrival. This they attributed to a change in wind direction.

"By law, foul odors on a neighboring property cannot deprive a homeowner of reasonable enjoyment of his house," says Walker. "But if a DEP field inspector can't verify the odor on the complainant's property, we can't issue a violation."

The program, however, responds to about 150 odor complaints a month and has resulted in hundreds of thousands of dollars in fines issued since its inception.



Greg Walker (left) and Ken Lembo are always on the lookout for polluters.

CRAIG DROSZ

Surveillance teams respond to complaints as soon as possible for a better chance of arriving while the odor is still present. Because of this, citizen complaints take priority over any other possible pollution violations.

The fines issued range from \$200 to \$50,000, depending on the degree of the penalty. In 1990, the Central Enforcement Region, the largest region encompassing Burlington, Mercer, Middlesex, Monmouth and Ocean counties, alone collected more than \$100,000 in environmental violation fines. The fines generated by the program well exceed the overtime pay received by the surveillance officers, who work as air pollution inspectors during the day.

When a surveillance team is not responding to odor complaints, the officers inspect refineries, factories, hospitals and other sites within their jurisdiction for pollution violations. The DEP inspectors know their territories and which plants and refineries emit what odors. They pay particular attention to those that previously have been cited for violations.

One way they can recognize a problem within a plant is by observing the plumes — the smoke-like discharge from a vent or smokestack. Harmless steam vapor dissipates at a certain point, while hazardous particles will trail off from the

dissipation point. This trail-off signifies a problem somewhere in the plant's control system, or that the plant is purposely bypassing its pollution control equipment to save money.

When a problem has been detected, the field inspectors have the authority to go inside the site and check records and equipment without a search warrant. If their access is denied, the plant can face an \$8,000 fine.

The importance of the Evening Surveillance Program is not the money it generates, but the deterrence factor, says Lembo. As long as potential polluters know DEP field inspectors are out and about, they may think twice about allowing violations and risking heavy fines.

By Adam Paratore, a DEP journalism intern from Cook College, Rutgers University



To file an odor complaint or for more information on the Evening Surveillance Program, call the DEP hotline at (609) 292-7172.

Cleaner Towns a Community Effort

A fire hydrant, a rent check for \$1,300 and a leather volume of Shakespeare's works dating back to the 1800s earned prizes for the most unusual, valuable and oldest trash found during West Milford's annual cleanup earlier this year.

But despite the prizes, a picnic and the generally festive atmosphere of the town's Beautification Day, its purpose was a serious one and resulted in the collection of more than 90 tons of litter and recyclables within three hours.

"I couldn't believe it," says Sharon Lintzenich, the town's Clean Community coordinator. "On one roadway alone, volunteers filled three 40-yard containers with trash. Public works employees were still out on Monday morning with a bucket loader, five dump trucks and a barricade in front of all the garbage collected."

More than 400 cities and towns across New Jersey administer anti-litter programs funded by a tax on the sale and distribution of products that often end up as litter: alcoholic beverages, cigarettes, paper products, food and groceries. Since the tax was created in 1986 by the passage of the state Clean Communities Act, the Department of Environmental Protection has awarded some \$30 million in grants to communities for litter control. As part of the grant requirements, every town receiving those funds must hold at least one cleanup of public lands, which include parks, streams, streets and highways.

In Atlantic City earlier this year, about 1,500 people collected 70 tons of trash from the boardwalk, streets and vacant lots as part of "Operation Clean Sweep '91." The city, which was allocated \$71,578 this year to implement a Clean Community program, has a population of 37,000, but is inundated each year by some 30 million tourists.

"Tourist trade just seems to perpetuate

litter," says Harrienne Bernstein, the city's Clean Community coordinator.

Another heavily traveled town in New Jersey is Morristown. The Morris County town with a population of 16,500 is the county seat and a main thoroughfare for businesses and county residents, drawing anywhere from 80,000 to 100,000 people who travel in and out every day. Very often, they leave behind additional litter.

On Morristown's cleanup day, 120 residents picked up 11 tons of litter and recyclables in the town, including 25 to 30 shopping carts and half a car from the Whippany River.

"In the sense that the event pulled the community together, it was a real success," says Glenn Coutts, president of Morristown Beautiful, Inc., chairman of the Morristown Clean Community Committee and the driving force in the

town's anti-litter program. "Now there are people working together, with a feeling of community pride. When people begin to feel good about the place they live, they begin to feel good about themselves."

Morristown received \$22,859 for its Clean Community program, which funds an inmate labor program, adopt-a-spot efforts and educational programs in the schools.

"The real issue," says Coutts, "is the act of littering, and not the litter itself. Our real program goal is to prevent littering, and we can only accomplish that through education."

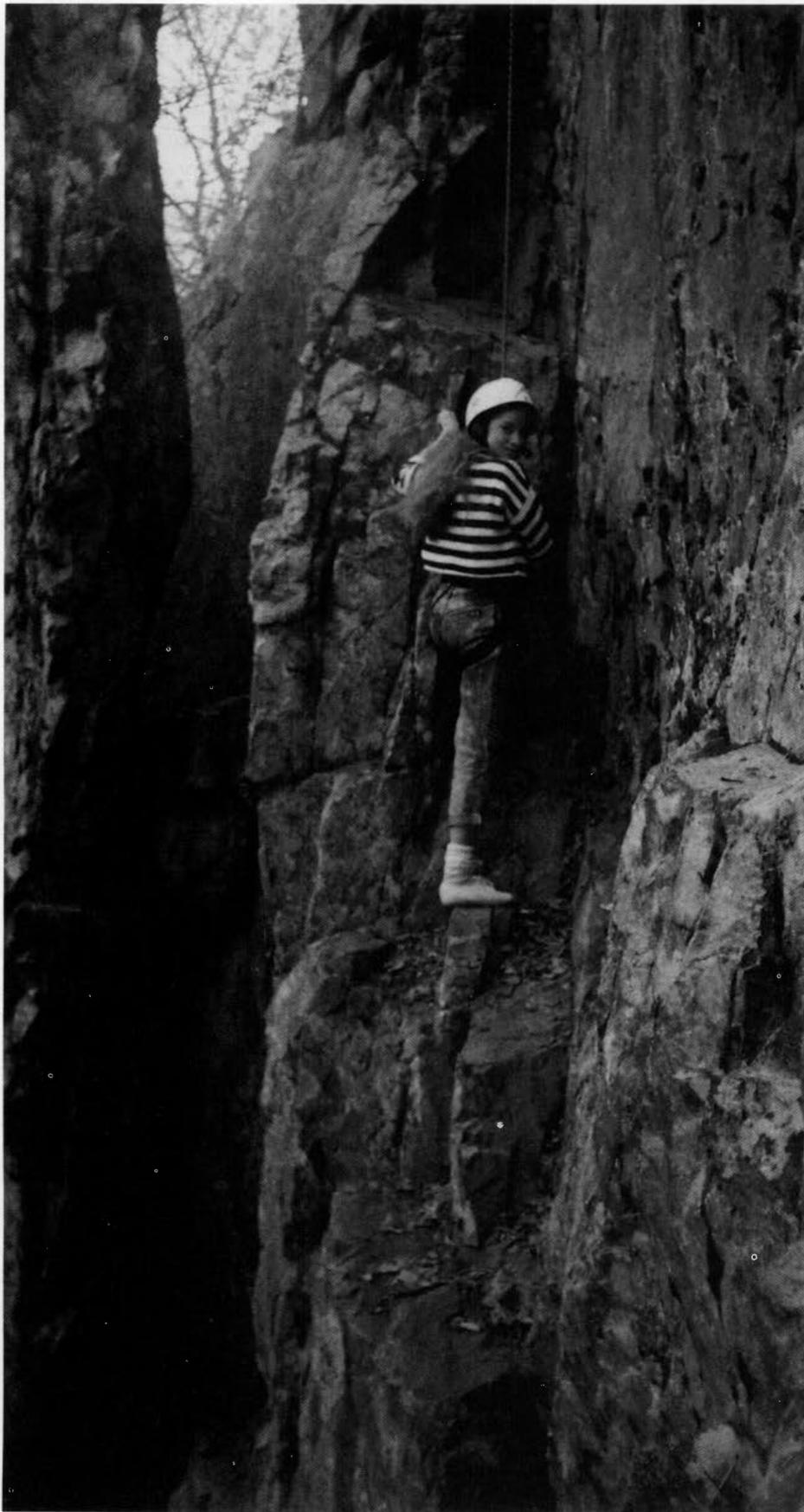
For further information on the state's Clean Communities Program, call DEP's Division of Solid Waste Management at (609) 530-8593.

By Sandy Huber, manager of DEP's Clean Communities Program

Members of Morristown Beautiful, Inc., pick up litter along the Whippany River.



BRIAN McLENNON



The Ups and Downs of Rock Climbing and Rappelling

Considering my fear of heights, I never expected to find myself 60 feet off the ground, clinging to the side of a cliff. But an introductory course in rock climbing and rappelling sounded exciting and interesting, so I decided to give it a try.

My one-day course was conducted at the Wildcat Mountain Wilderness Center in Hewitt, Passaic County. The center, located in Wawayanda State Forest, is operated by Project U.S.E. — Urban Suburban Environments — a private, nonprofit, educational corporation. Project U.S.E. took me under its wing and literally showed me the ropes.

My father and uncle were involved in starting the Wildcat Mountain Center in 1972, so when my brother Reed and I were born, the staff at the center decided to name a separate cliff after each of us. This would be my first trip to both rocks.

Before hiking to Reed's Rock for the climbing course, we first stopped at Julie's Rock for a "bouldering" class. Bouldering is practice climbing; it's done just a few feet off the ground with no belay, or securing, rope — just a spotter.

When I first saw Julie's Rock, I thought, "No way!" It looked 137-feet high and much too difficult for a novice. But after a short lesson and some climbing tips from my instructor, Jamling Norgay, I began to feel at ease. Jamling grew up in Nepal in a family of mountaineers and had been climbing since he was 6. He attended college in Wisconsin and has been teaching with Project U.S.E. for more than a year.

Julie Costello pauses for a rest on a ledge during her first rock-climbing attempt.

In bouldering, I learned that you don't need a huge ledge for each hand or foothold. With the proper technique, the thinnest crevice will do. It was great climbing practice, but I was beginning to get anxious to see Reed's Rock.

Jamling showed me how to use some equipment and explained a few techniques that later would prove helpful. I would be wearing a climbing harness made of thick nylon webbing with a loop for each leg and a waist belt. It was reassuring to learn how strong the climbing rope would be, and to be informed of the safety precautions taken for each climber.

I was instructed always to maintain three points of contact — two legs and one arm or two arms and one leg. Believe me, when you're 60 feet off the ground, you definitely want three points of contact! Since I don't have a lot of upper body strength, I was relieved to learn that rock climbers are advised to use their legs to push their weight up, rather than pull with their arms.

One mistake pointed out to me when bouldering was that I stuck too closely to the rock and therefore couldn't see all the possible holds. The object is to push yourself away from the rock. I was pretty nervous pushing myself away, but much to my surprise, it did enable me to plan my route and pick out the best places to move my hands and feet.

As I put on my climbing helmet, Jamling checked my harness and tied the climbing rope to my harness with a retraced figure-eight knot. My belayer, who was secured to a tree at the top of the climb, held the other end of the rope. When I was ready, I yelled to him and he shouted back the go-ahead. Good communication is necessary because you can't see each other. I gulped and began to take my first steps. My hands hurt a little because I was not used to the jagged edges and the roughness of the rock, but I was too excited to realize this at the time. The belay rope was kept snug. After my first couple of moves, I began to relax and even grin a little, although I was aware

that I needed to pay closer attention to my route up the cliff.

The next move was a long one. I tried to reach for it, but neither my grip nor my foothold felt secure and Jamling's instructions came rushing back to my mind: "If you aren't comfortable, don't try it." I stepped back, took a different route, but slipped and fell back a few feet. My belayer knew I was having trouble and tightened the rope. This time I was determined. I looked toward the top and knew I wanted to get there badly. Again, I tried a different route and pushed with all my strength. After a few seconds I found myself on what seemed like a huge ledge, but a few hours ago I would have laughed at the thought of even getting a foot on it.

I looked around and smiled. I knew I was going to make it.

Before the climb I had studied the cliff and planned my strategy, but it all looked so different when I was on the cliff and 30 feet in the air. I climbed with ease for a few moves, but a challenging part lay ahead of me. I began to move more to my left as there were very few holds on the right. I held my breath for what seemed like minutes as I inched to the left and threw my leg over a ledge and slowly raised myself up to the next level. Again, I reminded myself to breathe normally. I could hardly believe I was doing this. I usually get shaky about climbing a five-foot stepladder. Now I could begin to see the top of the climb and was tempted to look down, but I fought the urge and remembered to keep my eyes on the rocks.

As my belayer came into view, a few more pushes and pulls took me over the top of the cliff. I looked down and shrieked. There was no way that this rock could be that high, because now I would have to rappel back down.

I don't think I had ever been so thirsty. Once your adrenaline gets pumping it really dries out your throat. After a quick snack, I began to get ready for my first rappel. I had seen people rappelling on TV and in the movies. They glided down the mountain with a series of perfect bounces.

For me, rappelling was harder than it looked, and a little scarier than rock climbing.

Jamling gave me instructions and reviewed the safety procedures for the rappel. I would be in total control of how fast or slow I would descend the cliff. The rappel rope was anchored to the top of the cliff, then ran through a figure-eight descender, and then continued down to the ground. The belay rope was tied around my chest with a bow line on a coil knot. I gripped the rappel rope and I was off. I kept my right hand on the rope and behind my back — this was my brake hand and controlled my rate of descent. It was difficult to get into the correct position. I leaned back until my feet were flat against the rock, and began to feed the rope through the figure-eight descender.

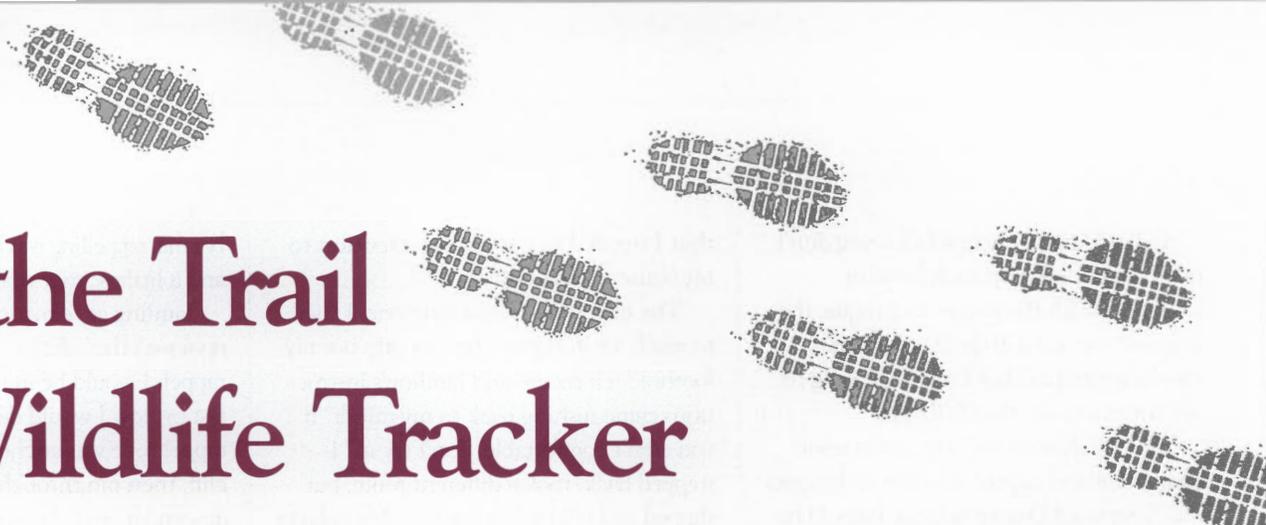
Rappelling was a real adventure. I stopped half way down the cliff to enjoy the peace and quiet of the mountains, and saw only the rock, my safety rope and the blue sky above.

I rappelled down over a series of steep ledges, trying to keep my feet well apart. I found out the hard way what happens when you keep them too close together: You tilt over and bang into the rock.

After landing at the bottom of the rock face, I breathed a real sigh of relief. The day had been exhilarating. It was a great feeling to look up from the bottom of the cliff and feel proud that I had just accomplished what had seemed the impossible.

By Julie Costello, a senior at Holy Cross High School in Delran

Project U.S.E. — Urban Suburban Environments — is a private, nonprofit, educational corporation that provides outdoor experiences for public and private schools, college, community organizations, state agencies and corporations on a year-round basis. For additional information, write Project U.S.E., P.O. Box 3315, Long Branch 07740, or call (908) 870-6650.



On the Trail of Wildlife Tracker

By Tanya Oznowich

The four of us stood quietly at the edge of the thriving green meadow that once was controlled by a farmer's tractor and many seasons of corn. Manicured fields are a typical scene in central New Jersey, except for these "greening," life-filled five acres outside of Phillipsburg that are nurtured by author and educator Tom Brown. Here, the meadows and woods, farmhouse and barn are home to his internationally known tracking, nature and wilderness survival schools.

"We've encouraged this area to return to its natural state," Brown told his three visitors. "The students and I have done a lot of planting. Fertile land and a variety of vegetation attract insects and mammals. They, in turn, attract birds and larger mammals. Everything is connected, you see. All things affect something else."

This 40-year-old, matter-of-fact giant of a man, also known as "the tracker," bent his tall, well-built frame and pointed gently to the tousled, matted grass and weeds surrounding us. "What do you see here?" he asked. Our imaginations pictured a scampering mouse, a butterfly and an occasional bird gathering its nesting material. We strained to see remains of these possible visits — a track in the soil, a feather — but our untrained eyes found nothing.

