

NEW JERSEY Outdoors

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Spring 1993

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Return to the Days of the One-room Schoolhouse • Plant Your Garden to Foil Deer
Get Ready to Go Mountain Biking • Explore Forest Fires' Natural Balancing Act
Find Out the Origins of That Trout on Your Line

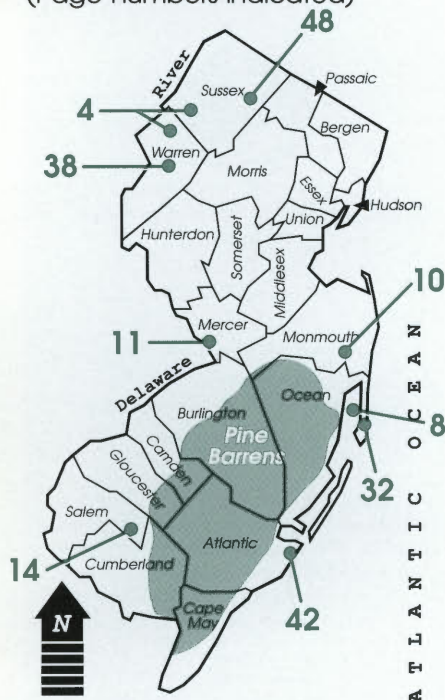
Flyfishing for trout at the
Ken Lockwood Gorge,
Hunterdon County.



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Mountain bikers race along a trail in Allaire State Park. See page 20 to get rolling yourself.



G. BROWER

Editorials



Jim Florio
Governor

New Beginnings for Better Water Quality

Spring is traditionally a time for new beginnings. And New Jersey is eager to meet the challenges ahead. Environmental and economic benefits flow into our state when we improve water quality. In New Jersey, we have an excellent program — the New Jersey Wastewater Treatment Financing Program — to tackle wastewater problems. It provides loans and assistance to local communities to purify wastewater and upgrade sewer systems. The result is a healthier natural environment, better community services and a high-quality infrastructure to support business and industrial needs.

Last November, New Jerseyans gave a resounding vote of approval to our Green Acres Bond Issue. The bond issue specifically dedicates funds for DEPE's Municipal Wastewater Assistance and the New Jersey Wastewater Treatment Trust. Now, we will have an increased loan capacity of almost \$90 million to speed up wastewater improvement projects all across the Garden State.

New Jersey has made a firm commitment to upgrade its water quality. It's an investment in jobs and basic services — and more. Clean water and proper wastewater treatment improve our all-around quality of life. It also gives local communities the capacity to increase tax revenues by supporting wise business and residential growth. At the shore, we're protecting our beaches and our summer visitors from sewer overflows. In rural and suburban areas we're increasing recreational opportunities along our rivers and waterways. All in all, that's a great way to welcome spring to New Jersey.



Scott Weiner
Commissioner

Taking Stock in Protecting our Natural Resources

As an enthusiastic angler, my work sometimes lets me combine business and pleasure and continue to hone my fishing skills. That's why I look forward each year to April when I get the chance to mark the official opening of spring trout-fishing season at the Pequest Trout Hatchery and Natural Resource Education Center in Oxford, Warren County.

Taking pleasure in the activities of the DEPE's Division of Fish, Game and Wildlife always provides an opportunity to reflect on the importance of the department's mission to protect our precious natural resources. Fish and other wildlife are good indicators of environmental quality. In the last five years, New Jersey has upgraded nearly 95 miles of streams to trout production or maintenance quality. As Governor Florio notes in his message above, New Jersey has committed itself to improving water quality. This has the added benefit of making more state waterways fishable.

Meeting the diverse needs of New Jersey's trout anglers is a tall order, but the Division of Fish, Game and Wildlife is up to the task. During spring season, the state-of-the-art Pequest hatchery stocks more than 250 public waters with more than 600,000 trout. (For more information on hatching and stocking trout, see page 38.)

Visit the Natural Resource Education Center at Pequest year-round to take in the displays and interactive exhibits. It's a pleasant way to learn that protecting our natural resources is everyone's business.

Here's to good fishing!

State of New Jersey
Jim Florio
Governor



Department of Environmental Protection
and Energy

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Commissioner

Becky Taylor
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Joanne Degnan
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New Jersey Outdoors
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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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Mailbox

Dear NJO Readers

This issue of NJO marks several major changes. First, it marks the final contributions of Hope Gruzlovic, who ably steered NJO for more than two years.

As the new editor, I hope to build on the quality she brought to NJO. In that regard, I welcome hearing from you. Please write to let us know what articles, features or departments in NJO you have liked — or disliked. Write to give us suggestions for future issues. You can write to: Editor, NJO, CN 402, Trenton, NJ 08625-0402.

A second major change has occurred in the way we now provide subscription services to you. In order to operate more economically and serve you better, NJO recently took over all the circulation functions that had been contracted to an outside firm. This includes processing new subscriptions, renewals, changes of address, bills and payments. After a longer and rougher-than-expected transition period, our system is finally fully up-to-speed. We apologize to any of you who have experienced delays in service or been inconvenienced in any way.

Now that we have day-to-day control over subscriptions and renewals, we expect to serve you more efficiently. If, however, you have encountered a glitch with any aspect of your subscription, please let us know. Sandra Pearson, who oversees NJO's circulation, is available to answer any questions you may have about your subscription. Please call her toll-free during business hours at 1-800-645-0038.

Over the years, our readers have demonstrated an exceeding loyalty to NJO. We thank you. And we pledge to work as hard as we can to produce a magazine that continues to justify that faith. Happy reading.

Sincerely,
Roger Shatzkin, Editor

New Jersey Outdoors welcomes letters to the editor. Please include your name, address and daytime telephone number. Our address is NJO, NJDEPE, CN 402, Trenton 08625-0402. We reserve the right to edit letters for length and clarity.

Less is More?

New Jersey Outdoors is a beautiful publication and I salute you for resuming publication. However, I think there's an error in "Protecting Your Drinking Water," in the winter 1993 issue. On page 50, under the heading, "How Do You Make Decisions on Water Quality," the article states, "with lead solder less than 10 years old, make sure you use a good flushing program any time water stands in the pipes for four hours or more." I believe it should read "more than 10 years old." Could you please clarify the matter. Thank you for your dedication to information and accuracy and for a great magazine.