Brown pointed to a slight, oval impression in the grass and outlined it with his finger. "A male fox walked through here last night in search of food. Do you see where this blade of grass is twisted? The fox must have startled a bird resting in that stand of trees and he turned and paused to listen. He then proceeded to leave the meadow in this direction." Brown's finger confidently continued to make obvious a series of slight impressions that previously were invisible to our own eyes. He then traced the path of an active rabbit and that of a foraging doe that left behind her tracks more than two days ago; and all that the three of us had seen was grass.

"Every mark is a track," Brown said as we, too, left the meadow. "Every track is the signature of a creature that is most likely still moving somewhere else."

We followed Brown as he walked stealthily up a dirt path that meandered through a mixed stand of mature trees and young saplings, also planted with his guidance. Here, the ground was shaded and the woods were alive with the hum of insect and bird activity. We could not help but stare at this man before us who planted each step firmly on the gravel, leaf and stick-strewn path, yet made no noise with his feet. His eyes darted from side to side and we sensed that his ears and entire body were observing and remembering everything about us and around us.

As we scuffled along noisily at his side, Brown once again drew our attention to unseen tracks and animal runs left by the inhabitants of this peaceful area. He spoke with respect of such close neighbors as a great-horned owl, pheasants and a variety of amphibians and reptiles. His ears seemed to absorb the surrounding cacophony of sounds, as if recognizing every one.

"Wildlife is all around us. People must learn to walk slowly and use all of their senses in

Tom Brown walks through the woods outside of Phillipsburg that are home to his tracking, nature and wilderness survival schools.



Tom Brown



PHOTOS BY LEE ATWATER

order to notice them and their trails." He paused to sigh. "Look at the problems that the earth has because we have forgotten that it is part of our flesh and home to so many other creatures." The four of us walked out of this now magical, busy woods.

Tom Brown's study, a cozy room on the side of his rented farmhouse, contains a comfortable, cluttered collection of nature and ancient and modern technology. His computer and printer are necessary tools in the creation of his numerous books and field guides, all striving to communicate his unique combination of knowledge, philosophy and skills to thousands of readers. Surrounding this machinery are skulls and bones, stuffed mammal and bird mounts, feathers, dried plants and herbs, wooden bowls and spoons, Native American hunting implements and many books, charts and maps. Clearly, the earth has been brought indoors.

"Is it really true that you stalk deer and touch them from behind before they realize that you are there?" he was asked. Brown's steel-blue eyes gazed into ours as he answered the question. "Of course," he replied. "I've even had some of my students accomplish this."

We also learned that Brown's identity is well-known by the FBI. Since the early 1970s, this man, claimed by many to be the best tracker in the country, has been called in to assist with close to 600 cases

internationally. Brown and some of his students have hunted for missing children, drug dealers, escaped convicts, illegal dumpers, stolen vehicles, rabid animals and lost hunters, along with assisting in military and police training programs. "A person's tracks tell me much more than who he is, what he weighs and where he is going," Brown said. "They tell me how he ties his shoes, when he combs his hair and hundreds of other things."

Tom Brown's interest in nature and the outdoors emerged during his childhood when, as a young boy, he would spend hours in the woods playing and collecting fossils. Growing up in a small town bordering New Jersey's Pinelands, Brown was 7 years old when he met Stalking Wolf, an elderly Apache tracker, scout and hunter from Mexico who traveled to New Jersey to visit with his son and grandson, Rick. For 10 years, Tom and Rick spent all of their free time with Stalking Wolf, disappearing into the semi-wild Pinelands during their evenings, weekends and summers. Stalking Wolf's knowledge, beliefs and skills made him the boys' mentor and guide as he creatively trained them in the areas of nature awareness and observation, Native American philosophy, stalking, tracking and survival.

Though Tom and Rick spent countless hours learning how to stalk, hunt, fish, make shelters, clothing and tools, and create a matchless fire, Tom's passion became tracking. The boys spent hours observing and following humans and other animals to examine, draw and



Tracker Tom Brown claims he can sneak up on deer and actually touch them.

memorize the tracks and signs left behind. They tracked ants, snails, dogs, birds and each other. Tom kept a record of everything that he learned and set up experimental plots to observe aging tracks.

Stalking Wolf taught Tom and Rick to track by compression — identifying slight depressions in the ground by their shape, pattern and arrangement. The boys also learned the Apache method of reading pressure releases, a series of ridges, indentations and bumps within a track. With hundreds of pressure and semi-pressure releases in one print, the tracker can read them and learn about the person or animal's direction, age, height, weight, whether it just ate, if it has a cold and numerous other details. With all of these gained skills, young Tom Brown was able to thoroughly examine any given area for what happened in it moments ago, months ago and years passed.

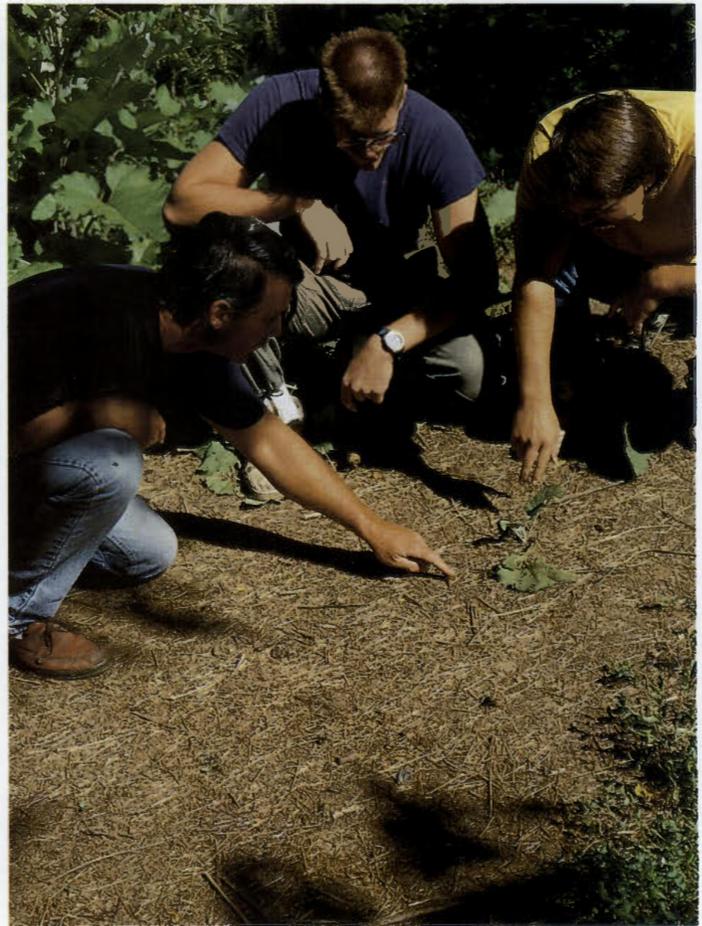
"Always look at the ground as if it were a manuscript," Brown now tells his students. "There is not a portion of the landscape that has not been written or re-written every day. Tracking is like opening a book, reading a story and imagining a picture."

When Brown was 18, he graduated from high school, and both Rick and Stalking Wolf left New Jersey. He spent the summer "living off of the land" in the Pinelands and later returned to the same woods to live there for a full year with only a knife and loincloth. Feeling restless and unsure of what to do, Brown spent the next several years traveling, working odd jobs and expanding on and testing his skills by living for months at a time in such areas as the Grand Canyon, Death Valley, the Grand Tetons and the woods of Maine. He also visited many Native American reservations to seek new wisdom and practices. Pressured by family and friends to pursue a profession, he found himself back in New Jersey. The tracks of a raccoon led him into the back yard of a woman named Judy Ford, who eventually became Brown's supportive wife, and he became the father of Judy's two children and eventually of their own son, Tommy.

In the late 1970s, after a series of successful searches and hunts for lost persons and rabid animals, a publisher contacted Brown and the result was the first book about his life as *The Tracker*. After receiving more than 10,000 letters of response from eager readers who wanted to learn more from this unique individual, his wife encouraged Brown to share his skills and start a wilderness survival school — and so it all began.

Each year, more than 2,000 students from around the world attend Tom Brown's tracking, nature, wilderness and survival courses, with two-thirds returning for additional "specialty" courses after surviving the required "standard course." Most courses are seven days in length and are held year-round at Brown's farm or in the more secluded areas of the Pinelands. All of the courses are taught by Tom Brown himself, although a number of loyal and informative instructors are always on hand to deliver brief lectures and to lend assistance.

The courses attract participants of varied ages with different reasons for attending. Lawyers, therapists, teachers, salespeople, machinists, students, seniors, parents, travelers, police officers and game wardens continuously sign up with varied feelings of eagerness, anticipa-



Tom Brown (left) points out a wildlife track.

tion, curiosity and doubt. Each leaves their home, family, friends, profession and surroundings for a week of simple meals, a hard bed and busy days and nights outdoors. One of Brown's basic goals is to have students return to their environment with a changed sense of values and a different way of thinking. "The more comfortable you are in the woods, the more aware you are of the earth and your place on it," Brown shares with his classes. "The mark of a survivalist is that he or she will proceed to make the best out of every situation."

The curriculum of the standard course has been "fine-tuned" throughout the years and is a tightly packed introduction to the life and mind of Tom Brown. Brown feels that his purpose in life is to share and pass on his knowledge, skills and experiences. On the first day of class, he encourages his students to fill their notebooks, ask questions and "be a sponge this week."

One of Brown's
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For seven days, students emerge from their sleeping bags at dawn to prepare daily meals of stew or hot cereal and participate in classes after cleanup. Students construct shelters, locate water sources, gather edibles, erect traps and snares, burn and dig out wooden bowls and spoons, and carve arrowheads out of bone. In their "free" time, students practice throwing rabbit-hunting sticks, making a fire from a bow and drill and stalking each other. One special evening involves a sweat lodge, a Native American ritual designed to cleanse the spirit.

Many "tracking" hours are spent in the barn's classroom with lectures that last well into some evenings. Brown draws patterns, tracks and pressure releases on the chalkboard and teaches the students to examine and understand the tracks he leaves in his tracking box, an enclosed area of fine sand. He asks the students to observe and remember how the tracks change when he jumps, jogs, pauses, turns and halts abruptly. During the day, students set up experimental plots to observe aging tracks and search fields and woods, sometimes on hands and knees, for slight depressions in the ground.

"Tom Brown has a way of making any area come alive," one participant remarked after taking the standard course. "I'm never bored now when I'm outdoors because there's so much to be a part of." In most instances, students return home

after seven days with a closer bond to the earth, Brown says.

We questioned Brown about his outlook for the future of the environment. He answered slowly, "The earth is not well. In making decisions for the future, it is too easy to overlook critical issues and take "token" actions. Resources are being mismanaged and wasted and people act as though the air, land and water don't matter. We are a society of people who are killing our grandchildren to feed our children. What legacy are we leaving for them? Think about it."

As Brown accompanied the three of us to our vehicle parked nearby, we asked him what advice he had for New Jersey residents.

"Regarding wildlife, people can make almost every home a sanctuary that would actually draw wildlife to it. In general, people should learn to slow down, simplify their lives and observe and appreciate what is around them. Get outdoors — nature isn't a disease. Above all, people should become more conscious of what impact their decisions will have on the earth."

Available at most bookstores around the country are five books that Brown has written or

coauthored about his life, *Stalking Wolf* and Native American philosophy. Also available is a series of field guides focusing on topics covered in Brown's classes, along with city and urban survival and children's activities. New Jersey Network sells two videos that bring Brown to the television screen. Finally, besides writing and teaching, he has been busy taping a series of programs that will air on a cable network beginning in the fall.

Tanya Oznowich is an environmental educator for DEP's Office of Communications and Public Education.

Some Common Wildlife Tracks

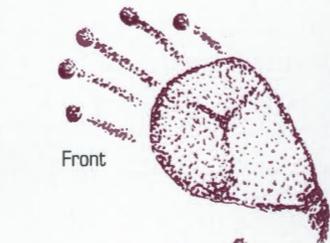


Front



Rear

Red Fox
(*Vulpes fulva*)



Front



Rear

Porcupine
(*Erethizon dorsatum*)

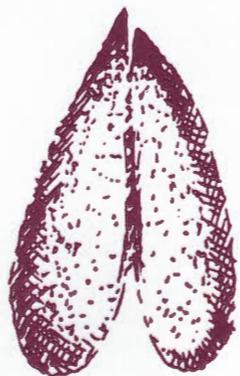


Front



Rear

Bobcat
(*Lynx rufus*)



Whitetail Deer
(*Odocoileus virginianus*)



Front

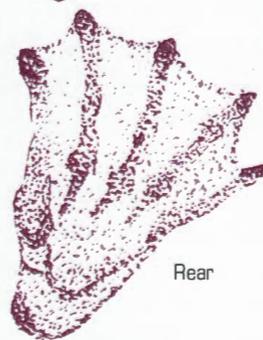


Rear

Coyote
(*Canis latrans*)



Front



Rear

Beaver
(*Castor canadensis*)

TRACK ILLUSTRATIONS BY HEATHER BOLYN

Tracking Down Further Information

Available from Tom Brown, Tracker, Inc., is a complete listing of course descriptions, prices and enrollment information, a schedule of upcoming classes and an order form and price list for Brown's books and field guides. Write to Tom Brown, Tracker, Inc., P.O. Box 173, Asbury 08802-0173, or call (908) 479-4681.



Responsibility the Focus of Hunter Education Efforts

By Patrick C. Carr

The morning air is crisp, the landscape a palette of crimson, yellow and orange. The honking of migrating Canada geese signals the onset of autumn. Fall is a special time for hunters. A hunting trip provides relaxation and recharges the spirit. The companionship of hunting partners and the events in a hunting day provide many memories to be retold and relived for years to come.

But along with the enjoyment comes the responsibility to obey the rules and regulations set by the Department of Environmental Protection's Division of Fish, Game and Wildlife and the U.S. Fish and Wildlife Service. The vast majority of hunters are law-abiding citizens who adhere to season dates, bag limits and other rules. Some individuals, though, are poachers and wildlife law violators who steal animals and degrade habitats.

In the spring of 1990, the New Jersey Legislature unanimously passed the Sportsman Responsibility Bills, which increased the penalties for violators, included license revocations

on the first offense for serious violations and established a remedial education program for those who had their licenses revoked.

New Jersey is the first state in the nation to develop a curriculum for retraining hunters who have had their licenses revoked for violations of fish and game laws. The program is not part of the punishment, like the fines and revocation, but part of the rehabilitation process. The objective is to change the attitudes of violators so they recognize that wildlife has a value, and that there is a responsibility to use it and its habitats in a proper manner.

"Establishing a better understanding of natural resource conservation, nurturing the idea that a wise use of our natural resources is necessary and will ultimately determine the future of all living things in New Jersey, is the first step in accomplishing that goal," says Bob McDowell, director of the Division of Fish, Game and Wildlife.

The division also has initiated a program called HUNT SMART, an extension of its efforts to educate hunters by raising their sense of responsibility and safety awareness. The hunter education course, mandatory for all first-time hunters, will include expanded emphasis on the responsibilities of a hunter, and more demonstrations using shoot/don't shoot scenarios, safety zone examples and range exercises. Also, division biologists will present HUNT SMART information at seminars for deer, turkey, waterfowl and small-game hunters in an attempt to reach all hunters, not just the first-time ones.

The division and the New Jersey Federation of Sportsmen's Clubs jointly sponsor Operation Game Thief, which provides a toll-free telephone line that allows citizens to report violations of laws protecting wildlife. This program primarily involves violations dealing with big game, turkey, bobcat and endangered species, illegal harvesting of small lobsters, dumping of hazardous, toxic and solid waste, and poisoning of birds.

"We need to realize that our own actions directly influence our natural resources; that each and every one of us is responsible to our environment and the wildlife that inhabits it," says George McCloskey, president of the Federation of Sportsmen's Clubs.

"Operation Game Thief can remain a success only if we realize that we are all genuinely a part of the solution, and that individual cooperation and action form the foundation on which the future of our natural resources depends."

In one year, 50 calls were received, resulting in 95 summonses issued. Although Operation Game Thief offers a reward for information, only one person requested it. Most callers feel that the reporting of wildlife crime is part of their civic duty and want only that the violator be prosecuted. Callers may remain anonymous. The number, 1 (800) 222-0456, is answered 24 hours a day by an answering machine.

The Sportsman Responsibility Bills, HUNT SMART and Operation Game Thief are three ways New Jersey is helping to protect both its hunters and wildlife.

Patrick C. Carr is Hunter Education administrator for the Division of Fish, Game and Wildlife.



RUSS WILSON

It's important to exercise caution in the field. Here, a handler holds his dogs back as a second hunter flushes a pheasant.

Hunter education teaches participants how to properly line up and space themselves (opposite page) when hunting small game, as well as other safety techniques.

An instructor teaches shotgun safety to a group of boys.

New Jersey Rates High in Safety

Thousands of New Jersey hunters return safely each hunting day, thanks in no small part to the success of hunter education.

Safety statistics kept by the Division of Fish, Game and Wildlife's Hunter Education Unit show that the chance of a hunter being injured by another is less than one in 129,000 hunting days. In 1990, only 26 hunting accidents were recorded in more than 3,350,000 hunting days in New Jersey.

"The division has been actively involved in establishing a quality hunter education program for 37 years, one which stresses safety, conservation and ethics, and New Jersey now boasts one of the

finest hunter education programs in the nation," says Bob McDowell, director of the Division of Fish, Game and Wildlife.

Hunter education training on a voluntary basis had been available since 1954. Starting in 1972, however, new hunters, regardless of age, were required to attend a hunter education course to purchase their first hunting license.