Ken Terebush
Somerset

Barker Hamill, chief of the DEPE's Bureau of Safe Drinking Water and co-author of the article responds: "Less" is the correct word. We were discussing lead solder in the sentence in question. Once lead solder is in contact with water for several years, the lead molecules on the surface form a chemical "skin" that slows down the lead's ability to leach into the water. So, with lead solder, older is better. Solder used since 1987 has been virtually lead-free. Therefore, plumbing installed between 1982 and 1987 is most apt to have been done with lead solder less than 10 years old. A good flushing program is essential for plumbing with lead solder from this period.

Torn Outside, Good Inside and a Year Ahead?

I received my copy of NJO in December and for some reason, I believe that you have the wrong date. It's dated "Winter 1993" and I think it should be "Winter 1992." Also, my magazine was torn on the top. It was probably not anyone's fault, but would you please send me another copy. I save all my copies. It is the best magazine I get. Keep up the good work and keep NJO rolling off the presses.

Carl R. Faulkner
Roselle

Editor's note: Thanks for the kind words about the magazine. By now, you should have received another copy to replace the torn issue. Incidentally, any subscriber who receives a damaged copy can call our toll-free subscription line, 1-800-645-0038, to request a replacement. As to the dating of issues: although you received your copy of the winter issue in 1992, NJO has traditionally dated this issue for the coming year.

Wily New Jersey Coyotes

Congratulations on the beauty of the winter 1993 issue of NJO. Can you supply information on the status of the eastern coyote in New Jersey, including the counties they have been sighted in and statewide population estimates? I think I saw one along Route 27 north of Kingston (along the border of Middlesex and Somerset counties). It resembled a small, densely furred German Shepherd dog.

William Flemer III
Princeton

Patricia McConnell, principal wildlife biologist, and Robert C. Lund, wildlife research scientist, for the Northern District of the Division of Fish, Game and Wildlife respond: Yes, you could definitely have sighted a coyote. Official sightings of the eastern coyote have been reported in 17 of New Jersey's 21 counties. The exceptions are Camden, Hudson, Monmouth and Union counties. We believe, however, that the animals are probably living in every county except Hudson. We currently estimate the statewide population to be in the thousands. Most of the specimens from New Jersey are tan and gray with whitish underparts and a darkish stripe down the back. However, coat color is variable and a German Shepherd coloring would not be unusual. The coyote's ears are not as long as a Shepherd's and its fox-like muzzle would be sharper and longer than its domestic relative's.

Afield

Paddling the Paulinskill

There's some great canoeing on the little streams of northwestern New Jersey. The Flatbrook, Paulinskill, Pequest and Musconetcong offer a variety of canoe experiences along some of the most unspoiled and scenic countryside in the East. This goes double for the Paulinskill River in Sussex and Warren counties.

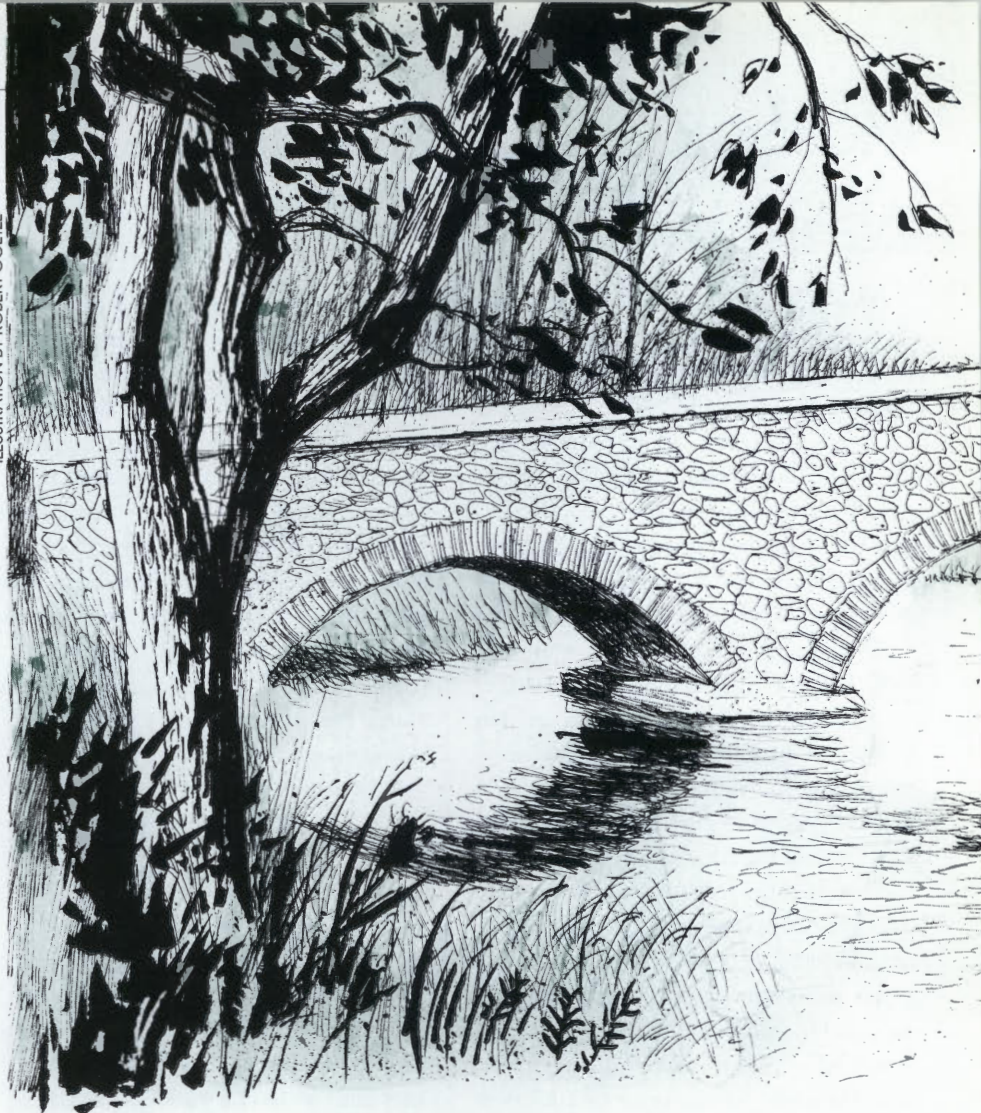
Beginning at the bridge in Stillwater and ending at Footbridge Park in Blairstown, a canoe trip down river provides a first-rate outdoors adventure combining white water with serene water. There's nothing too intimidating, but there's enough of a challenge for weekend canoeists like my wife, Diana, and me. Overall, we figure on about four hours to make a leisurely trip with time to explore.