That requirement has made a dramatic difference. New Jersey hunters were involved in an average of 60 accidents per year in the 1960s. Over the past three years, hunters were involved in an average of only 18 per year.

Volunteer instructors trained by biologists in the

division's Hunter Education Unit teach three separate courses: a basic firearms course (shotgun); an advanced firearms course (rifle/muzzleloading rifle); and a basic bow and arrow course. To complete the training, each student must show a responsible attitude, pass a written exam with a score of at least 80 percent and demonstrate safe use of firearms and safe and accurate use of archery equipment during a field test.

Hunter education courses are held in every county throughout the year, but primarily from August through November. The curriculum includes such topics as gun and bow safety, hunter responsi-

bility, wildlife management, fish and game laws and the contribution of hunters toward the conservation of wildlife.

New Jersey's hunter education program consistently receives high ratings from professional organizations. The National Rifle Association's Hunter Services Division recognized the program as one of the "Top Ten" hunter education programs in North America in 1990. The International Association of Fish and Wildlife Agencies also consistently rates New Jersey hunter education as a "AAA" program.



PETE MCCLAIN

Thousands of sportsmen who once fished for trout only in the spring now enjoy year-round fishing.



PHOTOS BY RUSS WILSON

Waters Stocked for Great Fall Trout Fishing

By Russ Wilson

It wasn't all that long ago that trout fishing in New Jersey was a spring-fling type of fishing. Using a system that began more than 50 years ago, the Division of Fish, Game and Wildlife each spring released more than a half-million hatchery-reared trout into selected waters throughout the state.

These fish, raised to a length of between 9 and 10-1/2 inches, were stocked during an all too brief period



Opening day of trout season at Big Flatbrook in Sussex County finds fishermen standing side-by-side, a sight you're not likely to see in the fall.

Division of Fish, Game and Wildlife workers stock the Manasquan River with trout in the spring and again in the fall.

starting a couple of weeks prior to opening day of trout season in April and continuing through the month of May.

The division hoped to provide the kind of trout fishing experience that anyone could enjoy, and in that it was very successful, each year selling more than 130,000 trout stamps.

It was strictly a "put and take" fishery, with workers from the Charles O. Hayford Hatchery in Hackettstown releasing a fresh batch of trout each week and anglers flocking to lakes and rivers to catch the fresh-stocked fish before they had a chance to become accustomed to their surroundings.

But the opening of the Pequest Trout Hatchery and Natural Resource Education Center at Oxford brought about major changes in New Jersey's trout fishery. Biologists discovered they could raise more, and on average, larger trout at the new facility, and a fall stocking program was instituted. Today, thousands of sportsmen who once fished only in the spring enjoy year-round trout

fishing that is as good as any found in the East.

When it comes to trout fishing, one visualizes a quiet meadow stream nestled in a near-wilderness setting, its surface dimpled by the rise of a feeding fish. Completing the picture is a solitary angler, waist-deep in the crystal-clear water, delicately casting a fur-and-feather creation with the hope of seducing a brightly colored native brookie.

Some things will never be. It is safe to say that one is not likely to find a near-wilderness setting or anything even remotely resembling a quiet meadow stream on the opening day of trout season in a state that is ranked as one of the most highly industrialized and densely populated in the nation.

But come September, it's another story as the flood of anglers dwindles to a gentle trickle.

Fly-casters as well as sportsmen with experience at fishing natural baits are just beginning to realize the full potential of late-season trout fishing. But even though more anglers are taking to the rivers and streams, there is plenty of room to fish without encountering a crowd.



Surprisingly, few otherwise savvy trout fishermen take advantage of the late fall and winter fishery. A trip to the Ken Lockwood Gorge area of the South Branch of the Raritan River in November was, to say the least, revealing. In the more than three hours we spent fishing some of the finest pools in the gorge, we saw only four fishermen. It was a refreshing change of pace considering that during peak periods in April and May, we often see 50 or more fly-casters wading the fast-flowing waters of Ken Lockwood Gorge.

The beauty of late-season trout fishing is that it can be enjoyed by anyone wanting to wet a line. For a three-week period in October, the Bureau of Freshwater Fisheries stocks trout into every major stream and many of the principal lakes and reservoirs, focusing primarily on lakes and ponds in southern New Jersey and placing major emphasis on rivers and streams in central and northern areas. These waters also are included in the pre-season and in-season stocking programs.

Although the number of trout released during the “second season” varies from year to year, the total usually exceeds 100,000. In 1990, for example, more than 45,000 standard production trout measuring from 8 to 10 inches, 1,500 excess breeders and more than 100,000 surplus fish were stocked during October.

There is no doubt that Hunterdon, Warren, Morris and Sussex are the best areas for late-season trout fishing. Located within the boundaries of these northwestern tier counties are the state’s foremost trout streams, most of which have the water flow and habitat to support year-round fishing.

Ask a dozen anglers to list their favorite trout stream and you probably will get a dozen different answers. But few will deny that Big Flatbrook in Sussex County is one of New Jersey’s best. A classic stream, it harbors brook, brown and rainbow trout on a year-round basis.

Running a very close second is the Musconetcong River, a freestone stream that winds its way through

Jim Campbell of Toms River fishes for trout on the Pequest River in Warren County.



Sussex, Morris and Hunterdon counties before joining the Delaware River.

The South Branch of the Raritan River is a favorite of many knowledgeable trout anglers, and for good reason. The entire river, from its headwaters below Budd Lake to its confluence with the North Branch near the town of South Branch, has abundant insect life and exceptional trout habitat.

A section of the South Branch, the Ken Lockwood Gorge, is considered by many the most productive and scenic area for trout fishing in the state. Having fished the gorge for more than 30 years, I tend to agree. This section of the South Branch is limited to fly-fishing from mid-April through September, but bait fishing is permitted from then until the close of trout season in mid-March.

There are many streams offering equal opportunities for late-season trout fishing. The Pequest River, Paulinskill River, Rockaway River, Ramapo River, Pohatcong Creek, Black River, the North and South branches of the Metedeconk River, the Manasquan River and Toms River are included in the fall stocking program, and each can be counted on to provide exciting sport.

Fall and winter trout fishing can be extremely productive and at the same time equally frustrating. There is a world of difference between knowing a stream harbors an abundance of trout and having the expertise to catch those fish.

Trout that have become accustomed to life in the wild survive by feeding on a diet of natural foods. These are not the dumb, grab-anything-that-looks-like-food, brookies and rainbows that dominate the early season fishery.

Tricking stream-wise trout requires a more delicate approach. If there is a key to being a success at late-season trout fishing, it is knowing the types of foods that are common to the stream, using artificial lures or baits that closely resemble these foods and presenting them in a way that allows the lure or bait to appear natural to the trout.

Fly-fishing enthusiasts know that many natural insect-hatches occur just after sunrise or during that all too brief period when the sun is about to drop beneath the western horizon, and will plan fishing trips to coincide with times that offer the best opportunities.

Although fly-casting is considered the ultimate trout-fishing experience, it does take a bit of learning and may not appeal to everyone. No problem. Anglers having expertise at using all types of tackle and various natural baits share equally in the late-season bounty.

Sportsmen who prefer to use spinning tackle, and this

includes the majority of Garden State freshwater anglers who go fishing for trout, are advised to use the lightest tackle that will do the job. Ultra-light rods measuring between 4-1/2 and 6 feet in length and reels filled with 2- or 4-pound test line are more than adequate for stream work.

Anglers planning to sample the action in large lakes and reservoirs, where live baits often come into play, might opt for a slightly heavier rod, say 6 to 7 feet, a mid-size reel and 6- or 8-pound test monofilament line.

Hook size is equally important. Expert trout fishermen recommend beak-style hooks constructed of light wire in size 10 through 14 when using small baits such as a garden worm, salmon egg, Power Bait or mealworm. Large baits, including live fat-head minnows, shiners or night crawlers, may require a slightly larger No. 6 or No. 8 hook.

In addition to having the right tackle and proven baits, a stealthy approach and flawless presentation of the bait or artificial lure are essential.

Trout that have adjusted to life in the wild usually are found in deep pools, backwater eddies, riffles and in front of or alongside rocks, trees and other obstructions that provide a resting area out of the main flow of water. Find an area having these characteristics, present the lure or bait so it looks real and chances are a trout will grab it.

The trout are there for the taking. The rest is up to you. To enjoy this under-utilized fishing, you will need a freshwater fishing license and a trout stamp. A resident license costs \$12.25 and a resident trout stamp will cost an additional \$6.25. Non-residents are charged \$19 for a license and \$11.50 for the trout stamp.

Russ Wilson is an outdoor writer who lives in Neptune.

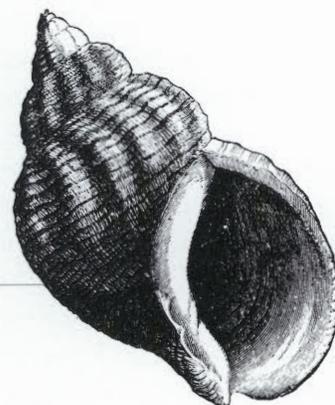
A complete list of stocked waters, rules and regulations for New Jersey trout fishing is included in the December 1990 edition of the New Jersey Fish & Wildlife Digest. Free copies are available at license-issuing agents and sporting goods stores, or by writing to the Division of Fish, Game and Wildlife, CN 400, Trenton 08625-0400.

Travel Back to Jersey's Seashore of the Past

Memories of a Bygone Era in Cape May and Beach Haven

Early visitors to Cape May (below) wore plenty of clothing on the beach to avoid exposure to the sun.

Salt water taffy, featured at this stand in Cape May (right), was a trademark of the Jersey shore as early as the turn of the century.



By Marsha Cudworth and John Bailey Lloyd
Hand-painted photographs by Howard Michaels

The Atlantic coastline of New Jersey extends more than 90 miles from Sandy Hook to Cape May. Until the middle of the 19th century, when railroad seashore lines were extended across the state, the desolate barrier islands with their wave-washed sandy beaches and mountainous dunes were as remote as any spot on Earth. Virtually uninhabited, they were, during winter storms, the scene of many a shipwreck.

The U.S. Life Saving Service (see cover photo) was formed in 1871 to rescue the many wrecked mariners and passengers. A three-man contingent guarded the beaches through 43 winters until finally, in the twilight of the sailing era, they became the U.S. Coast Guard in 1914.

Barnegat Light at the northern tip of Long Beach Island was a favorite subject for the camera, and equally famous was the sprawling three-family "Keeper's House" at the base of the light. Built in 1889, it was torn down in 1920 as it was destined to be washed into the sea.

The great seashore resorts, which sprang up in the 1800s, were nearly all built with railroad money. Beach Haven, at the other end of Long Beach Island, did not exist until the Tuckerton Railroad was completed in 1871 on the mainland. Connections then could be made with Philadelphia and New York, but even

PHOTO CIRCA 1905

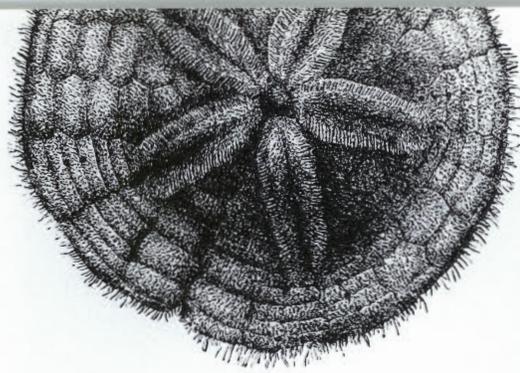




Tents were a tradition on the beach in Cape May as they are today. The Iron Pier in the background, however, no longer exists.

PHOTO CIRCA 1900





Commercial fisheries at the northern end of Long Beach Island send their catch to New York and Philadelphia fish markets from a railroad stop at Barnegat Light.



Victorian architecture still lines Ocean Street in Cape May.

Visitors to Beach Haven stroll over to the soda fountain at the corner drugstore for ice cream.



PHOTO CIRCA 1910

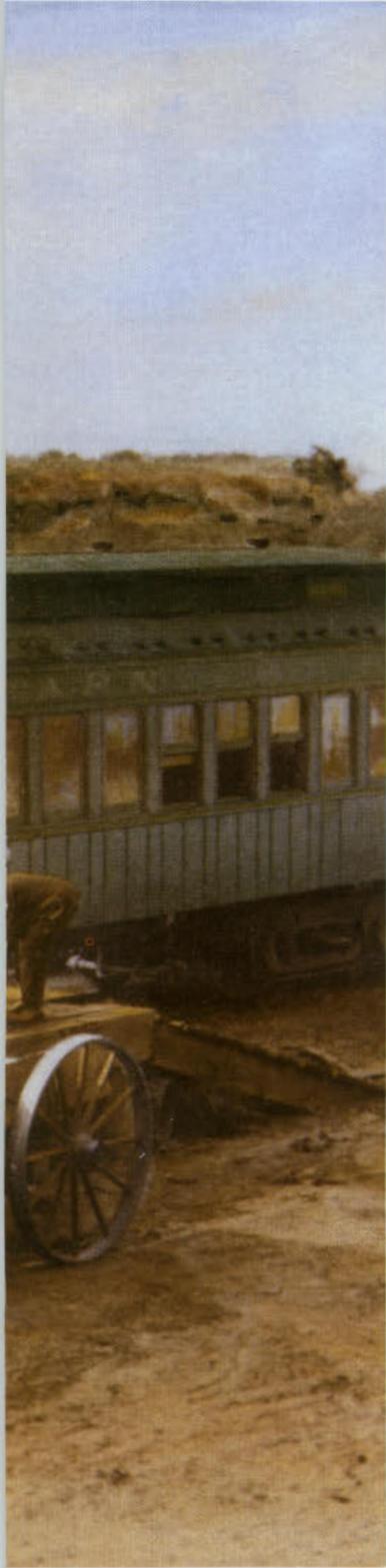


PHOTO CIRCA 1910



PHOTO CIRCA 1904

Sludge: From Waste to Beneficial Products

Good, clean
sludge mixed
with soil
results in a
richer
topsoil, capable
of supporting
more crops.

By Judy Morgan

Imagine a rich, brown crumbly substance that provides valuable nutrients and minerals for soil and allows soil to hold moisture and resist erosion. Even better, it is harmless and available in large quantities at a low cost — much lower than competing products like fertilizer or peat moss.

Sound too good to be true? Not at all. The substance is — or soon could be — sewage sludge. Under policies now being developed by the Department of Environmental Protection, many sewage authorities will make clean composted sludge or other sludge-derived products available to the public over the next few years.

Sewage sludge is not well understood by most people. If you ask someone what sludge is, they'll likely guess it's the stuff at the bottom of a crankcase oil pan or the solid part of human waste. Actually, sewage sludge is the bacterial residue that remains after sewage is treated by modern treatment plants. It is not human waste. During treatment, sewage is "digested" by large volumes of "good" bacteria, which transform the waste into harmless by-products. These by-products — mostly bacterial cell mass and harmless organic matter — then are separated from the treated water to become sludge.

Sludge is a relatively recent development in the history of human waste management. In primitive societies, wastes simply were deposited on the land or into holes dug in the ground, as with outhouses. In early cities, human waste often was dumped into ditches that ran along streets, resulting in numerous health problems

and occasional epidemics. With the rise of modern sanitation, sewer lines were laid to carry the waste away. The waste still was released directly into the environment, but usually in an area away from where people lived.

Eventually, people realized that untreated sewage created serious health and environmental problems. The science of sewage treatment was born and the first sludge was created. However, as environmental concerns grew in the 1960s and 1970s, sewage treatment and the resulting sludge improved. "Primary" treatment — the settling of solids from sewage — was supplanted by "secondary" treatment — bacterial digestion of sewage, and even "tertiary" treatment — advanced wastewater processes.

Better Treatment, More Sludge

With these advances, sludge no longer was settled waste, but a processed by-product. In New Jersey, all sewage treatment plants are, or soon will be, at the secondary treatment level, and many are at the tertiary level.

As the treatment of sludge improves, a strange thing happens: The amount of sludge created increases. This is because better treatment means more bacteria digesting the sewage, and the greater number of bacteria in turn means more cell mass to form sludge. So as New Jersey improved its sewage treatment, it also created a problem with sludge management. Up until recently, most of this sludge was handled in two ways — dumped in a landfill or dumped in the ocean off Sandy Hook. Due to declining space in



Keith Siroky, manager of Harmony Dale Farms in Warren County, looks over his corn crop. The farm uses sludge on its fields.

landfills, New Jersey banned the disposal of sludge in landfills in 1985. Then, in 1988, a law was passed banning ocean dumping of sludge by last March. The Legislature recognized that ocean dumping really didn't solve the sludge management problem — it just transferred it to the ocean, where the sludge could deplete marine life and pollute coastal waters.

"Our oceans and waterways have not evolved to absorb or recycle sewage sludge or other wastes generated by land ecosystems," says Tim Ruby, principal geologist with the Division of Water Resources' Bureau of Pre-treatment and Residuals.

After years of work by sewage authorities to develop alternatives to ocean dumping, ocean dumping of sewage sludge finally ended on March 17. However, much of the sludge that used to be dumped in the ocean is now being hauled away to out-of-state landfills, some as far away as Texas. Naturally, these other states don't like the fact that New Jersey is filling up their landfills with sludge, and efforts have been initiated in Congress to stop the interstate shipping of sludge and other wastes.

The Benefits of Sludge

Is there a better way to manage sludge? There certainly is. Sludge, if properly treated, doesn't need to be disposed of at all. It can be recycled — or beneficially reused — as a fertilizer and soil enhancer. Good, clean sludge mixed with soil results in a richer topsoil, capable of supporting more crops. Composted, it can be used to restore damaged land,

such as at construction sites. In pelletized form, it can be spread on lawns, gardens and fields as fertilizer.

"Most people are amazed to see how simple and how benign a process it is," says Dale Crouse, a fourth-generation farmer with Harmony Dale Farms in Harmony, Warren County.

Crouse has had a permit from the DEP since 1984 to use sludge on the 1,000-acre farm he owns, and is operator of AgOrganic Inc., a company that processes sewage sludge into fertilizer and sells it to out-of-state farmers.

Crouse applies the treated sludge to his fields, which produce feed crops such as corn, hay, winter barley and winter rye, before he plants the crops and in between harvests. The sludge, he says, helps maintain the soil's proper pH level, and adds to its moisture-holding capacity.

"The average amount of organic material in topsoil should be 12 to 15 percent," Crouse says. "With wind erosion, soil erosion and chemical farming the last 30 to 40 years, the percentage of organic material has dropped as low as 6 to 7 percent, and productivity goes down. With sludge, we're building back the organic material."

What does it take to beneficially reuse sludge? First, it must be free of harmful contaminants. Many contaminants, such as metals, are discharged in the wastewater created by industrial facilities. To remove these contaminants, pre-treatment is required. Pre-treatment is the process of treating the wastewater created by industry right at the plants where it is generated, rather than allowing the wastewater to be

Existing In-State Land Application Operations (as of September 1990)

As of 1990, approximately 10% of New Jersey's sludges (180,823 dry lb./day or 32,964 dry tons/yr) were being recycled through land application. By way of comparison, according to the United States Environmental Protection Agency, approximately 40% of municipal sewage sludge in the United States is being land applied in one form or another. Below is a table of existing in-state land application operations.

Facility	Approximate Size of Application Area	Crops Grown
Ag Organic Harmony Dale Farms, Warren County	148 Acres	field corn, reed canary grass
Applied Land Science Sunnyside Farms, Burlington County	290 Acres	all crops except human food chain crops
Applied Land Science Rancocas S. P., Burlington County	90 Acres	corn, alfalfa, barley, wheat
Ash Lane Farms, Salem County	170 Acres	field corn, hay, grains
Caprioni's Sewerage, Cape May County	24 Acres	field corn, hay, grasses
McKenzie Inc. Honey Suckle Farms, Burlington County	210 Acres	barley, soybeans, field corn, wheat, rye, canary grass, sudan alfalfa
Pemberton Township MUA*, Burlington County	129 Acres	corn, soybeans, wheat, alfalfa, rye
Cumberland County MUA*, Cumberland Nursery, Cumberland County	76 Acres	shrubs, small grains, grasses
Cumberland County MUA*, Newkirk Sod, Cumberland County	136 Acres	sod, corn, soybeans, grasses, hays
Township of Bernards SA**, Fellowship Deaconry, Somerset County	25 Acres	corn, sorghum, grass, hay, rape
Lambertville SA**, Hunterdon Hills Farm, Hunterdon County	108 Acres	corn, grass, hay, soybeans, wheat
Landis SA**, Cumberland County	376 Acres	Bermuda grass
Readington-Lebanon SA**, Huska Farm, Hunterdon County	14 Acres	corn

*Municipal Utilities Authority **Sewerage Authority

discharged into sewers for eventual treatment at a sewage treatment plant.

Pre-treatment is controversial because it can be very expensive. If the costs are too high, factories may be forced to close, hurting the economy. But if the wastewater isn't treated to remove hazardous contaminants, the state may be left with no way to handle its sludge. Besides industrial sources, the state must also make sure that other sources of contaminants in sludge are addressed, such as hazardous materials flushed down sewers from houses, and lead and copper that may be leached from pipes by corrosive water supplies.

Fortunately, the problems with sludge quality can and are being solved. Sludge generated in New Jersey is getting cleaner all the time. With new initiatives to promote and

hasten clean sludge, New Jersey should be able to guarantee that almost all of its sludge will be suitable for safe, beneficial reuse within a few years. Much of its sludge meets the stringent quality criteria for reuse right now.

To allow beneficial reuse of sludge, markets must be created for it. The people who can use the sludge, such as farmers, construction contractors and landscapers, must recognize that sludge is safe to use and can actually help them. And the general public must learn to accept sludge recycling as desirable, rather than something to be concerned about.

Currently, about 23% of New Jersey's sludge is beneficially reused in some way. Another 22% is incinerated. The remaining sludge is almost all sent to out-of-state landfills. The state's experience with beneficial use of sludge has been

very positive — there have been no negative impacts on land values, or water or soil contamination problems. One major concern with beneficial reuse — odors — is rapidly being resolved through better understanding of sludge processing methods, and most up-to-date beneficial use operations now have essentially no odors detectable off the site. And there is no odor, other than the earthy smell of good topsoil, associated with composted sludge or pelletized sludge products.

It may be some time before the term “sewage sludge” brings to mind green fields and flowers, rather than an unwanted waste. But if everyone works together, in a few short years most of the state’s sludge could be improving our soils and fertilizing our land.

Judy Morgan is an outreach coordinator for the DEP’s Division of Water Resources.

KEITH SPOCKY



Cows are fed silage, a mixture of grains, grown on Harmony Dale Farms, which uses sludge on fields that produce feed crops.

Group Endorses Recycling of Sludge

A Sludge Management Policy Roundtable convened by the Department of Environmental Protection in February strongly endorsed the concept of increasing the beneficial reuse of sludge.

Taking part in the effort to help develop an updated statewide sludge management policy were representatives of sewage authorities, environmental groups, industry, municipal government and the agricultural community. The policy recommendations that grew out of this roundtable now are being developed for implementation statewide. Specific recommendations focused on three areas:

❑ **Sludge Quality** — To promote and allow as many alternatives as possible for sludge reuse, a high standard of sludge quality should be set for the entire state. The standard should be high enough to assure that sludge can be used safely anywhere, without fear of contaminating land or risking health. To achieve this standard, pre-treatment and quality monitoring programs should be

required, and investigation of other sources of contaminants should be conducted.

❑ **Sludge Markets** — Markets should be encouraged and supported by giving preference to sludge products when the government purchases fertilizers or soils for restoring land. Also, regulation of clean sludge should be decreased so that the costs and paperwork burden for reuse of sludge don’t discourage people.

❑ **Public Acceptance** — Ultimately, the ability to beneficially reuse sludge depends on public acceptance. Efforts to educate the public and potential users should be undertaken to overcome fears and resistance.

The DEP now is in the process of developing regulations and other programs to implement the recommendations of the Sludge Policy Roundtable. By the end of this year, it is hoped that New Jersey will be well on its way to managing sludge in a way that uses it as a resource rather than as something to be thrown away.

East Coast Efforts Revive

Striped Bass

By Peter Himchak



Fishermen with a striped bass caught at Island Beach State Park

PHOTOS BY PETE McLAIN



Marine biologists survey the number of young striped bass.

There's good news for fishermen — the striped bass are back. The coastal migratory stock that was so depleted in the early 1980s has made a remarkable recovery. Striped bass schools are plentiful and, even more importantly, the population is made up of a high percentage of adult spawners.

Fishery managers and fishermen have labored for many years to restore the coastal migratory population of striped bass, but it hasn't been easy. Coastal states from North Carolina to Maine have had to implement many restrictive management measures, most notably an extraordinarily high minimum size limit that angered many fishermen.

"Some fishermen accuse fisheries managers of not knowing what they're talking about when they want to impose restrictions," says Larry Sarnier, senior biologist for the Department of Environmental Protection's Division of Fish, Game and Wildlife.

"Sure, they don't know everything, but the commercial and recreational fishermen sometimes miss the bigger picture."

The bigger picture and the need for a new Interstate Management Plan for Striped Bass became obvious in the early 1980s when the Chesapeake Bay striped bass stock experienced several years of poor spawning and a decrease in the number of young. These highly migratory fish, the major contributor to many sport and commercial fisheries along the coast, were no longer abundant and many fisheries suffered.

Under the framework of the Atlantic States Marine Fisheries Commission, the stock recovery process began. Emergency money was authorized by Congress to support research on the status of the striped bass stocks and reasons for their drastic decline.

All states were asked to comply with coastwide management strategies, including area and seasonal fishing closures, moratoria and by-catch eliminations, to attain 55% reductions in catch.

Even with all these coastal restrictions and a minimum size limit of 24 inches along the coast, fishing mortality on immature fish was still at unacceptable levels.

In 1982, interstate fishery managers received some very encouraging news. A Maryland survey conducted throughout its portion of the bay found that spring spawning and good survival of eggs and larvae had produced an above-average year class of striped bass. (A year class is made up of all the young born that year.) But fishing pressure on immature fish continued to stall the stock recovery process. Not enough fish were escaping the gauntlet of coastal fisheries to be able to grow, mature and spawn.



The once-depleted striped bass stock has made a remarkable recovery.

An amendment to the management plan was adopted to steadily increase the minimum size limit along the coast to protect 95 percent of the Chesapeake Bay female striped bass of the 1982 year class, and all subsequent year classes, until those fish could become sexually mature and spawn at least once.

The 24-inch limit gave way to 31 inches, then 33 inches, with each rise in minimum size meeting with heated debate and growing opposition.

"Some fishermen — not all — will say, 'you can't restrict our fishing, it's going to cut down on our living, or cut down on our fun,'" says Sarnier. "And as the fisheries collapse, we hear, 'why don't you do something?'"

The maturation rate of the 1982 year class fell far behind the expected, and the minimum size limit had to be pushed even higher. Thirty-three inches jumped to 34, 36 and 38 inches. Fortunately, striped bass spawning activity, early survival and numbers of young in the Chesapeake Bay were outstanding in 1989. But while the stock was well on its way to recovery, the population stability remained tenuous at best. The stock will not be fully restored until 8-year-old female fish dominate the spawning population.

The 1989 studies led to a relaxation of minimum size limits, allowing increased harvesting by sport fishermen and the reopening of many commercial fisheries. The new striped bass management plan allows for expanded striped bass fisheries, but all fisheries must be monitored closely.

How are New Jersey fishermen faring? The minimum size limit for recreational fishermen has dropped from 38 to 28 inches, except in the Delaware River and Bay where it remains at 36 inches to protect another recovering stock. There is a recreational bag limit of one fish per angler per day unless a fisherman participates in the trophy bass program. This allows a fisherman to keep two fish per day, but one of them (the trophy) must be greater than 38 inches long.

Fishermen must apply to the Division of Fish, Game and Wildlife and receive the necessary fish possession seal to participate in the program.

While bringing the striped bass back was a struggle, a more difficult task remains, that of keeping the valuable resource healthy and thriving for future years.

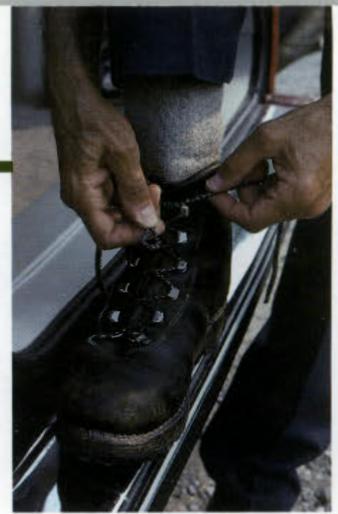
"One successful year doesn't ensure long-range success," says Sarnier. "If a few years from now we're having the same kind of fishing, we could be more sure."

In the meantime, fishermen and biologists hope that the striped bass resource remains stable, providing livelihoods and recreation for many years to come. This is the new challenge to the striped bass managers.

Peter Himchak is a supervising biologist with the Division of Fish, Game and Wildlife's Bureau of Marine Fisheries and supervisor of the marine fisheries office at the Nacote Creek Research Station in Atlantic County.

Getting Ready to Go Hiking

By Nancy Wolff



New Jersey offers a wealth of hiking opportunities, from the Appalachian Trail in the north to the Batona Trail farther south. You can hike in local parks and in state and national recreation areas, and along mountainous terrain or shoreline. Choose from a flat canal walk near the Delaware River or a ledgy rock scramble along the Palisades on the Hudson.

Hiking can be a simple matter of putting one foot in front of the other with no thought or plan. On the other hand, you can enhance your enjoyment and safety with some preliminary thinking.

- **Be prepared**

Scouts aren't the only ones who should follow this motto. You should wear appropriate clothing and footgear, carry drinking water, take extra layers to accommodate weather changes, get information about the area in which you plan to hike, choose terrain that matches your health and experience — and don't forget common sense.

- **What to wear**

Sturdy footgear is important. Running shoes may be all right on a flat trail with no rocks or slippery areas, but I

Hikers are treated to close-up views, such as these ferns at water's edge.



PHOTOS BY NANCY WOLFF

prefer a hiking boot with firm ankle support. Avoid leather soles; you need a sole that grips. A nice compromise for some is a lightweight hiking boot sold by many outdoor stores. Some boot hints: When you try on new boots, wear the identical socks you plan to wear when hiking. Cut your toenails as short as possible so they don't bump into the boot on a downhill slog. Break in your boots before you wear them on a serious hike. Wear them first around the house, up and down stairs and on one or two flat, undemanding walks.

Everyone's feet are different. Happy feet are a key to hiking happiness. Wear two pairs of socks — a thin one nearest the foot and a heavier wool or other outer sock for insulation. Wearing two pairs of socks helps prevent blisters.

Layered clothing offsets New Jersey's changeable weather. A T-shirt, a long-sleeved shirt and a light parka provide layers to cover the changes in temperature and body heat as you move through the day. A lightweight wool sweater will protect against the chill when you stop for lunch.

A hat with a brim protects you from insects (crawling,

A backpack will keep your hands free and provide good balance while you walk.



dropping from trees, flying into your hair), shields your eyes from the sun's glare and keeps you fairly dry in a slight drizzle.

• What to Carry

A backpack or fanny pack (*not* hand-held, *not* worn over one shoulder) will keep your hands free and give you good balance while you walk. In it, you carry your water, maps, lunch, small first-aid kit, sweater, rain gear, jackknife, sun protection and insect repellent, and other items you might want to bring along, such as a camera, binoculars or eyeglasses. Some people carry string to mend broken laces; a saw (special backpack design) for making a splint or a stretcher in an emergency; gorp (translation: good old raisins and peanuts) or other snack food for a special treat to get you up that mountain; and water or fruit juice.

Lunchtime is not the time to lighten your pack by throwing your sandwich wrapper and juice container in the woods. Apple cores might be eaten by deer or raccoons, but banana or orange peels tend to remain as unsightly garbage for several weeks. A good rule to follow: "You carried it in — you carry it out."

What's in your first-aid kit? A well-known mail-order catalog offers three kits ranging in price from \$8.95 to \$54.95. The largest is for "larger groups or solo hikers who travel more than a few hours from civilization." It includes various kinds of bandages, gauze, adhesive tape, moleskin pads, a splint, thermometer, tweezers, needle, razor blade, antibacterial soap, Tincture of Benzoin, aspirin, a zip-lock plastic bag and a first-aid booklet.

For rain gear, don't wear a poncho. It will act as a sail and blow you around in open areas and will catch on branches and rip in the woods. Get a rain jacket and pants, preferably of some breathable material, to avoid chills on a rainy day.

What about insect repellents? Your body chemistry affects your bug appeal. Your natural scent might make bugs stay away, go to someone else, or buzz around your head and drive you wild. Some people recommend garlic as a repellent, or cigarette smoke, vitamin B-1 and certain hand lotions. Most effective has been repellent that contains DEET (diethyl toluamide). The more DEET in the repellent, the more powerful it is. My photo friends tell me to *never* spray bug repellent anywhere near a camera, lens, eyeglasses, any plastic items or synthetic fabrics. It's wise not to wear scent of any kind (perfume, cologne, scented soap, deodorant or especially hair spray)



if you want to avoid attracting flying insects. You might be mistaken for a flower.

- **Reduce the Risks**

Every activity carries risks. Knowing about them will help you handle the things that happen.

Bees, wasps, hornets? If you are allergic to their sting, stay out of the woods in the fall when they are a greater threat. For most people, an application of meat tenderizer is enough to relieve the sting. Others need an antihistamine or other medical assistance. See a doctor and carry what you need.

Ticks? If you haven't read by now about Lyme disease (caused by a tick bite), you can get information from the Lyme Disease Hotline, 1 (800) 792-8831. Ways to help prevent tick bites include wearing light-colored clothing, a long-sleeved shirt, a hat, long pants tucked into socks and insect repellent applied to clothing openings and exposed skin (keep it away from eyes), thorough examination after the hike and a bath or shower before going to sleep that night. Experts say a deer tick that carries the disease is the size of the period at the end of this sentence. Lyme disease isn't to be taken lightly. If you think you might have it, consult a doctor who specializes in infectious diseases.

Giardia? Don't drink the water! Flowing water may look clear, but bacteria (the protozoan giardia lamblia) can't be seen. Deer, beavers, birds and other animals live, feed, become sick and/or die near water sources, contaminating the water. Carry plenty of drinking water with you and don't be tempted by a lovely cascade.

Also, don't eat mushrooms or green plants unless you absolutely know that they are safe.

Of course there are risks. That doesn't mean you won't hike, only that you'll consider the risks, prepare to handle them if they occur and go out and have a good time outdoors. After all, people break their hips in the bathtub. That doesn't mean you'll never take a bath again. Let's consider some of the joys.

- **Where to Go**

New Jersey has an astonishing variety of hiking terrain. Guidebooks and maps are available at many different sources: a bookstore in Bergenfield, a deli near the Delaware, a camping store near the Kittatinnies, a sports store near Succasunna — all sell the N.Y.-N.J. Trail Conference maps of the highlands between New York and the Delaware Water Gap. Parks and recreation areas post their trail maps near the ranger's office or visitors center, and you can often order maps by writing to the particular county or state-run area that interests you.