We'd learned — the hard way — that low water sometimes makes streams like the Paulinskill uncanoeable. Spring is the best time of year to ensure proper water flow, but you should never take it for granted. You don't want to run out of canoeable river deep in the woods and miles from the nearest road.

We checked the river at the Marksboro bridge, just off Route 94 on Route 659. Marksboro is about midway between Newton and Blairstown, and the old bridge marks the halfway point on the roughly seven-mile journey we'd mapped out. The bridge crosses the Paulinskill at the head of the most serious set of rapids we would encounter. If the water at this point is not running fast and its volume not sufficient to cover the boulders in the riverbed, it's a fairly good indicator that you should try another day. If the water is up and running, the view from the bridge also provides a good chance to study the rapids and plot a track through the hundred feet of rock-strewn white water.

Logistics can be complicated. We had taken two cars with canoe racks and had

ILLUSTRATION BY ROBERT GOETZL



dropped the first off in Blairstown before proceeding in the second with canoe in tow to Marksboro. We then drove to Stillwater where we would park the second car and start our trip. (If you have one car or one canoe rack, it helps to have friends who can drop you off or pick you up at either end of the trip.) The launching spot in Stillwater is a right off Route 521 at the river.

Once underway, we had gone 20 feet or so when we encountered a strand of wire across the river. Farmers sometimes place wire across these streams to keep cattle from escaping fenced pastures, so it's a good idea to keep an eye out, especially when you're near grazing land. The current was slow and we simply raised the wire and passed under it.

The stream from Stillwater was, as the name implies, gentle and easygoing. We passed between lush pastures full of fat cows and sleek horses. Stippled sycamores

guarded the banks and shaded the water. We saw muskrats, mallards and a blue heron.

A mile below Stillwater, we came to a low dam where a mill once stood. We pulled to the right bank and stepped over the low obstruction, dragging the canoe behind. We bypassed the fast-running millrace and headed for the center arch of an old stone bridge that led us to a beautiful trout pool. (Although the state stocks trout in the Paulinskill, it has also been adopted by a group called Trout Unlimited. This group has found the river's water so pure that it is stocking breeder fish in an attempt to develop a steady population of native trout.)

The river's banks below the stone bridge are wooded, with an occasional cabin in the distance poking through the branches. There are several good picnicking areas along this stretch.

The growl of approaching rapids



R-G

The bridge across the Paulinskill at Marksboro.

announced our arrival at Marksboro. Before the white water stands a fine old stone mill, built in 1759, and lovingly restored and maintained. We hardly had time to contemplate it when we plunged into the 100 feet of white water we'd inspected earlier. As we attempted to follow the course we'd plotted out, I realized things looked entirely different at water level. But by kneeling in the bottom of the canoe and using teamwork that we'd developed, Diana and I "did good." We're not too sophisticated to kneel at times like this; it keeps the center of gravity low and it is convenient for praying.

Below the Marksboro rapids the river hugs the Paulinskill Road before it reaches another set of rapids, slightly more manageable than the first. Here the river passes over a series of ledges for about 50 feet and you feel as if you are canoeing down a set of stairs. Not surprisingly, this

section is called "The Stairs."

We next entered the backwater of Paulina Dam. There's no getting around the dam, so we had to portage on the right side of the pond. This gave us a chance to stretch our legs on land and explore a bit. A few buildings here make up the small, old village of Paulina. This is the site of a grist mill built in 1783 and the location, at one time, of a whole series of water-powered mills and factories.

Back in the river, we proceeded downstream to another dam that is slight enough to drag the canoe across. Spying a modern school in the distance, I knew we were nearing Blirstown. Passing under Route 94, we noticed Blairs Creek entering on the right and then the footbridge that crosses the river and gives its name to the park which was our destination. This bridge was originally built to carry pedestrians across the river

between the old New York, Susquehanna and Western Railroad station and the village. The station is gone, but a group called the Paulinskill Valley Trail Committee maintains 26 miles of the railroad bed as a hiking trail (which the state just purchased), a great alternative activity if there is not enough water in the river for a canoe. And, there's plenty of parking here as well as picnic tables and toilets.

This is a great spot to eat lunch. We walked across the footbridge to a delicatessen and bought sandwiches of homemade cold cuts and real German potato salad to cap off a perfect day on the Paulinskill.

by Frank T. Dale, a freelance writer who lives in Allamuchy

Research

Battling the Destructive Zebra Mussel

A tiny invader from eastern Europe threatens to harm local freshwater fish reproduction, foul beaches and damage boat hulls and motors. These diminutive interlopers can also block intake pipes of municipal water treatment and electrical power plants that draw water directly from lakes and streams.

The culprit? The zebra mussel (*Dreissena polymorpha*), a small freshwater bivalve mollusk (a relative to clams and oysters) native to regions of the Black and Caspian seas of Europe. The mussel only grows to a length of about two inches, with the majority the size of a fingernail. But, attracted to moving water, they colonize to such a degree that water flow may be severely reduced. Colonies consisting of as many as 750,000 mussels per square meter can form broad reef-like mats several feet thick. Upon death, the mussels impart a foul taste to drinking water. A

few birds such as diving ducks and some fish species will prey upon adult zebra mussels, but not enough to control their numbers.

The mussel's shell is elongated with alternating light and dark bands and contains dense elastic strands called byssal threads that the mussel uses to attach to hard surfaces. Zebra mussels will live attached to dock and pier pilings, buoys, boat hulls, submerged rocks and other underwater surfaces as well as intake pipes of utility, water and industrial plants.

In June 1988, zebra mussels were first sighted in United States waters in Lake St. Clair (between lakes Huron and Erie). By July 1988, sightings were confirmed in the western basin of Lake Erie. The zebra mussel was probably introduced accidentally into the Great Lakes from the ballast water of ships arriving from overseas freshwater ports. From the Great Lakes, the zebra mussel is moving closer to New Jersey with

populations established in the Susquehanna River, Hudson River, Ohio and Mississippi River drainages and in Connecticut.