But for me, the best way to hike is with a group of friends. We belong to several outdoor clubs and we always have something to do (thus avoiding household chores) with like-minded companions.

Hiking clubs range from informal gatherings of a few people who plan trips on the spur of the moment, to national organizations with many thousands of members.

Summer too hot? Hike in Stokes State Forest and end with a swim. Or go to Sandy Hook and walk along the shore, dipping into the sea to cool off. Looking for fall foliage? How about High Point? Ringwood? The deep maroon hues of the scrub oak leaves in Wharton or Lebanon State Forest? Goldenrod in Wawayanda?

New Jersey truly is a hiker's paradise.

Nancy Wolff of Montclair is a freelance writer and a member of several outdoor clubs, including the Appalachian Mountain Club and the Union County Hiking Club.

Members of a hiking club explore Hacklebarney State Park in Morris County.



Emergencies Happen — Be Prepared

❑ "I never saw it coming. I was hiking in the snow and stepped on a hidden rock and slid right off. I heard a snap and knew my leg was broken."

❑ "I didn't even think about falling. We were walking uphill, and one minute I was climbing up slowly, and the next I was flat on my face. I broke a rib."

❑ "We were walking near the Palisades. It was a lovely, warm day. I was following someone as we walked through a field of brambles. Next thing I knew, my eye felt as if razor blades were slicing through my eyelid. A briar had scratched my eye."

Injuries and accidents happen everywhere. How you plan to prevent them and how you handle an emergency can make the difference between an unpleasant adventure and a tragedy. This is one woman's story:

"I was hiking with the Frost Valley Trail Walkers last fall. It was morning and we had been out for only an hour. A blanket of slippery oak leaves covered the ground.

I think of myself as a careful hiker. But as I headed down a steep slope, my foot slid on an acorn. At first, I didn't know what was happening. Then I heard a snap. It was so loud the woman hiking in front of me heard it, too. Even before I hit

the ground, I knew my ankle was broken. It didn't hurt right away (the real pain came later that night), so I insisted I could continue walking. Some sensible members of our group were able to change my mind.

Fortunately for me, I was accompanied by many seasoned hikers, some of whom had medical experience. As I reflect on my accident, I'm thankful they were so well-prepared. One carried a stretcher and a very small folding saw to cut sticks for splints. Some were equipped with first-aid kits. Another hiker had an inflatable "sit-upon," which can be wrapped around the injured limb and blown up as a support. Someone gave me a jacket, which I wore backwards like a blanket to keep warm.

I know it's awkward to carry anyone out of the woods on a

litter. And even though I'm only 5 feet tall, I felt sorry for those men as they struggled over slippery leaves and rocky terrain. Some of those hikers had sore muscles for a month. I'll always be grateful to those people who took care of me."

There is always some risk of being hurt when you go into the woods. But hikers can — and should — prepare themselves to handle emergencies.

At your next club meeting, demonstrate how to make a stretcher and practice carrying someone in it. Also, discuss the importance of carrying basic supplies such as some length of wide webbing to use around a stretcher.

With preparation, cooperation and some good common sense, hiking New Jersey's trails can be both a safe and enjoyable experience.

Resource Guide for Hikers

Books - Where to Hike

50 Hikes in New Jersey: Walks, Hikes and Backpacking Trips from the Kittatinnies to Cape May, by Bruce Scofield, Stella Green and Neil Zimmerman; Backcountry Publications, Woodstock, Vt., 1988.

25 Walks in New Jersey, by Kevin Dann, Rutgers University Press, New Brunswick.

Walks and Rambles on the Delmarva Peninsula: A Guide for Hikers and Naturalists, by Jay Abercrombie, Backcountry Publications, Woodstock, Vt., 1985.

Marsh, Meadow, Mountain: Natural Places of the Delaware Valley, John J. Harding, Ed.; Temple University Press, Philadelphia, 1986.

Books - Advice for Hikers

Hiking Light, by Marilyn Doan: Light on your budget, light on the land, light on yourself. Published by the Mountaineers, Seattle, Wash.

Hiking, Pure and Simple, by David L. Drotar, Stone Wall Press, Washington, D.C.

Walking for Fitness and Pleasure, by Dr. Roland E. Walker. A Hearthstone Book published by Carlton Press Inc., N.Y., 1988.

Maps

Maps of State Parks and Forests:

Maps and Publications

Bureau of Revenue

CN 417

Trenton 08625-0417

(609) 777-1038

Maps of Various New Jersey and New York Trails

N.Y.-N.J. Trail Conference

232 Madison Ave., Suite 908

New York, N.Y. 10016

(212) 685-9699

The Trail Conference has individual and club members. Send a self-addressed stamped envelope for a packet of information about outdoor clubs, maps, members library, publications and activities.

Most recreation areas make trail maps available at a ranger's office or visitors center.

Holiday Marketplace



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Binder with screen-imprinted logo on cover and spine for storing 12 issues (3 years) of New Jersey Outdoors. A great way to preserve and organize your magazines for future reference \$10.95		N/A	White	

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Bookshelf

THROUGH THE EYES OF A YOUNG NATURALIST, by William S. Sipple, published by Gateway Press Inc., is an account of 20 years of the author's outdoor experiences as a youngster, teenager and young adult in New Jersey. He writes of his adventures hunting, trapping, fishing, camping, hiking, birding and studying plants across New Jersey from 1951 to 1971. To receive this book, send \$18.00 for each copy plus \$2.00 shipping and handling for the first copy and \$.50 for shipping and handling of each additional copy. Please make checks payable and mail to William S. Sipple, 518 Red Bluff Court, Millersville, Md. 21108.

THE JERSEY GAME, THE HISTORY OF MODERN BASEBALL FROM ITS BIRTH TO THE BIG LEAGUES IN THE GARDEN STATE, by James DiClerico and Barry J. Pavelec, published by University Press, covers the history of amateur and professional baseball in New Jersey. Available for \$18.95 at local bookstores.

FISH TALES, a quarterly publication made possible through the cooperation of the New Jersey Department of Agriculture, the New Jersey Fish and Seafood Industry, the New Jersey Marine Sciences Consortium and the Fisheries and Aquaculture Technology Extension Center of Rutgers University, provides information about fish, seafood and related activities, including upcoming



events, fishing tips, recipes and a legislative summary. Free copies are available from the New Jersey Department of Agriculture, Fish and Seafood Development Program, CN 330, Room 204, Trenton 08625, or by calling (609) 292-7643.

KEEPING NEW JERSEY SAFE: A CITIZEN'S HANDBOOK ON NEW JERSEY'S COMMUNITY SAFETY PROGRAM, published by the Department of Environmental Protection, describes the four aspects of New Jersey's community safety efforts — getting information, preventing chemical accidents, planning for chemical emergencies and responding to emergencies. Free copies are available from DEP's Bureau of Hazardous Substance Information, CN 027, Trenton 08625.

Following is a list of publications issued by DEP's Division of Hazardous Waste Management in conjunction with the Hazardous Waste Advisement Program. Check off which publications you are interested in receiving. Free copies are available from DEP, Maps & Publications, CN 402, Trenton 08625-0402.

Hazardous Waste Information Series:

1. ___ Classification of Hazardous Waste
2. ___ Generators
3. ___ Hazardous Waste Minimization
4. ___ New Jersey's Hazardous Waste Regulatory Program
5. ___ Standards for Hazardous Waste Treatment, Storage & Disposal Facilities
6. ___ Toxins in the Home
7. ___ Transporters
8. ___ Uniform Hazardous Waste Manifest

Waste Minimization Publications Technical Information Series (TIPS):

9. ___ Metal Manufacturing
10. ___ Vehicle Maintenance
11. ___ Printing

Waste Minimization Fact Sheets:

12. ___ Metal Finishers
13. ___ Paint Formulators
14. ___ Pesticide Formulators
15. ___ Commercial Printing

Other Waste Minimization Publications:

16. ___ ARROW Manual (Federal guide to waste minimization)
17. ___ Pollution Prevention Grant Program Summary

Other Publications:

18. ___ Regulations: Unified Hazardous Substance List
19. ___ A Citizen's Guide to the Major Hazardous Waste Facility Siting Act
20. ___ List of Commercial Treatment, Storage and Disposal Facilities

Geologic Map Series: The maps listed below are but a few of the many New Jersey Geological Survey publications — including bulletins, reports, pamphlets and aerial photographs — available from DEP. Orders for the maps below should be made to DEP, Map and Publication Sales, Bureau of Revenue, CN 417, Trenton 08625-0417. Please make checks payable to "Treasurer, State of New Jersey."

Geologic Map Series 88-6 **BEDROCK TOPOGRAPHY AND PROFILES OF VALLEY-FILL DEPOSITS IN THE RAMAPO RIVER VALLEY**, 1989.

Cost, \$8.00.

Geological Survey Map 89-2 **SURFICIAL GEOLOGIC MAP OF THE DOVER QUADRANGLE, MORRIS AND SUSSEX COUNTIES**, 1989. Cost, \$4.00.

Geologic Map Series 89-3 **PROVISIONAL GEOLOGIC MAP OF THE PROTEROZOIC AND LOWER PALEOZOIC ROCKS OF THE CALIFON QUADRANGLE, HUNTERDON AND MORRIS COUNTIES**, 1989. Cost, \$4.00.

Geologic Map Series 89-4 **BEDROCK GEOLOGIC MAP OF THE GLADSTONE QUADRANGLE, MORRIS, HUNTERDON AND SOMERSET COUNTIES**, 1990.

Cost \$4.00.

Geologic Map Series 90-1 **BEDROCK GEOLOGIC MAP OF THE CHESTER QUADRANGLE, MORRIS COUNTY**, 1990. Cost \$4.00.

New Jersey's First Map Comes Home After 375 Years

By Susan D. Halsey

It was in the early 1600s that Captain Cornelius Hendricks mapped what we now know as New York and Raritan bays, the Atlantic and Delaware Bay coasts of New Jersey and Delaware, and up to the Falls of Trenton.

The Dutch sea captain/surveyor returned to Holland with his findings, which he presented in 1616 to the States-General, a 12-member board that represented the government of The Netherlands in its treaties with King James I of England.

The States-General, however, noted that the territory mapped — between latitude 38° and 40° north — extended two degrees south of the limits assigned to New Netherlands, placing it within, or very close to, the territory of Virginia.

Not wanting to create political difficulties with King James I by appearing to encroach on his territory, the States-General at first denied, and then indefinitely postponed, a decision on Hendricks' application for a trading license. The map became the property of the government, which filed it away.

This explains why the map, the first known coastal chart of New Jersey, remained unknown to state geologists and historians until only recently, when it was uncovered in Europe by a geologist with the Department of Environmental Protection's Division of Coastal Resources.

Historical Setting

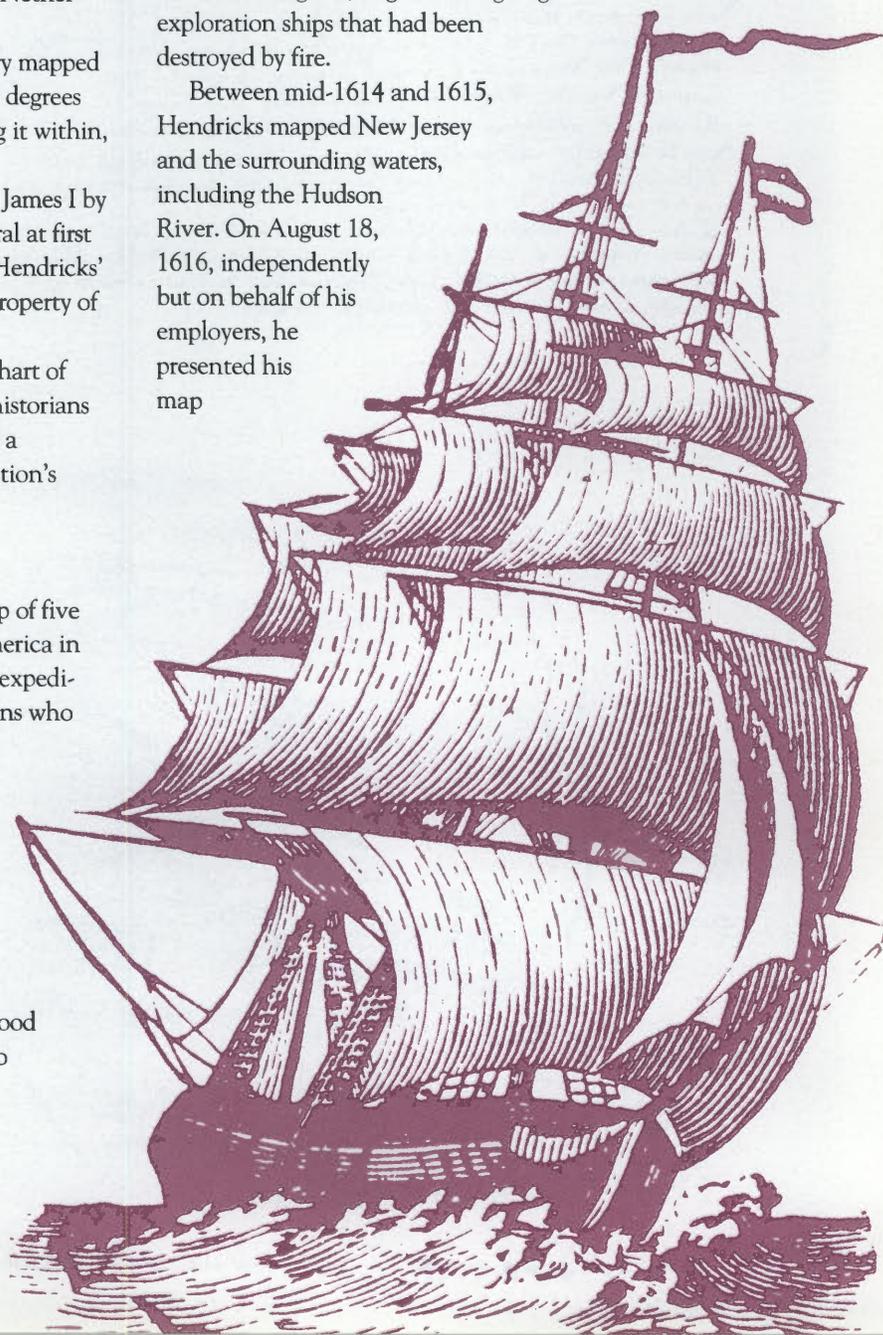
Hendricks was not named as one of the original group of five Dutch sea captains dispatched to the coast of North America in 1614 after the success of Captain Henry Hudson's 1609 expedition. He apparently was the son of one of the five captains who were commissioned by 13 merchants of the Amsterdam and Hoorn areas to survey and explore for new trade opportunities along the coast of the new land between 40° and 45° north.

This section of territory was named "New Netherlands" and was defined as "situated between New France (now the Quebec area) and Virginia." The charter, if granted by the States-General, was authorization "for prosecuting the whale fishery in the neighborhood of Nova Zembla, and the exploration of a new passage to China."

In mid-1614, the original five captains returned to Holland to report to the States-General on behalf of their new company, the Amsterdam Trading Company.

Left behind to continue exploring, Hendricks skippered the yacht "Onrust" farther south below 40° north. The Onrust (translation: Restless) is believed to be the first vessel built in North America by Europeans. The 44.5-foot vessel was built on Manhattan Island to replace the Tiger, one of the original, larger ocean-going exploration ships that had been destroyed by fire.

Between mid-1614 and 1615, Hendricks mapped New Jersey and the surrounding waters, including the Hudson River. On August 18, 1616, independently but on behalf of his employers, he presented his map



and report. A historian quotes Hendricks from his report to the States-General:

"And did there traded with the inhabitants; said trade consisting of Sables, furs, Robes and other skins. He hath found the said Country full of trees, to wit: Oaks, hickory, and pines; which trees were, in some places covered with vines. He hath seen, in the said country, bucks and does, turkeys and partridges. He hath found the climate of the said Country very temperate, judging it to be as temperate as that of this country Holland..."

Features of the Map

The original hand-colored map is just over one meter long and one-half meter wide. The northern half of the map (not shown on previous page), includes the present areas of New York's Hudson River and its valley, Lake Ontario and the Catskill-Adirondack Mountains. The southern half of the map features New York and Raritan bays, including Staten Island, the state of New Jersey, eastern Pennsylvania, Delaware Bay and the coastal areas of the state of Delaware. The Delaware River is depicted, including the Falls at Trenton. Although the Schuylkill and Susquehanna rivers are included, Hendricks drew — with a liberal dose of wishful cartography — the suggestion of easy navigation between major rivers and passage up to the Northwest. In addition, portions of Maryland and the Chesapeake Bay area also are depicted, but since these areas were out of reach of the explorer's vessel, they were most likely speculation.

The Delaware is shown to end much farther south than it actually does because the Falls at Trenton prevented navigation to the north. Therefore, when Hendricks' reconnaissance men reported back to him of a curving river in the water gap area of what is now western New Jersey, he erroneously labeled it the Susquehanna instead of the Delaware.

There are many more interesting features on this map that currently are being researched and studied, particularly the accuracy of the shapes and locations of the barrier islands. When the islands mapped by Hendricks are "rolled forward" in geologic time, they match up almost perfectly with the islands of today.

Another aspect of interest is the careful detail regarding locations of the Indian settlements (some with clusters of long houses) and their names. These locations and names were important business information because these inhabitants were to become the trading company's eventual trading partners.

U.S. scientists usually are wary of relying on charts or maps younger than the first U.S. Coast and Geodetic Survey series in the middle to late 1800s, unless they were produced by some other official government agency such as the British navy. Therefore, coastal scientists always are intrigued when old maps or charts are discovered, particularly when they appear to be relatively accurate. Maps such as the one by Captain Cornelius Hendricks provide invaluable clues in helping scientists decipher changes in coastal features that take place over hundreds of years.