The average life span of zebra mussels is 3.5 years, but they can live as long as five years. When zebra mussels colonize new areas, they rapidly increase in number for several years. The population then decreases and subsequently fluctuates. They are found in water depths of six to 21 feet but can form colonies at depths up to 150 feet, depending on water conditions.

Zebra mussels are spread primarily by recreational boaters and anglers who inadvertently transport them from infested waters to non-infested waters. Therefore, it is imperative that recreational boaters and anglers be aware of the problems associated with this introduced species and take proper precautions against it. Larvae of the zebra mussel can hitch a ride in boat bilge water, engine cooling water systems, live wells and bait buckets. Adult and juvenile zebra mussels can attach to boat hulls, engine drive units and boat trailers.

Colonies consisting of
as many as 750,000
mussels per square
meter can form broad
reef-like mats several
feet thick.

Zebra mussels clinging to a freshwater clam.



UNIVERSITY OF WISCONSIN SEA GRANT

Proper precautions to slow the spread of the mussels are especially important because they can survive under extremely adverse conditions. Adult zebra mussels can live for several days out of water in moist, shaded areas. If kept wet but not submerged, adult zebra mussels can survive out of water for more than a week.

The Department of Environmental Protection and Energy (DEPE) and the New Jersey Sea Grant Advisory Service are taking a number of steps to identify zebra mussels, if they spread to New Jersey's streams, rivers, lakes and reservoirs. Sea Grant has offered a training course in zebra mussel identification and monitoring techniques. As part of its existing biological monitoring network for public drinking water purveyors, industrial water users and power plants that draw water from surface waters, the DEPE has requested voluntary participation in a statewide self-monitoring program for the mussels. The department is also using its statewide computerized bulletin board to share informa-

tion about the locations of any zebra mussel infestations that are identified.

There also are easy steps — shown in the accompanying chart — that all recreational boaters and anglers can take before leaving an infested area to help slow the invasion of the zebra mussel into New Jersey waters. To report possible sightings of the zebra mussel or receive additional information, please contact: Dr. Eleanor Bochenek, New Jersey Sea Grant Advisory Service, Rutgers Cooperative Extension, Ocean County Extension Center, 1623 Whitesville Road, Toms River 08755. Tel. (908) 349-1152. For more information on participating in the voluntary zebra mussel monitoring program, contact Paul Morton at the DEPE's Bureau of Water Monitoring Management, (609) 292-0427.

by Dr. Eleanor Bochenek, a marine agent with Rutgers Cooperative Extension/New Jersey Sea Grant Marine Advisory Service

Help Stop the Spread of Zebra Mussels

Before leaving an area suspected to be infested with zebra mussels, please do the following:

Inspect • Drain • Wash

- ☐ Trailer frames
- ☐ Boat hulls
- ☐ Outdrive units
- ☐ Trim plates
- ☐ Trolling plates
- ☐ Props and prop guards
- ☐ Transducers
- ☐ Anchor rope and chain
- ☐ All bilge water
- ☐ Live wells (& pumping systems)
- ☐ Boat buckets
- ☐ Raw water engine cooling systems
- ☐ Other boat parts that get wet



While reported to grow to two inches, most zebra mussels are the size of a fingernail.

Managing the Resources of the Barnegat Bay Watershed

BARNEGAT BAY... Seventy-five square miles of richly populated estuarine ecosystem... Replete with densely populated eelgrass beds... Home to the economically important blue crab and hard clam... Year-round nursery for winter flounder... Nesting grounds for the endangered least tern... Critical wintering site for large numbers of birds... Provider of numerous scenic views... Prime recreational area for boating and water sports.... Drainage area for 450 square miles of land, populated by nearly 450,000 people in winter and twice as many in summer... Provider of 1,739 cubic meters per minute of cooling water for a nuclear generating station...

... an ecosystem at a crossroads, with an uncertain future...

When a group of concerned citizens banded together in 1987 to express their concerns to the New Jersey Legislature about the long-term health of Barnegat Bay, few thought that this local initiative could grow into a legislative mandate for a study of the bay.

But today there is an exciting and unique collaborative effort between the New Jersey Department of Environmental Protection and Energy (DEPE) and the people of Ocean County to compile information on the resources of the bay and to contemplate the options to manage the ecosystem. These efforts culminated in September 1992 in *A Watershed Management Plan for Barnegat Bay*, a blueprint to manage growth and improve the quality of life and natural resources in this environmentally sensitive watershed.

Along these lines, the draft plan makes

133 recommendations. These include developing comprehensive educational programs, acquiring and protecting sensitive ecological areas, developing a system of vegetative buffers, and continuing to monitor and research the bay to ease the way for future planning.

The goals of the plan are to maintain shoreline open space; to maintain and enhance the recreational fishing, waterfowl hunting, and commercial fishing potential of the bay; and to provide opportunities for boating and water sports.

DEPE Commissioner Scott Weiner called the plan the state's most significant attempt to recognize and deal with cumulative impacts of development and pollution on a watershed. "Barnegat Bay is a unique environmental treasure," he said. "The plan recognizes that the bay's continued environmental and economic vitality are clearly dependent on one another."

According to Martin Bierbaum, director of the DEPE's Office of Land and Water Planning, the plan has a number of factors in its favor. First of all, there are simi-

Few areas of the bayshore have been relatively undisturbed by progress. This one is located at the Lighthouse Adult Vacation Center for the blind in Waretown.



CORNELIUS HOGENBIRK

lar, watershed management plans in other areas of the East, West and Gulf coasts. Also, the plan is backed by a \$2.5 million contribution from the Ciba-Geigy Corporation and \$219,000 in federal grants earmarked for the watershed.

Just as importantly, however, the plan's implementation can count on the fact that it is a joint effort between the state and the Barnegat Bay Citizens Advisory Committee, a group of citizens, elected officials, environmentalists, and representatives of business and civic groups, which means that the state's and the region's expertise and resources can be pooled.

The cooperative development of the plan has the potential to serve as an example for much of the state. For example, the study and planning process revealed that many factors have contributed to the bay's failing health. The main threat to the bay, however, is "nonpoint source" pollution, which includes the end-products of over-fertilization, excessive applications of pesticides, sediments from construction projects, petroleum drippings from automobiles and uncollected pet wastes, just to name a few. The fact that this type of pollution follows the flow of water with gravity and does not necessarily respect municipal or county boundaries led to the decision to define the study area as the whole watershed.

The draft plan recommends that Ocean County's government assume a central role in the region's planning, ensuring that local experts are reviewing many of the aspects of development in the watershed, especially those that might have a regional impact. After a series of public meetings and hearings on the draft recommendations, the final plan should be adopted later this year.

For more information, call the DEPE's Office of Land and Water Planning at 609-984-0058.

by Theresa Fowler, a coastal zone implementation specialist with the DEPE's Office of Land and Water Planning, who helped coordinate development of A Watershed Management Plan for Barnegat Bay



New Jersey is famed for its carvers of Barnegat Bay decoys. Here (above) Gary Giberson is at work in his display workshop at the Noyes Museum in Oceanville, Atlantic County. The Doris Mae (below) leaves her bayside slip in Barnegat Light for a night bluefishing trip.



Volunteers

A Living Time Capsule at Allaire

Connie Dzenis rolled up the sleeves of her long calico dress, picked up two buckets full of well water and headed to the Manager's House where she would heat the water over an open stove fire. It was Laundry Day at historic Allaire Village at Allaire State Park in Monmouth County, and she and other volunteers dressed in authentic 1830s costumes were busy bringing history alive at the once deserted iron manufacturing community.

Dzenis, who lives in Brielle and has been a member of the Ladies Auxiliary at Allaire for the past 16 years, is one of a group of about 70 volunteers at the village who play roles in historical reenactments, organize events and help raise funds.

"We couldn't run this place without them," says Nick D'Amico, park superintendent. "When I need them, all I have to do is give them a call."

On this morning, the volunteers are using the hot water to hand scrub and rinse their natural linen and cotton costumes, apparel typical of that worn in the early 19th century. Visitors look on, getting a glimpse of what life in an industrial community looked like more than 150 years ago.

Many of the Ladies Auxiliary members act as interpreters for tours, guiding visitors through original buildings, including a church, a school, a general store, workshops and housing. These buildings once were part of "The Howell Works," an industrial community where castings and pig iron were made for building steamship engines and boilers. Among the volunteers are a blacksmith, a carpenter, a miller and others who help maintain the grounds and assist with administrative duties at the village. Many describe themselves as people-oriented and say they get a special satisfaction out of their work.

"Little children always ask us if we live in the village," says Dzenis. "They think we've been here since the 1830s and never left."

Traveling back to a more rugged time pe-



ALLAIRE VILLAGE

Victoria and
Constance Dzenis
serving up a taste of
the 1800s.

"Hard work
is fun,
when you
don't have
to do it for
a living."

— Malcolm
Dalrymple

riod can have its challenging moments, however. Dzenis recalls one such time during an outdoor candle-making demonstration. "I leaned over to dip the candles in the hot wax and a strong wind caught my dress on fire," she says. It was one of the many times she felt a deeper appreciation for the hardships of life in the early 1800s, when fire was the second leading cause of death for women.

When Dzenis looks back over her last 16 years as a volunteer, doing everything from loom spinning to cider making, she recalls not only the many hours of hard work, but the rewards that result.

"The women worked hard, because that's the only way they knew how to live," she says. "But I wish I had some of the peace that surrounded them in their simple lifestyle."

Malcolm Dalrymple, who lives in Wall Township, has volunteered in the village carpenter shop since he retired in 1987, demonstrating the various tools and procedures used by carpenters of years ago. Besides making farm tools, he crafts wooden folk toys that are sold in the village's general store to raise money to help support Allaire's operation. A former sales and

marketing executive, Dalrymple says he enjoys the time-consuming process of fashioning wooden objects by hand and gets satisfaction from helping to preserve a piece of history.

"Hard work is fun, when you don't have to do it for a living," he says.

The village has become a training ground and learning experience for students as well as volunteers. The volunteers have coordinated internships for college students in such areas as history, archaeology, historic architecture and anthropology. While the students do their research, they also volunteer as interpreters and have the chance to learn many of the customs and traditions of a bygone era.

Though summer is the busiest season for visitors, the village hosts year-round events. Scheduled spring activities include: a Junior Fishing Contest on April 24; a Spring Craft Show and Sale on May 1; an Antique Show and Sale on May 8; and Parlor Games and Outdoor Amusements on May 9. For more information on these events or on how to volunteer, call (908) 938-2253.

by Amy Cradic, a Trenton State College
journalism intern

Graveyard's Shift Brings History Alive

The City of Trenton is hoping that history will come alive by giving people the opportunity to see the resting places of its most prominent dead.

The Mercer Cemetery, the oldest non-sectarian cemetery in the city, is well on its way to being restored to Victorian grandeur, thanks to a volunteer group, the city, and the state's Green Acres Program.

According to Liz Johnson, director of Recreation, Natural Resources, and Culture for Trenton, the new cemetery will be a public park where families can come and trace the history of the city while enjoying the five acres of green, tree-lined space.

"This is important to the revitalization of our downtown area," Johnson says. "It's the only open space in that area, so it's the only place where people can gather in a park setting."

Located between the Trenton train station and the traffic circle of Route 33 and Route 1, the Mercer Cemetery is in the heart of one of the busiest areas of the city. Johnson says it has the potential to be the centerpiece of Trenton, which has been trying to sharpen its image over the last few years.

"Visual things are important," Johnson says. "We don't want Trenton's image to include a dark, off-limits cemetery. With all of the new construction in the area around Trenton station, it's kind of like putting a puzzle together."

The cemetery was first opened in 1842, and it was seen as the premier burial place for Trenton's elite. Over time, famous industrialists, inventors, military heroes, and politicians have been buried there, as well as everyday citizens who made Trenton an industrial powerhouse of the 19th and early 20th centuries. Johnson says that she hopes with a new clean, open Victorian feel, citizens and visitors can get a better understanding of the city's history.

But fixing up the cemetery is not easy work. According to Charles Webster IV, the Mercer Cemetery historian, the cemetery has been left unattended since 1972, and it has been the victim of repeated vandalism and vagrancy. Making it an attractive park will take time and effort.