Susan D. Halsey is a coastal geologist with DEP's Division of Coastal Resources.

The Search for the Missing Map



Susan D. Halsey

The director of the Ocean County Cultural and Heritage Commission in Toms River led a concerted, but unsuccessful, two- to three-year hunt for the map after finding general references to it.

Polly Miller happened to mention her frustrating search to DEP coastal geologist Susan D. Halsey while they were collaborating on another project in 1988. Halsey told her that she would be traveling to Europe that summer and suggested that on her way through Amsterdam, she could make a quick search to see if she could find the Hendricks map.

After arriving in Amsterdam, Halsey made a search of several museums before she obtained an appointment with the curator of the Ryksmuseum, who referred her to the curator at The Hague. Her last day in The Netherlands, Halsey took the train to The Hague and followed directions to the Royal Dutch archives. Five minutes after she was introduced and told the archivist what she was looking for, the long map case containing the Hendricks map was laid before her. After ordering a negative, the first thing she did before getting back on the train was start a postcard to Miller with these words: "Sit down! I found it!" After 375 years, the Hendricks map finally was coming home to New Jersey.

A reprint of the New Jersey portion of the map reproduced in this article can be purchased by writing to the Ocean County Historical Society, 26 Hadley Avenue, Toms River 08753, or by calling (908) 341-1880.

Roundup

Looking Back 200 Million Years May Help Predict the Weather

Clues to what the weather has in store for us in the next century may be 200 million years old and buried thousands of feet below the earth's surface.

Scientists from Columbia University's Lamont-Doherty Geological Observatory are digging 3,000-feet deep at six sites in northern and central New Jersey for soil and fossil samples from Lake Newark, which once stretched for 500 miles from New York to Virginia.

Lake Newark teemed with reptiles 200 million years ago. Theory has it that when a giant asteroid crashed into the earth, billions of tons of soot spread throughout the atmosphere. The subsequent drop in temperature froze the lake and drove 90 percent of the world's animal species into extinction. A period of intense global warming followed, fueled by forest fires that released enormous amounts of carbon dioxide into the atmosphere.

By studying the soil samples, scientists hope not only to confirm the asteroid theory, but to compile a nearly continuous record of the earth's changes in climate over a period of 15 million years.

This record of our planet's cataclysmic journey to modern times may play a significant role in helping to predict what effect a buildup of carbon dioxide and other gases will have on our weather well into the next century.

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4 Sites Designated Historic Places

Four sites have been added to the New Jersey Register of Historic Places.

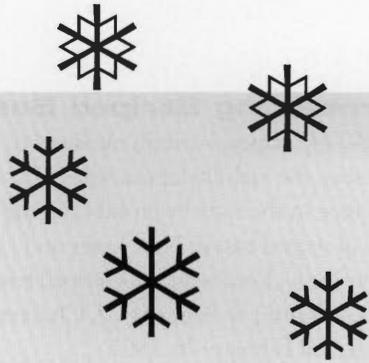
The **Santa Rita Apartments** (above) in Atlantic City, Atlantic County, embody the distinctive characteristics of the early 20th-century urbanization of Atlantic City. At the time it was constructed, this apartment building towered over all but two of the existing hotels. The building's vertical copper bands and cornice give the structure a striking presence that even now makes it a landmark in Atlantic City.

The **Centennial House** in Merchantville Borough, Camden County, stands as a monumental example of exterior Stick-style architecture and interior Eastlake style. Constructed as a twin, the house is located in the earliest subdivision of the borough that became a fashionable and desirable suburb for Victorian-era commuters out of Philadelphia.

The **Pleasant Valley Historic District** in Hopewell Township, Mercer County, and West Amwell Township, Hunterdon County, is a well-preserved example of an isolated agricultural community that developed during the 18th and 19th centuries in the upper reaches of the Delaware Valley. The numerous outbuildings, unpaved roads, hedgerows and fencing, along with the farmhouses and barns, enhance the district's sense of a turn-of-the-century agricultural community.

The **Schooley's Mountain Historic District** in Washington Township, Morris County, is one of the state's earliest and most successful mineral springs resort communities, and contains a collection of architecture representative of the period from 1810 to 1929. The initial attraction to the area was due to the presence of a mineral spring revealed to colonists by the Lenape Indians.

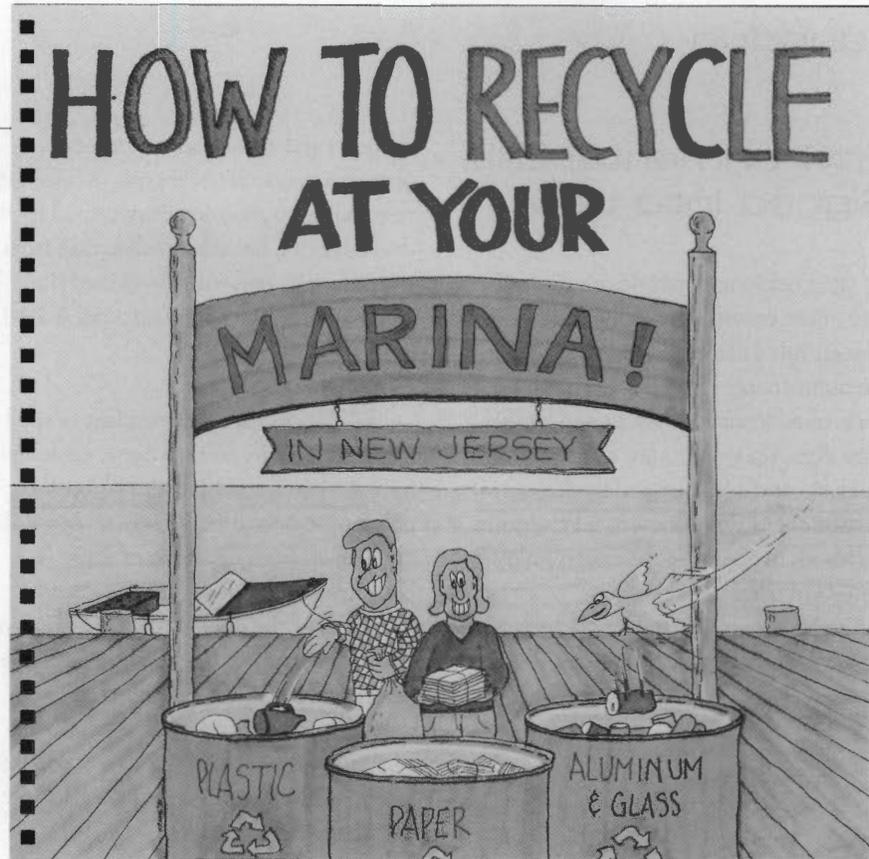
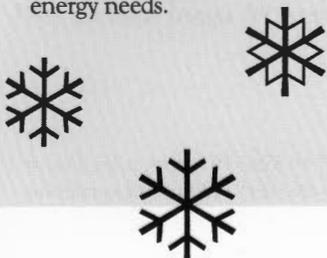
The four sites will be considered for inclusion in the National Register of Historic Places.



Prepare to Save Energy This Winter

Properly preparing your house or apartment for winter now can more than pay for itself in the long run, and make you and your family more comfortable when the cold winds begin to blow. Here are some tips for saving energy this winter:

- Caulk and weather-strip doors and windows.
- Install storm windows and doors, or tape clear plastic film to the inside of windows.
- Make sure the walls and attic are properly insulated.
- Have your heater tuned up so it will run as efficiently as possible.
- If you burn wood, have the stove-pipe cleaned once a year to avoid dangerous creosote fires.
- Insulate your hot water storage tank and piping.
- Close fireplace dampers when not in use.
- Buy an automatic thermostat or set back the thermostat at night.
- Keep your radiators clean and unobstructed by furniture.
- Dress sensibly. An extra layer of clothing will make you more comfortable and reduce your energy needs.



Boaters Urged to Recycle

Many boaters try to stretch the summer season as far into fall as possible. Regardless of the season, however, the Department of Environmental Protection encourages boaters to take advantage of the recycling centers available at many marinas.

The DEP has published a handbook, "How to Recycle at Your Marina," which stresses the importance of keeping recyclables out of oceans, lakes, ponds, streams or rivers. This will

not only make boating experiences more enjoyable, but protect aquatic wildlife from injury or death as well.

The handbook was published through the Marine Debris Recycling Pilot Project, implemented and coordinated by the DEP's project manager, Linda Doherty. It was funded by the New Jersey Shore Foundation.

For more information, contact DEP's Office of Communications and Public Education at (609) 633-1317.

'Quiet Season' Bonus for Park Users

A good way to get to know New Jersey's state park system is to visit during the "quiet" months. Parking fees will be discontinued at 21 state parks and forests and reduced to \$4 daily at Island Beach State Park from the day after Labor Day until the busy season begins again next Memorial Day weekend. The "free parking on Tuesdays" program continues at Island Beach year-round.

Off-season free parking will be in effect at the following areas: Allaire, Atsion, Barnegat Lighthouse, Bass River, Batsto, Belleplain, Cheesequake, Hacklebarney, High Point, Hopatcong, Lebanon, Parvin, Ringwood, Round Valley, Shepherd's Lake, Spruce Run, Stokes, Swartwood, Washington Crossing and Wawayanda. All are administered by the Department of Environmental Protection's Division of Parks and Forestry.

Environmental Bills Signed Into Law

Listed below are brief descriptions of some of the environmental laws enacted between July 1, 1990, and May 1, 1991. The number and variety of environmental concerns addressed in bills passed by the Legislature, signed into law by Governor Jim Florio and administered by the Department of Environmental Protection provide an overview of the state's many-faceted environmental efforts.

Assembly bills are those with "A" numbers, while Senate bills are those with "S" numbers.



Hazardous Substance Spills

S-2517 authorizes imposition of civil administrative penalties for violations of the "Spill Compensation and Control Act"; establishes interest charges on unpaid penalties; establishes a penalty of \$10 million for catastrophic discharges; extends the catastrophic spill provisions to spills of 100,000 gallons or more originating outside the state; authorizes recovery of compensatory damages; and authorizes DEP to recover the costs of such actions. Chapter 75, signed July 21, 1990

S-2520 requires a refinery, storage facility, transfer terminal, pipeline facility or transport vessel to take certain safety measures during the transfer of a hazardous liquid between a designated facility and a vessel, or among two or more vessels. Chapter 76, signed July 21, 1990

S-1928 authorizes a municipality to adopt an ordinance permitting the municipality and appropriate local

agencies and authorized volunteer organizations to recover costs incurred in responding to an emergency caused by the discharge of a hazardous substance, from the person or persons who caused the discharge. Chapter 85, signed April 4, 1991

Recycling

S-2700 requires the recycling of used lead acid electric storage batteries designed for use in motor vehicles, aviation equipment or marine vessels, and prohibits any person from disposing of these batteries as solid waste at any time. Members of the public may either return the used battery to a retailer in exchange for the purchase of a new battery, or deliver it to a secondary lead smelter, a scrap processing facility or to a household hazardous waste collection site. Chapter 94, signed April 9, 1991

Green Acres

S-3035 through S-3038 appropriate \$103,299,500 to the Department of Environmental Protection from the "Open Space Preservation Bond Act" of 1989, to provide grants and low-interest loans to local governments to acquire and develop lands for recreation and conservation purposes. It also allocates \$49,042,000 for state acquisition and development projects. Chapters 13 - 16, signed January 24, 1991

The Pinelands

S-2462 authorizes the extension of Pinelands Development guarantees and the purchase of Pinelands Development Credits for another two years beyond the legislatively mandated expiration date of December 31, 1990. Chapter 24, signed February 19, 1991

Historic Preservation

S-2761 appropriates \$10,229,137 to the New Jersey Historic Trust from the "Cultural Centers and Historic Preservation Fund" for grants to fund the renovation, restoration and rehabilitation of certain historic preservation properties. Chapter 91, signed August 22, 1990

Protecting Striped Bass

S-1442 imposes certain measures to improve the viability of the striped bass resource in the state by prohibiting the sale of striped bass in New Jersey and imposing a closed season for striped bass from January 1 to February 28. Chapter 43, signed February 26, 1991

Harvesting Surf Clams

A-3774 authorizes the commissioner of the DEP to issue licenses for the harvesting of surf clams in New Jersey waters on a seasonal, rather than annual, basis, and imposes a per-bushel fee for all surf clams harvested within the waters of the state. Chapter 79, signed April 1, 1991

Water Pollution

A-3110 authorizes the DEP or a delegated local agency to issue a summons, enforceable in municipal court, for a violation of the "Water Pollution Control Act" if the amount of the penalty is \$5,000 or less. Chapter 8, signed January 21, 1991

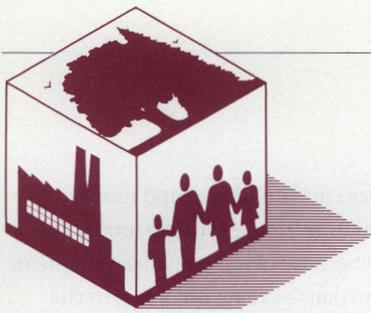
Right-to-Know Fees

S-2542 exempts nonprofit, non-public schools, colleges and universities from the fee requirements of the Worker and Community Right-to-Know Act, affording these schools the same exemption as is currently enjoyed by public schools, colleges and universities. Chapter 25, signed February 19, 1991

Environmental Health

A-877 amends the "County Environmental Health Act," P.L.1977, c.443, to expand the environmental law enforcement authority of certified local health agencies and to provide additional financial resources to these agencies in carrying out their obligations under the act. Chapter 99, signed April 15, 1991

Prepared by Kate McGuire, a legislative analyst with DEP's Office of Legislation



Expo to Unite Industry, Government

Department of Environmental Protection Commissioner Scott Weiner and the state's environmental prosecutor, Steven Madonna, will address the "8th Annual New Jersey Environmental Exposition for Business and Industry," which will be held on October 21, 22 and 23 at the Raritan Conference Center in Edison, Middlesex County.

This year's theme is "Bringing industry and government together on common ground ... and air ... and water." The event will feature three full days of comprehensive programs, including workshops, panel discussions and one-on-one sessions with state and federal environmental regulators. There also will be more than 150 exhibits of environmental goods and services. DEP has been a prime sponsor of the event since its inception in 1984.

For further information and a registration fee schedule, contact Virginia Maguire of Environmental Exposition, Inc., at (201) 379-1100 or by fax at (201) 379-6507.

Follow-Up



Green Acres Adds Sayen Park to List

Sayen Park, a 27-acre tract of woodland and gardens, recently was opened to the public in Hamilton Township, Mercer County.

The park, bordered by Mercer Street and Hughes Drive, is located in one of the most densely populated areas of the township, which purchased the tract with funding assistance from the Department of Environmental Protection's Green Acres Program (NJO Summer '91).

The Sayen family had surrounded their turn-of-the-century home with a wide variety of plantings. The township has added others to present a dazzling display of rhododendrons, lilies, roses, magnolias, cherry trees and 30 varieties of azaleas. A wooded tulip grove has been set up to accommodate nature education classes. Trails lead through stands of pine and hardwood that cover 70 percent of the park.

Sayen Park is open from sunrise to sunset. Admission is free.

Signs Warn of Fire Danger

The danger of forest fire jumps in the fall, particularly between October 15 and November 15 when the trees lose their foliage. The dry, dead leaves become fuel that feeds wildfires fanned by the windy conditions of the changing season. More than 90 percent of all forest fires are the result of human activities, and anyone visiting wooded areas should practice fire prevention.

The Bureau of Forest Fire Management within the Department of Environmental Protection's Division of Parks and Forestry has been refurbishing and improving existing Smokey Bear forest-fire danger signs. The signs, a familiar sight along several New Jersey roadways, alert the general public to the conditions for potential forest fires, ranging from low danger to very high. The revamped signs are located at Double Trouble and Island Beach state parks, Miller Air Park, Batsto Village, Lakehurst Naval Air Station, Atsion, the Warren Grove Bombing Range and Stokes Road in Medford.



National Beach Cleanup Finds Plague of Plastics

The most prevalent type of trash on the nation's beaches in the summer of 1990 was plastic, which made up 63.9 percent of all litter.

That was the finding by the Center for Marine Conservation (CMC), which coordinated the 1990 National Beach Cleanup in which more than 108,000 volunteers cleaned up more than 3,600 miles of coastline.

From September 8 through October 20, more than 260 million pounds of trash were collected. That figure includes 2,000 pounds collected by 200 volunteers in New Jersey who cleaned up Sandy Hook and Long Beach Island beaches, according to the CMC's report, *Cleaning North America's Beaches: Results of the 1990 Beach Cleanup*.

New Jersey had the second highest percentage of plastics reported — 75.87 percent of the total amount of litter collected. Plastic is of particular concern

because it can persist for many years and poses a hazard to wildlife, which can ingest or become entangled in it.

Plastics included Styrofoam items as well as cigarette filters, which were the most commonly reported item nationwide. Volunteers collected 531,828 cigarette filters, or butts — the equivalent of 26,591 packs of cigarettes. This made up 12.6 percent of all beach trash.

Most cigarette filters are made of cellulose acetate, a synthetic material, and therefore are classified as plastics. But many people think the filters are paper and will degrade rapidly, perhaps explaining their abundance on our beaches, says the CMC.

In the Northeast, commercial and recreational fisheries, sewage systems and storm drains are sources of non-point source pollution. Most of the sewage-associated waste, including tampon

applicators and condoms, and medical wastes such as plastic syringes, end up on beaches because of antiquated sewer systems and storm drain systems, according to the Environmental Protection Agency.

New Jersey and Massachusetts had about five times the national percentage of sewage-associated wastes, the CMC reports. New Jersey had the second-highest percentage of syringes nationwide.

Volunteers around the country also reported finding peculiar items, such as an inflatable female doll, major appliances, 10 kitchen sinks and various parts of the popular "Barbie" doll: Her head and shoe were found in Massachusetts, her leg in Lake Erie and her bra in Scarborough, Maine.

Among the other items found on New Jersey beaches were a crack vial, "GI Joe" face camouflage makeup, a doll's leg, the side of a boat, a cat toy, a drum cover, a pink plastic carnation and a plastic leaf, all at Sandy Hook, and crack vials, a hair clip, an ice pop holder and a lipstick at Long Beach Island.

New Jersey's 'Dirty Dozen'

	Total Number Reported	Percent of Total Debris Collected
1. Plastic straws	2,348	11.85
2. Plastic pieces	1,532	7.73
3. Plastic food bags/wrappers	1,442	7.28
4. Foamed plastic pieces	1,322	6.67
5. Plastic caps/lids	1,197	4.68
6. Cigarette filters	1,184	5.98
7. Metal beverage cans	1,006	5.08
8. Plastic beverage bottles	773	3.91
9. Paper pieces	772	3.90
10. Glass beverage bottles	724	3.65
11. Miscellaneous plastic	628	3.17
12. Plastic cups/utensils	607	3.06
TOTAL	13,535	68.32

Above are the 12 most prevalent items reported during New Jersey's cleanup. (From *Cleaning North America's Beaches: Results of the 1990 National Beach Cleanup*, published by the Center for Marine Conservation)

Volunteer for September 21 Cleanups

New Jersey's cleanups were coordinated by Clean Ocean Action, which organized the Sandy Hook effort, and Alliance for a Living Ocean, which led the Long Beach Island cleanup. New Jersey's cleanup date this year is **September 21**. For more information, contact:

Susie Feiring or Tim Merkel
 Clean Ocean Action
 Box 505
 Building 18, Hartshome Drive
 Highlands 07732
 (908) 872-0111
 Ginnie and Earl Gottshall
 Alliance for a Living Ocean
 P.O. Box 95
 Ship Bottom 08008
 (609) 492-0222

Number of Debris Items Collected During National Beach Cleanups

PLASTIC

Bags:	
food	178,856
trash	51,930
salt	3,435
other	66,408
Bottles:	
beverage	100,036
bleach	22,071
milk/water	35,384
oil/lube	20,054
other	42,481
Buckets	8,156
Caps/lids	165,384
Cigarette filters	531,828
Cigarette lighters	26,622
Cups/utensils	102,245
Diapers	9,425
Fishing line	32,174
Fishing nets	11,007
Floats/lures	12,688
Hard hats	964
Light sticks	14,341
Pieces	286,238
Pipe thread protector	5,576
Rope	93,736
Sheeting:	
longer than 2 feet	6,832
2 feet or shorter	14,577
Six-pack holders	34,722
Strapping bands	20,889
Straws	140,843

Syringes	3,738
Tampon applicators	17,125
Toys	15,628
Vegetable sacks	7,823
Write protection rings	6,592
Other	81,055

STYROFOAM

Buoys	15,020
Cups	117,672
Egg cartons	8,110
Fast food containers	34,139
Meat trays	15,552
Packaging	47,527
Pieces	250,898
Plates	18,863
Other	26,481

GLASS

Bottles:	
beverage	169,513
food	15,246
other	18,962
Fluorescent light bulbs	3,210
Light bulbs	9,580
Pieces	193,221
Other	16,370

RUBBER

Balloons	26,536
Condoms	3,741
Gloves	11,169
Tires	7,772
Other	36,893

METAL

Bottle caps	96,528
Cans:	
aerosol	14,177
beverage	168,779
food	13,111
other	8,709
Crab/fish traps	2,645
55-gallon drums:	
rusty	2,329
new	366
Pieces	33,682
Pull tabs	36,328
Wire	17,213
Other	38,792

PAPER

Bags	34,231
Cardboard	28,610
Cartons	22,971
Cups	41,301
Newspapers	19,953
Pieces	196,753
Plates	13,795
Other	62,847

WOOD

Crab/lobster traps	1,634
Crates	2,511
Lumber	69,546
Pallets	3,544
Other	31,854
CLOTH (clothing pieces)	48,424

(From *Cleaning North America's Beaches: Results of the 1990 National Beach Cleanup*, published by the Center for Marine Conservation)

\$5.5M to Fight Shore Pollution

The Department of Environmental Protection has made \$5.5 million available to attack ocean pollution caused by antiquated stormwater and sewer drainage systems.

As a preliminary step to making this money available, DEP has signed off on the final mapping rules under the Sewage Infrastructure Improvement Act, moving New Jersey forward in further attacking non-point source pollution.

"Mapping stormwater systems and sewer connections will help pinpoint sources that contribute to ocean pollution, such as

improper connections to storm sewers. This effort will go a long way toward fixing the problem and making sure that all pollution goes to treatment plants and not to the ocean," said Governor Jim Florio.

The approval of the mapping rules paves the way for municipalities to carry out a stormwater and sewage infrastructure mapping program that will help to identify the point and non-point sources of pollution.

The \$5.5 million in grant money will cover up to 90 percent of the mapping costs incurred by each of the affected municipalities. Ninety-four municipalities in four counties — Monmouth, Ocean, Atlantic and Cape May — are eligible for the funding.

The Sewage Infrastructure Improvement

Act became effective on August 3, 1988. It was designed to address both point and non-point sources of pollution from stormwater sewer systems and combined sewer overflows. The act requires all municipalities with stormwater sewer systems discharging into salt water in Monmouth, Ocean, Atlantic or Cape May counties to adopt a final map of their stormwater sewer systems.

On completion of these maps, affected municipalities are required to monitor water quality at any stormwater sewer outfalls discharging into salt water. This monitoring is to occur at least every three months. In addition, affected municipalities are required to take measures to reduce non-point source pollution entering surface waters.



Explorer

Oh, Dread! It's LEAD!

It is a dark, misty night. Superman cautiously enters an alleyway where he spots the villain who has kidnapped Lois Lane standing beside a large trunk. The villain suddenly lifts the trunk's lid, takes something from inside and holds it in front of the super-hero. A powerless Superman falls to the ground.

If you're a Superman fan, you know that the villain was holding kryptonite, a mineral from the planet Krypton that leaves Superman helpless. You also know that the only metal that can protect Superman from this reaction to kryptonite is lead.



Humans have used lead for thousands of years. The Greeks and Romans used lead pipes to carry drinking water. They stored their wine in lead decanters and used lead compounds — mixtures of metals, one of which is lead — as sweeteners and preservatives for wine. Many historians think these factors may have contributed to the decline of the Roman Empire.

Lead is one of the softest metals found on Earth. Because of this and the fact that it melts at a relatively low temperature (327.5° C compared to 1,535° C for iron), it is found in many products and manufacturing processes. Lead is found in the air, in the water and in the soil.

Our bodies absorb lead. That means that when we breathe or eat lead, not all of it passes through our system and comes out in our waste. Some stays behind in our blood, bones and organs. Adults absorb one-third of the lead they breathe and one-tenth of the lead they eat. But young children absorb as much as one-half of the lead they eat.

Lead poisoning occurs when a person's body absorbs too much lead — in other words, when a person's body becomes polluted with lead. Lead poisoning can cause brain damage, coma, convulsions and even death.

To stop lead poisoning we need to change the ways we use and dispose of things containing lead.

Where Does Lead Lurk?

Locating lead in our communities is half of the battle in reducing the amount of lead in the environment. The other half is properly using, recycling or disposing of leaded materials.

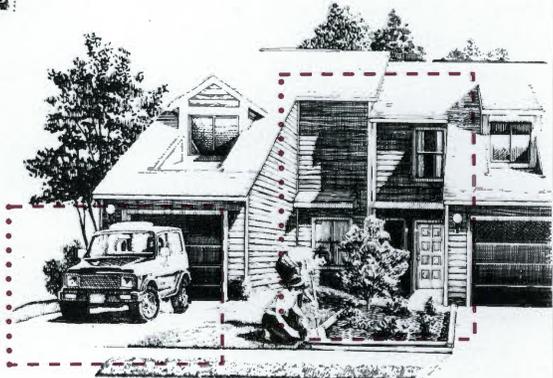
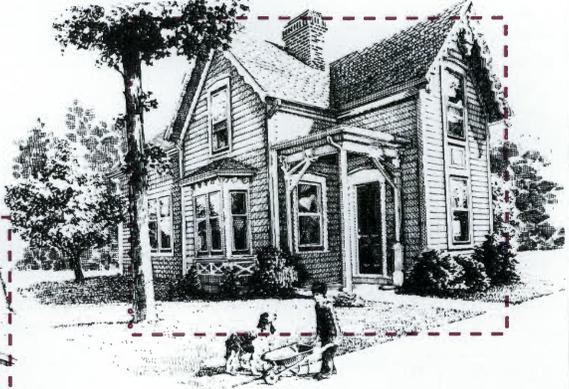
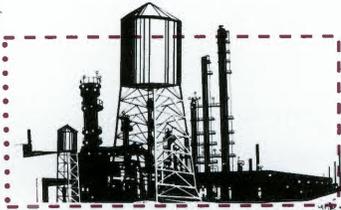
To see where lead may be hiding in your community, cut out both boxes on the next page. Then cut along the dashes and fold along the dotted lines in Box #1. Next, place Box #1 over Box #2 and tape them together. Now just open the flaps and hold it in front of a mirror to see where lead is lurking in your community.

TEACHER'S NOTE

Giving students a demonstration of lead testing can be helpful when you're teaching about the human body in grades 4 through 6, earth science in grades 4 and 5, and physical science in grades 3 through 6. Many companies sell lead testing kits to test the lead content in solder, pipes, ceramics and water. For a complete listing of these companies, refer to Page 378 in the June 1990 issue of *Consumer Reports*, or call DEP's Division of Science and Research at (609) 292-9692.

Explorer by Marlena Gloff-Straw of DEP's Office of Communications and Public Education

Box # 1



*Lead was banned from being put in paint by the federal government in 1977.
 **The use of lead solder was banned in New Jersey in 1987.

Box # 2

Smelting metals
with lead

Pottery,
lead crystal,
making
stained glass

Solder that
seals pipes**

Making
lead sinker
& flies
for fishing

Car
batteries
& used
motor oil

Paint
& paint
dust inside
houses*

DIAGRAM BY DENISE BECK

Events

September

Every day CAPE MAY HAWK

WATCH Flights totaling more than 100 hawks per day begin in early September. Bring binoculars, sunglasses and sunscreen. Sponsored by New Jersey Audubon's Cape May Bird Observatory. **Hours:** All day **Admission:** free **Phone:** (609) 884-2736, 9:00 a.m. - 5:00 p.m. Tuesday - Saturday; **Hotline:** (609) 884-2626 **Location:** Hawk Watch Platform at Cape May Point State Park

4 CEDAR CREEK TUBING Choose 1-1/2 or 2-1/2 hours on a clear stream with wildflowers along the banks and a nice swimming hole en route. Bring lunch and tube. Wear old sneakers (no flip-flops); life jackets for weak swimmers. Trip depends on warm period preceding date. Sponsored by the Sierra Club. **Hours:** 10:30 a.m.

Admission: free **Phone:** (609) 267-7052 **Location:** Meet at Double Trouble State Park, Pinewald-Keswick Road, 3 miles west of Route 9 via Central Parkway and Veterans Blvd.; from the west, from Routes 539/70 near Whiting, take Route 530, crossing Dover Road, for 2-1/2 miles

Wednesdays in September and October BIRDING FOR FIRST-TIMERS Join the Cape May Bird Observatory staff on a brief, leisurely exploration of Cape May's lingering breeding birds and autumn migrants. Bring binoculars and field guides, if available. **Hours:** 7:30 a.m. - 9:00 a.m. **Admission:** \$4.00 members, \$6.00 nonmembers (Price includes "Cape May Birding Attack Pack" containing information on the observatory and a birding map.) **Phone:** (609) 884-2736, 9:00 a.m. - 5:00 p.m. Tuesday - Saturday; **Hotline:** (609) 884-2626 **Location:** Meet at The Nature Conservancy's refuge parking area on Sunset Blvd.

6, 7 SUNRISE WARBLER WALKS Land birds have migrated all night and will be touching down at Higbee Beach at dawn. This is the peak time for warbler

migration. Join the Cape May Bird Observatory on these warbler walks where you may see 25-plus species of warblers, not to mention an assortment of other land birds. Limit: 15 people. Call to preregister. **Hours:** 6:30 a.m. - 8:00 a.m. **Admission:** \$4.00 members, \$6.00 nonmembers **Phone:** (609) 884-2736, 9:00 a.m. - 5:00 p.m. Tuesday - Saturday; **Hotline:** (609) 884-2626 **Location:** Higbee Beach, Cape May

7 DEEP CUT PARK DAY Visitors to the park will be treated to displays and demonstrations of orchid-growing and bonsai culture, dried flower arranging, plant propagation, wreath-making and herbal tastings. **Hours:** 10:00 a.m. - 4:00 p.m. **Admission:** free **Phone:** (908) 842-4000 **Location:** Deep Cut Park, Red Hill Rd., Middletown

7 AMERICAN CANCER SOCIETY BIKE-A-THON Bike 50 miles. **Hours:** 8:00 a.m. **Admission:** \$50.00 — includes T-shirt, hat, bike flag, dinner ticket and party afterwards **Phone:** (609) 645-7272 **Location:** Begins and ends at Maloney's Restaurant, 23 South Washington Ave., Margate

7, 8 ROCK, GEM & MINERAL SHOW AND SWAP Sponsored by Cape-Atlantic Rockhounds. **Hours:** Saturday, 10:00 a.m. - 5:00 p.m.; Sunday, 10:00 a.m. - 3:00 p.m. **Admission:** free **Phone:** (609) 646-4615 **Location:** Clubhouse Grounds, Cologne Ave., between White Horse Pike and Black Horse Pike, Cologne

7, 14, 21 & Oct. 12 & 26 HAWK ID MINI-WORKSHOPS Confused by the 19 different species of hawks and eagles that pass through Cape May by the thousands each fall? Learn to tell one from another. Bring binoculars and field guide, if available. Sponsored by New Jersey Audubon's Cape May Bird Observatory. **Hours:** 1:00 p.m. - 3:00 p.m. **Admission:** \$4.00 members, \$6.00 nonmembers

Phone: (609) 884-2736, 9:00 a.m. - 5:00 p.m. Tuesday - Saturday; **Hotline:** (609) 884-2626 **Location:** Meet at Cape May Point State Park's Education Building for slide program and materials, followed by a hawk identification walk

13, 14 FRELINGHUYSEN ARBORETUM HARVEST SHOW Fall horticultural forum with slide lectures and demonstrations. Gardeners may enter their prize vegetables, flowers or roses in 60 categories of plants, and cooks may enter their dishes in 14 categories of food. There are special categories for children. Sponsored by the Morris County Park Commission and Friends of Frelinghuysen Arboretum, in cooperation with the New Jersey Committee of the Garden Club of America. **Hours:** Friday, 12:30 p.m. - 7:00 p.m.; Saturday, 10:00 a.m. - 5:00 p.m. **Admission:** free **Phone:** (201) 326-7600 for complete list of all the categories and their requirements **Location:** Frelinghuysen Arboretum, 53 East Hanover Ave., Morris Township



14 BIKE TO THE BEACONS 25-, 50- and 100-milers sponsored by the Shore Cycle Club. **Hours:** 7:30 a.m. **Admission:** \$8.00; registration deadline September 1 **Phone:** (609) 628-2358 **Location:** Davies Sports Complex, Cape May Court House

14, 15 FIREFIGHTERS WEEKEND Celebrate the tradition of the firefighter with games, contests, bucket brigade and more. **Hours:** 10:00 a.m. - 4:00 p.m. **Admission:** \$1.50 adults, \$.75 children 6 - 12, under 6 free **Phone:** (609) 898-2300 **Location:** Historic Cold Spring Village, Cold Spring

Every Saturday and Sunday Sept. 14 - Oct 27 HAWK BANDING DEMONSTRATIONS A rare opportunity to see birds of prey. Learn about raptor biology, the importance of Cape May to migratory birds and the Cape May raptor research project. Sponsored by New Jersey Audubon's Cape May Bird Observatory. **Hours:** 10:00 a.m. - 10:30 a.m. **Admission:** free **Phone:** (609) 884-2736, 9:00 a.m. to 5:00 p.m. Tuesday - Saturday; **Hotline:** (609) 884-2626 **Location:** Meet at the picnic pavilion next to the Hawk Watch Platform at Cape May Point State Park

15 NEWFOUNDLAND DOG WATER TEST Training and show of Newfoundland dogs will include water rescue events and competition. Sponsored by New-Pen-Del Newfoundland Club. **Hours:** 8:00 a.m. - 5:00 p.m. **Admission:** free **Phone:** (908) 236-6355 **Location:** Round Valley Recreation Area, Lebanon

15 OUTDOOR RECREATION EXPO See the latest in outdoor recreational equipment and speak to experts who are proficient in a variety of outdoor pursuits. Sponsored by the Monmouth County Park System. **Hours:** 10:00 a.m. - 5:00 p.m. **Admission:** free **Phone:** (908) 842-4000 **Location:** Turkey Swamp Park, Georgia Rd., Freehold

21, 22 WINGS-N-WATER FESTIVAL The Wetlands Institute's 9th Annual Wings-N-Water Festival will celebrate South Jersey's coastal environment with 30 family events along a 15-mile stretch. **Hours:** Saturday, 10:00 a.m. - 5:00 p.m.; Sunday, 10:00 a.m. - 4:00 p.m. **Admission:** \$8.00 for adults, \$6.00 for senior citizens, \$2.00 for children ages 6 - 12, and free for children under 6 **Phone:** (609) 368-1211 **Location:** Stone Harbor