Already new walkways, park benches and better lighting have been installed and a new entrance has been built, making the cemetery safer and easier to enter, Webster says. He runs tours by appointment, and the cemetery is open while the renovations continue.

"Our ultimate goal is to open up the cemetery as a park so that people can enjoy themselves and reflect on their lives and the lives of those who went before them," Webster says.

Obviously, a renovation like this takes money, and initially the project was funded solely by seed money from the

Trenton Lions Club back in 1985. Then, in 1990, the Department of Environmental Protection and Energy's Green Acres Program awarded loan and grant funds to the city for this project. To date, a total of \$500,000 in state Green Acres funds and \$250,000, representing the city's matching share, have been committed to this project. A volunteer group called Friends of Mercer Cemetery is trying to raise the rest of the money to pay the estimated \$1.3 million in renovation costs.

John Watson, supervisor of the Bureau of Green Trust Management for the Green Acres Program, considers this a unique and historically significant green space.

According to Watson, "Cities across the nation are recognizing the value of cemeteries as public open space."

by Ray Hennessy, a Trenton State College journalism intern.

A cemetery in the heart of the city being transformed into park space.



MERCER CEMETERY ARCHIVES FILE

Profile

Photographer in Focus — Walter Choroszewski

So much for the mystique of photography.

When he is on a shoot, Walter Choroszewski, one of New Jersey's most prolific and best-known professional photographers, leaves his home a full two hours before sunrise: 3 a.m. in the summer and 5 a.m. in the winter. As even an amateur photographer knows, the light at the beginning or end of the day is the best, and the best of Choroszewski's images are often taken before 9 a.m.

"On my way home from a great morning shoot, I see other people just going to work and I know I've already put in a good shift," he says with a laugh. The remainder of the day is spent on his "second shift" — designing, marketing, doing clerical tasks, collecting for photos sold, and dealing with his publishing business. "The mystique with photography," he explains, "is just in the glamorous side, in a successful finished product. People aren't

aware of what all is involved in getting there."

Choroszewski's finished product has captured the different faces of New Jersey — its natural wonders and stunning architecture. His photographs are characterized by dignity, elegance, simplicity and maturity. As a result, this 39-year-old's pictures strike a viewer as being the work of someone much older. "Other people have told me that," he says with a smile. "It's because of the traditional way I shoot and because of the subject matter. Also, I'm trying to show the good side of life. I'm an optimist. And positive energy is traditional."

Choroszewski has been shooting New Jersey for 12 years and has visited all 21 counties. What does he find so special about New Jersey? "Its variety. New Jersey is compact. And it has different geography in different areas in relatively close proximity," he says. "I'm one of the state's cheerleaders. I didn't believe all the negative hype about New Jersey I heard when I was a kid in Pennsylvania."

Although he has seen residential and commercial development encroaching on the state's natural areas during his career, he even finds virtue in New Jersey's most obvious claim to fame: "If it's the most densely populated state in the Union, there must be a good reason why so many people want to live here." Whenever people ask him how he makes New Jersey look so good, he replies, "It's easy. You just have to look beyond the clichés to find the real beauty of the state."

The son of a Pennsylvania coal miner, Choroszewski majored in biology at Penn State University. He purchased his first camera, a used Nikon F-1, with some graduation gift money and began using it on one of his first jobs, teaching environmental biology at the North Shore Science Museum on Long Island. A faculty photo show prompted a referral to a New York photo agency where his new career began.

"It just happened," he says of his decision to pursue photography instead of biology or medicine. "The people at the photo agency liked my images, but felt there was still much I needed to learn." During his first meeting with the agency people, they offered him a job, but not as a photographer. In his four years at the stock photo agency, Choroszewski learned photography from the business end and eventually decided to take up freelance photography full time. In 1980, he responded to an advertisement for a book project shooting

"Photography is a medium of art," he says. "I view it no differently than if I pick up a paint brush or draw on the computer."

— Walter Choroszewski



New Jersey landscapes. Persistence — and business savvy learned at the stock agency — helped him win his first professional assignment over hundreds of competitors. This became his first book, *New Jersey, A Scenic Discovery* (1981).

As a self educated, self-styled “photographic artist,” Choroszewski is not beholden to any “school” or “master photographer” for inspiration. The work of his peers that he admires most is that of such photographers as Clyde Smith, Richard Brown or James Randklev. In fact, he is not overly impressed with some of the “big name” photographers whom others worship. “I’m not a black-and-white purist,” he insists. Instead, Choroszewski eats, breathes and sleeps in color. He even says, “I dream in color! Doesn’t everyone?” He will shoot black and white “as needed for commercial purposes, but not for pleasure.” Does he develop his own film? “Not at all. I’m an ‘in-camera’ artist only.” Choroszewski prefers slow-speed transparency film, such as Kodachrome or Fuji Velvia, which is processed at a commercial lab.

And where does he stand on the classic question: “Is Photography Really Art?”

“Photography is a medium of art,” he says. “I view it no differently than if I pick up a paint brush or draw on the computer. Not all photography is art, nor is every brush stroke or line drawn. Art is in the eye and created by plan.” Choroszewski adds, “I don’t consider myself just a photographer, but rather a visual artist who uses photography.”

Among the rewards of his profession, Choroszewski notes that he feels lucky that he can be creative and get paid for it. “It’s good emotionally to work in a field you love,” he explains. Balancing out the rewards, however, are the frustrations. “I have to continue to make a living in a field that is becoming more competitive with fewer clients seeking photography.” And he admits he is “a slave to the weather, changing light and the seasons.” Along with the pressure to produce “new” images, he calls the changing of seasons “my spring and autumn weeks of panic.”



A garden at Drumthwacket, the Governor’s Mansion in Princeton, from Walter Choroszewski’s new collection, *The Garden State in Bloom*.

He adds, “I have to be in every corner of the state — all at the same time.”

He can rarely relax. He may plan to stay indoors and help his wife and business partner, Susan, catch up on the endless administrative chores of running their own publishing firm, Aesthetic Press, which publishes Choroszewski’s books and calendars. But if the weather changes and the sun comes out unexpectedly on a “bad weather clerical day,” Susan claims, “he’s like a maniac because he doesn’t want to miss a shot if he can help it.”

One of his favorite shots, however, came right to him. Walter and Susan Choroszewski describe the day when a farmer was cutting hay in a field adjacent to their home in South Branch, Somerset County. Ever on the alert for distressed wildlife, Susan heard a bleating sound which she at first thought was a lamb, and looked out the kitchen window to see a fawn that had gotten separated from its mother. Amidst the fawn’s plaintive cries, the roar of the farmer’s mechanized hayer and the barking of a threatening neighborhood German shepherd, they decided to bring the fawn into the house. After borrowing a neighbor’s baby bottle and making a quick trip to the health food store for goat’s milk, the fawn was their guest for the day, until their backyard quieted down.

Before releasing the fawn that evening, Choroszewski spent some time photographing it in their wildflower field. “I was lucky to have him as a model,” he says.

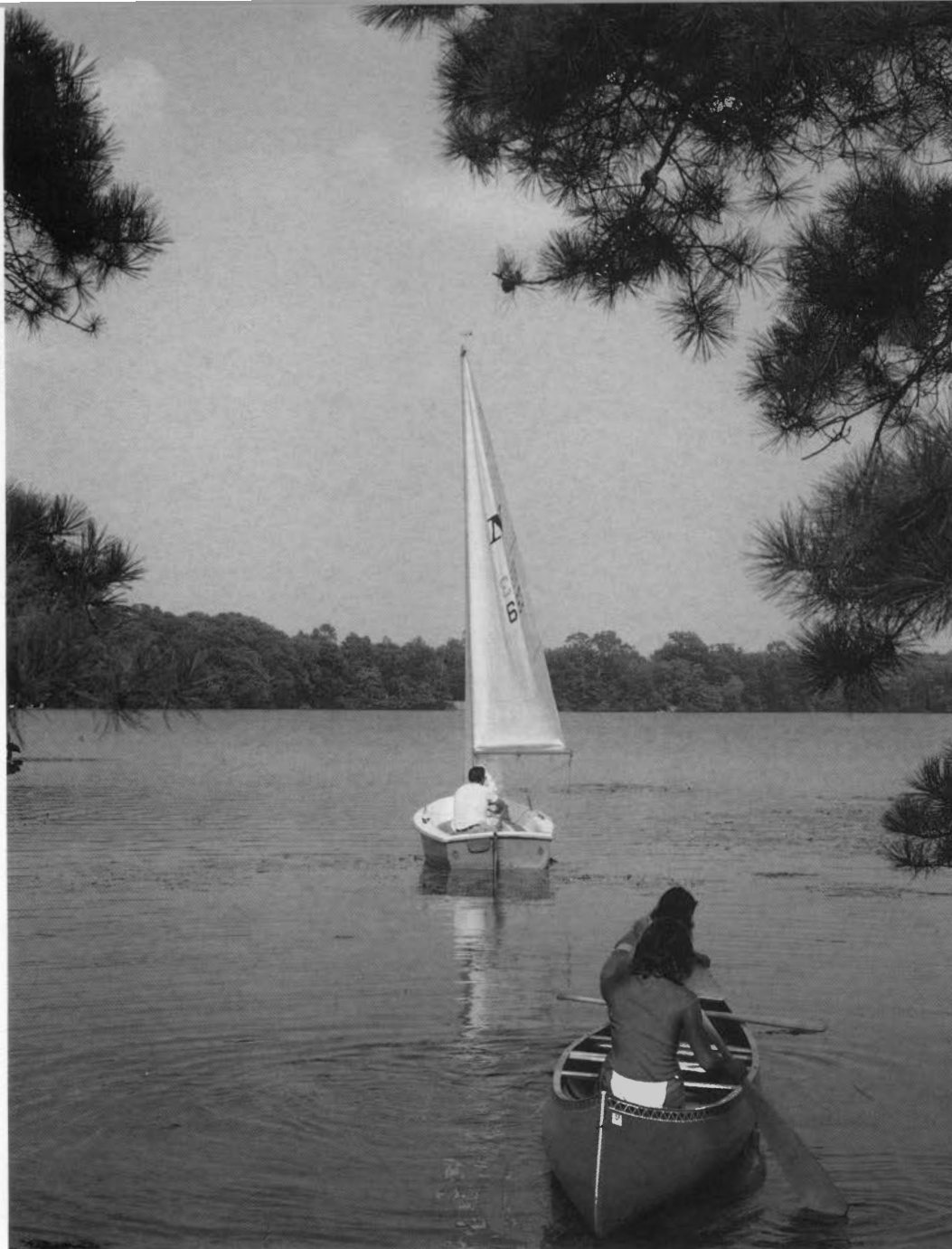
The fawn photos have appeared in books, calendars and magazines.

Freelance assignments found in his backyard are a pleasant exception. He usually seeks out images while traveling throughout New Jersey, logging an average of 30,000 miles on Garden State roads each year.

Examples of his work from around the state can be seen on New Jersey state tourism promotions, on the covers of New Jersey Bell telephone directories and showcase pages, on and in numerous magazines (see this issue’s cover), and on the walls of fine art galleries. In addition to *New Jersey A Scenic Discovery*, he has produced other books that also show the state at its best: *New Jersey, A Photographic Journey* (1987) and *New Jersey, Naturescapes & Detail* (1992). His newest collection, titled *The Garden State in Bloom*, features more than 60 public gardens displayed in all their glory. Pictures include First Lady Lucinda Florio’s restored garden at Drumthwacket as well as the rarely photographed Duke Gardens in Somerville.

When asked about the legacy he will leave behind, Choroszewski’s satisfaction with the road he has taken is apparent. “Knowing that there is so much change going on in the state, I’m glad that I’ve made a historical record. I’ve captured something that may be changing, may be gone.”

by Larisa Káné, a freelance writer who lives in Princeton



Sailing and canoeing on Parvin Lake.

Pinxter flower in spring bloom at Parvin (below).



Parvin: A 'Hidden Jewel'

By JoAnne Ruscio

Parvin State Park offers a secluded place for visitors to swim, hike, boat, fish and camp in an unspoiled setting. Yet for all its recreational opportunities, the park remains uncrowded enough for its superintendent, Joe Reed, to term it the "hidden jewel" among New Jersey's parks.