21, 22 BIRD-WATCHING FOR BEGINNERS All aspects of bird identification, bird-watching (local hot spots), equipment (books, binoculars, telescopes, tripods), and attracting birds to

your own back yard will be covered Saturday evening. A field trip on Sunday will put new skills to use. **Hours:** Saturday, 7:00 p.m. to 10:00 p.m.; Sunday, 10:00 a.m. to noon. **Admission:** \$10.00 members, \$15.00 nonmembers **Limit:** 15 people; preregistration is required **Phone:** (609) 884-2736, 9 a.m. to 5 p.m. Tuesday - Saturday; **Hotline:** (609) 884-2626 **Location:** Cape May Point State Park's Education Building

21, 22 FIBER TO FABRIC WEEK-END Special demonstrations of fiber arts — sheep-shearing, dyeing, spinning, weaving and more. **Hours:** 10:00 a.m. - 4:00 p.m. **Admission:** \$1.50 adults, \$.75 children 6 - 12, under 6 free **Phone:** (609) 898-2300 **Location:** Historic Cold Spring Village, Cold Spring

27 AMERICAN INDIAN DAY CELEBRATION Featuring Indian food and entertainment. **Hours:** 3:00 p.m. to sunset **Admission:** free **Phone:** (609) 261-4747 **Location:** Rancocas Road, Rancocas

28 PROJECT FREEDOM, INC. 10-, 25- and 62-mile bicycling events. **Hours:** 10-miler starts between 10:00 a.m. and 10:30 a.m.; 25-miler between 9:30 a.m. and 10:00 a.m., and 62-miler between 7:30 a.m. and 8:30 a.m. **Admission:** \$20.00 registration fee. Pledges not necessary, but prizes will be awarded for them **Phone:** (609) 584-8857 **Location:** Start at Foxmoor on Hutchinson Road in Washington Township, across Burlington County and back



28 VILLAGE FAIR — HISTORIC VILLAGE OF OLD BRIDGE Guided walking tours of historic district, entertainment, arts, crafts and antiques. Sponsored by the East Brunswick Museum Corp. Rain date: October 5 **Hours:** 10:00 a.m. - 5:00 p.m. **Admission:** free **Phone:** (201) 257-8825 **Location:** Kossman Street, East Brunswick

28 JERSEY DEVIL CENTURY & HALF CENTURY Bicycling event sponsored by the South Jersey Wheelmen features a 50-mile figure eight, then lunch, then, if you want, another 50 miles. **Hours:** 8:00 a.m. **Admission:** \$8.00 preregistered, \$10.00 day of event **Phone:** (609) 691-3936 **Location:** Start and finish at Parvin State Park, Centerton

28, 29 APPLE DAY Continuous country music, storytellers, crafts show in the orchards, horse-drawn wagon rides, pony rides, opportunities to pick your own apples and pumpkins and make your own scarecrows, and more. **Hours:** 10:00 a.m. - 5:00 p.m. **Admission:** \$3.00, children under 3 free **Phone:** (609) 924-2310 **Location:** Terhune Orchards, Lawrenceville

28, 29 CIVIL WAR WEEKEND Encampment of Civil War re-enactors, memorabilia displays. **Hours:** 10:00 a.m. - 4:00 p.m. **Admission:** \$1.50 adults, \$.75 children 6 - 12, under 6 free **Phone:** (609) 898-2300 **Location:** Historic Cold Spring Village, Cold Spring

Events

29 10TH ANNUAL HARVEST FESTIVAL A celebration of colonial life, including music, work skills, crafts, children's games, food and encampment. Sponsored by the Union County Department of Parks and Recreation. **Hours:** 1:00 p.m. - 5:00 p.m. **Admission:** \$1.00 suggested donation **Phone:** (908) 789-3670 **Location:** Trailside Nature & Science Center, Coles Ave. and New Providence Rd., Mountainside

October

Thru Nov. 17 BIRD WATCHING AT CAPE MAY JETTIES The migration of scoters, sea ducks, loons, cormorants and gannets is a sight to behold. There is probably no better vantage point than Cape May's jetties. Bring binoculars and telescope, if available. Dress warmly. **Hours:** 7:30 a.m. - 10:00 a.m. **Admission:** \$5.00 members, \$8.00 nonmembers. **Phone:** (609) 884-2736, 9 a.m. - 5 p.m. Tuesday - Saturday; **Hotline:** (609) 884-2626 **Location:** The leader will meet you at the 2nd Avenue jetty in Cape May, which is the last jetty at the western end of Beach Avenue. From there you will car pool to the other jetties, including the Coast Guard jetty (normally off-limits)

19 SEA BIRD WATCH In 1987 this watch (in just a few hours) recorded 3,000-plus scoters migrating offshore, as well as a good number of mergansers and loons. This is also when many royal terns stage along the beach. **Limit:** 25 people; preregistration is necessary **Hours:** 2:00 p.m. - 4:00 p.m. **Admission:** \$4.00 members, \$6.00 nonmembers **Phone:** (609) 884-2736, 9 a.m. to 5 p.m. Tuesday - Saturday; **Hotline:** (609) 884-2626 **Location:** Depends on migration; possibly Stone Harbor or Cape May Point

19, 20 CHATSWORTH CRANBERRY FESTIVAL Includes contests, storytelling and cranberry bog tour; call for reservations for tour. **Hours:** 10:00 a.m. - dusk **Admission:** \$3.00 parking donation,

additional charge for tour **Phone:** (609) 859-9701 **Location:** Main Street, Chatsworth

19, 20 BIRD-FEEDING WEEKEND Information and displays on birds and bird feeding will be available. There also will be information on ways to baffle squirrels, pigeons and raccoons. Catalogs from birdseed suppliers will be on hand. **Hours:** 10:00 a.m. - 4:00 p.m. **Admission:** free **Phone:** (201) 635-6629 **Location:** Great Swamp Outdoor Education Center, 247 Southern Blvd., Chatham

20 TURKEY SWAMP PARK DAY Enjoy an arts and crafts sale, food festival, pony and wagon rides, diaper derby and tot trot, music and other entertainment. Sponsored by the Monmouth County Park System. **Hours:** 11:00 a.m. - 5:00 p.m. **Admission:** free **Phone:** (908) 842-4000 **Location:** Turkey Swamp Park, Georgia Rd., Freehold

27 FOLKLORE OF THE SWAMP Native American Jack Ruching will tell tales about the Great Swamp's past, including stories of the Swamp Devil. This will be a great way to start a Halloween week. **Hours:** 2:00 p.m. **Admission:** free **Phone:** (201) 635-6629 **Location:** Great Swamp Outdoor Education Center, 247 Southern Blvd., Chatham

November

2, 9, 16 OWLS IN THE BEAM OF THE LIGHTHOUSE Each fall, by the light of the moon, hundreds of owls migrate through Cape May. This nocturnal migration of saw-whet, barn, long-eared and short-eared owls occurs between mid-September and late November. **Hours:** 4:30 p.m. - 6:30 p.m. **Admission:** \$4.00 members, \$6.00 nonmembers **Phone:** (609) 884-2736, 9:00 a.m. - 5:00 p.m. Tuesday - Saturday; **Hotline:** (609) 884-2626. **Location:** Meet at the entrance to Cape May Point State Park in the small outer parking lot

9 NATURE PHOTOGRAPHY WORKSHOP "Individual approach"

John Spoulos, a professional nature photographer, will offer this workshop, the third in a series, at the Cape May Bird Observatory. The morning session will be indoors. The afternoon session will be a photographic expedition in the field. Participants should bring a 35mm camera, several rolls of 36-exposure slide film and five original slides of nature subjects for discussion during the morning session. **Limit:** 20 people; call to preregister **Hours:** 9:00 a.m. - 5:00 p.m. **Admission:** \$25.00 members, \$30.00 nonmembers **Phone:** (609) 884-2736, 9:00 a.m. - 5:00 p.m. Tuesday - Saturday; **Hotline:** (609) 884-2626 **Location:** Cape May Point by lighthouse



16 FALL HIKE See the animals of the Pine Barrens in a hike in the Whitesbog Village area. **Hours:** 9:00 a.m. to noon **Admission:** \$3.00/person, \$9.00/family **Phone:** (609) 893-4646 **Location:** Meet at General Store, Whitesbog Village, Lebanon State Forest, Pemberton Township

16, 17 NATURAL DYES WEEKEND Learn how to make dyes from asters, onion skin, marigolds, pokeberries and black walnuts. This weekend's program will include hands-on demonstrations of various natural dyes and natural dye techniques. **Hours:** 10:00 a.m. - 4:00 p.m. **Admission:** free **Phone:** (201) 635-6629 **Location:** Great Swamp Outdoor Education Center, 247 Southern Blvd., Chatham

Outings

Horseback Riding

Since the horse is New Jersey's official state animal, it's only appropriate that opportunities for horseback riding are so numerous and varied.

Many stables offer horses for hire, usually for an hour, some with guides. Riding lessons are available for all levels of experience and different styles of riding.

Here are just a few of the places where you can rent horses, take riding lessons and go riding in New Jersey:

- ❑ **Briar Oak Farm** offers individual lessons in both English and Western riding. **Phone:** (609) 927-9203 **Location:** Off Zion Road, English Creek (Atlantic County)
- ❑ **Overpeck Riding Center** offers English riding instruction, private or group lessons, beginners to advanced. Students go to shows with instructors. **Phone:** (201) 944-7111 **Location:** Fort Lee Road, Leonia, about two miles from the George Washington Bridge (Bergen County)
- ❑ **Triple R Ranch** offers horses for hire on a guided trail through woods and beach, Western-style lessons and pony rides. **Phone:** (609) 465-4673 **Location:** 210 Stagecoach Road, Cape May Court House (Cape May County)
- ❑ **Montclair Riding Academy** offers lessons to students on the 408-acre Eagle Rock Reservation, with an indoor arena and two outdoor arenas. **Phone:** (201) 731-4182 **Location:** Woodland Avenue, West Orange (Essex County)
- ❑ **Circle W Farm** boards and sells horses and holds shows. Lessons are available, group or private, English and Western, but you must have your own horse. **Phone:** (609) 728-9070 **Location:** Williamstown (Gloucester County)

❑ **Washington Crossing State Park** has a two-mile trail beginning in the Phillips Farm area near group campsites. Riding is permitted when the park is open. **Phone:** (609) 737-0623 **Location:** Off Route 29, eight miles north of Trenton, bordering the Delaware River (Mercer County)

❑ **Johnson Park** has show rings, a 1/4-mile trotting track, horse shows and exhibit racing on Sundays. **Phone:** (201) 745-3930 **Location:** River Road (Route 18), Piscataway, directly across from Rutgers University Stadium (Middlesex County)

❑ **Circle A Riding Farm** offers horses for hire to ride in Allaire State Park, pony rides and stables for boarding and leasing. **Phone:** (908) 938-2004 **Location:** 363 Squankum Road, Howell (Monmouth County)

❑ **The Handicapped High Riders Club**, a member of Horseback Riding for the Handicapped of N.J., Inc., offers a year-round program for disabled riders. Lessons are primarily on an individual basis with some group work. There is a part-time physical therapist available. **Phone:** (609) 259-3884 **Location:** Riding High Farm, Allentown (Monmouth County)

❑ **Seaton Hackney Stables** offers group and private lessons and teaches advanced students to be instructors. Riding is on trails in the Morris County Park System. A children's summer camp with riding lessons also is offered. **Phone:** (201) 267-1372 **Location:** South Street, Morristown, off Route 287 (Morris County)

❑ **Lakewood Riding Center** gives lessons and has horses for hire, hayrides, pony rides, ponies for parties on the property, a tack shop, an indoor arena and trails on 600 acres of property. **Phone:** (908) 367-6222 **Location:** 436 Cross Street, Lakewood (Ocean County)

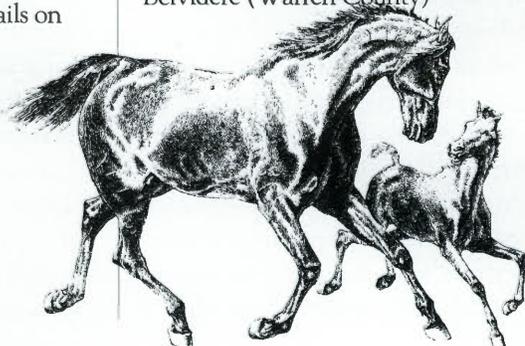
❑ **Echo Lake** offers lessons and horses for hire. On Friday and Saturday nights, you can take an evening ride featuring a Western-style barbecue and a hayride back to the parking lot. Birthday parties at the stables also are offered and ponies can be brought to special events. **Phone:** (201) 697-1257 **Location:** 55 Blakely Lane, Newfoundland, near Wayne (Passaic County)

❑ **All Bright Farm** offers private English-style lessons for beginning to advanced riders. **Phone:** (609) 358-2187 **Location:** Beal Road and Cohensy-Aldine roads, Alloway (Salem County)

❑ **Lord Stirling Stables** offers English-saddle, group riding lessons with three horse shows for students that are open to the public. There are horses for hire, horse-drawn hayrides and surrey rides. Horse-drawn sleigh rides will be offered in the winter if there are at least 4 to 6 inches of packed snow. **Phone:** (908) 766-5955 **Location:** South Maple Avenue, Basking Ridge, down the road from the Environmental Center (Somerset County)

❑ **Watchung Stables** offers riding lessons for children ages 9 through 17 and adults. It also has horses for hire to ride through the 2,000 acres of the Watchung Reservation. **Phone:** (908) 789-3665 **Location:** Watchung Reservation, Summit Road, Mountainside, near Route 22 west (Union County)

❑ **Yellow Rock Horse Ranch** has horses for hire to ride on 80 open acres, without a guide. **Phone:** (908) 475-4732 **Location:** off Route 519 on Mountain Lake Road, Belvidere (Warren County)



By Michelle Anthony, a DEP intern from Trenton State College

Wildlife in New Jersey

The Striped Skunk

While out driving some warm evening, you just might see a dark, chubby creature with a distinctive white streak scurry across the road. In the whirlwind of an instant it's gone, perhaps leaving behind the all too familiar odor that has been known to accompany it. The creature is none other than the striped skunk, one of the most recognizable and notorious mammals found in New Jersey.

Skunks are nocturnal animals and rise at sunset to begin their nightly forage for food. The "tuxedoed marauder" eats practically anything.

A member of the weasel family and about the size of a house cat, the striped skunk is distinctly characterized by a black body, a narrow white strip up the middle of its forehead and a broad white area on the back of its neck that usually divides into a "V" shape at the shoulders. The two white streaks often continue to the base of a thick, bushy tail, which may or may not have a white tip. Variations do occur and some skunks may sport incomplete stripes or no white coloration at all aside from a tiny patch on the nape of the neck.

Possibly the best-known characteristic of the striped skunk is its rather unique protective device, which takes the form of two finely developed scent glands. These two oval sacs, located beneath the skin surface and just below the tail, are filled

with an overpowering, odorous liquid. When in use, the fluid-filled sacs protrude from the anus and can be emptied in a fine spray, singly or both at once, showering a range of up to 10 feet. The animal is so skilled it can actually "aim" at its enemy, and then beware. A good, stiff shot in the eyes or on the skin can cause quite a fiery, stinging sensation.

Skunks will not use this protective device unless greatly provoked. They are very good "bluffers," acting out mock aggressiveness by raising their tails and thumping their forefeet. They are truly peace-loving creatures, so in the event of a crisis, remember to avoid any sudden moves and stay calm. These little animals are fearless, however, and once aggravated will stand their ground. It's no use entering into a contest to see who will flee first; it is always the intruder who inevitably loses.

Striped skunks are very clean animals. The strong-smelling defense fluid rarely comes in contact with their own fur. They can be found virtually all over the state of New Jersey. Adaptable to almost anywhere, they prefer open fields and mixed woodlands, usually within a two-mile distance from water.

Skunks are nocturnal animals and rise at sunset to begin their nightly forage for food. The "tuxedoed marauder" eats practically anything, including mice, eggs, insects, berries, carrion and any garbage pail delights set out by unsuspecting humans. Diet and eating habits change with the seasons. Beetles and bees are a favorite in early summer, as are crickets and grasshoppers in late August. During cold weather, the skunk eats high-protein foods to gain fat for the winter slumber.

It isn't a true hibernation, though. Skunks may occasionally leave their dens on the milder days of the season. For warmth and security, several females may den together in ground burrows beneath

buildings, boulders, tree stumps or wood-piles. Males remain solitary.

Mating takes place between February and March. A female skunk usually gives birth to five or six young in early May. One of the more memorable sights is a mother skunk strutting down a path with young in tow, following single file.

Aside from their susceptibility to diseases such as distemper and rabies, skunks are very beneficial creatures. They are essential to agriculture in the control of insect and small rodent populations. Many homeowners, however, do suffer damage to their lawns, especially in the fall when skunks are busy digging up grubs. For those with "problem" individuals on their hands, mothballs or ammonia-soaked rags placed in areas the animal frequents should do the trick. Harried homeowners also may consider contacting the Division of Fish, Game and Wildlife's Wildlife Control Unit at (908) 735-8793 for additional advice.

By Kathy Previte, a public information specialist with the Division of Fish, Game and Wildlife



Carol Decker
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Boys play in one of the many abandoned ships dotting the New Jersey shoreline in a photo circa 1904.

In Next Season's Issue:

The Story of New Jersey's Deadly Sea Monster
Name That Town: The Facts, the Legends
Exploring the Dark Wonders of Caves