Located in rural Salem County, the 1,125-acre park is home to two lakes: Thundergust, created when the Civilian Conservation Corps built a spillway and dam on Thundergust Creek in the 1930s, and Parvin Lake, the center of many of the park's activities.

Water covers more than 100 acres of the park. Fifteen cabins, each with a refrigerator, stove, electric lights and indoor sanitary facilities with hot and cold water, are situated along the north shore of Thundergust Lake. The cabins are for public use, but must be reserved in advance. Not far down the road on Parvin Lake's south shore is the Jagers Point Camp Area with facilities for tent and trailer camping. Picnic sites are located throughout the camp.

Fishing is a popular sport in the lakes and streams, which offer largemouth bass, eastern chain pickerel, channel catfish, carp, calico bass and white and yellow perch. Boats and canoes may be rented

and used on Parvin Lake or on the stream known as Muddy Run, a tributary of the Maurice River that wanders through the Parvin Natural Area for two miles and eventually reaches Delaware Bay.

The 400-acre natural area is made up of a Pinelands fringe oak-pine forest and a swamp hardwood forest. The natural area is protected through legislation and managed for its ecological significance by the Natural Areas System. Forty types of trees are known to exist at Parvin, as well as 61 different woody shrubs, more than 200 herbaceous flowering plants and 17 ferns and club mosses. Spring visitors can take in the blooming beauty of the mountain laurel, with its white and purple-tinted clusters of flowers.

More than 120 species of birds have been sighted at Parvin, and early morning bird walks are conducted the first two weekends in May to take advantage of the spring migration. A variety of other Saturday programs are offered through the year, including nature walks focusing on such topics as: fruits and vegetables, wild edible plants and insects; aquatic studies; outdoor sketching; and nature crafts.

Hikers can follow 15 miles of trails through the park and the Parvin Natural Area, says park naturalist Paul E. Taylor. "The trails take you sometimes on the edge of a lake, then through wooded spots and along swampy areas," he says. "Spring is a popular time because things are becoming fresh and green again, and people want to get out and enjoy it."

Prior to its purchase in 1930 through an appropriation by the state Legislature, Parvin was a private recreation facility for 30 years. Before that, it was owned by the Parvin family, which operated a gristmill and sawmill on one of the streams. Going further back, there also is evidence of ancient Indian encampments along the shore.

From 1933 to 1943, the park was the site of a Civilian Conservation Corps camp, to which its present buildings owe their architectural style. During World War II, the camp was used to house German prisoners of war who were shipped there from Fort Dix. It also housed Japanese-Americans detainees who were exiled from their homes in the United States. Many remained in the area, making it their permanent home.

Field and factory workers at the nearby Seabrook Farms vegetable plant also have lived at the park. All during the time that Parvin functioned as a residence for so many diverse groups, it continued to operate as a state park. Today, that is its sole purpose.

Parvin State Park is administered by the Division of Parks and Forestry and is open year-round. For more information, contact the Parvin office, RD 1, Elmer 08319; or call (609) 358-8616.

JoAnne Ruscio is the communications coordinator for DEPE's Division of Parks and Forestry

Conservation Corps' Legacy

In Parvin State Park and throughout New Jersey's other parks and forests, charming stone and wood buildings with arched doorways and windows and other engaging architectural features remain as testament to the Depression era. These structures, which often serve as recreational centers, are surrounded by terraces and landscaped grounds that merge gently with the surrounding natural terrain.

Many of the buildings and much of the landscaping, as well as dams, roads and bridges, were constructed by the Civilian Conservation Corps (CCC), a work camp program established in 1933

by the U.S. Congress under Franklin Delano Roosevelt shortly after he became president. Its purpose was to supply work for unemployed youth throughout the country while helping to conserve natural resources and design and construct recreational facilities.

The CCC restored historical buildings, built new structures, laid out roads and trails and assisted with fire fighting, pest control and reforestation from the East to the West Coast.

Joseph Truncer, the first superintendent of Parvin State Park, remembers the CCC camp stationed at the park from 1933 to 1942. "There were nearly 200

young men from Newark and Camden who lived at the park and constructed the beach pavilion on Parvin Lake with used brick brought from Trenton and Philadelphia," he recalls.

Talented architects, landscape engineers and civil engineers worked with the park staff and representatives from the Division of Parks and Forestry to design, plan and supervise the construction of the buildings, dams and landscape. Under the committee's supervision, the young men who made up the camp at Parvin constructed roads and bridges. By damming a small stream and clearing the under-

brush and trees, the CCC created Thundergust Lake.

In 1937, a second group built the cabins on the shore of Thundergust Lake, which remain popular with campers today. They also rebuilt the dam at Parvin Lake when it washed out after a storm flooded Muddy Run in 1940.

After the United States entered World War II, the CCC camps were disbanded. The camp at Parvin State Park closed in 1942, eventually becoming a camp for German prisoners of war and later, a temporary home for interned Japanese-Americans.

Gardens

Gardening with Deer

White-tailed deer are beautiful animals, graceful and elegant when still or in motion. But to a New Jersey farmer, they can be a significant financial problem; to a motorist they can pose serious danger; and to a flower gardener they can be destructive pests.

This is a problem humans have created. Deer thrive in "edge habitats," places where different types of vegetation meet.

"Edges" offer food, cover, travel paths and easy escape routes. Suburban landscapes are perfect "edge habitats" and also provide the bonus of well-watered, well-fertilized banquet tables of flowers and plants.

How is a gardener to cope with these adversaries? First of all, we must understand our foes. Deer are vegetarian mammals and spend most of their lives in an area of roughly one square mile. They

A colorful natural arrangement of Strawflower.



Best Choices for Gardening with Deer

Key: A - Annual P - Perennial B - Bulb

Achillea - yarrow	P
Aconitum - monkshood	P
Ageratum	A
Alliums - garlic, chives, wild onion	P
Anaphalis - pearly everlasting	P
Anchusa - bugloss	P
Anemone - Japanese and grape-leaved only	P
Arquilegia - columbine (only red A. canadensis)	P
Artemisia	P
Aruncus - goatsbeard	P
Asclepias - butterfly weed (not the bush)	P
Astilbe	P
Borage	P
Calendula - pot marigold	A
Caltha - marsh marigold	P
Canna lily	B
Centaurea montana - mountain bluet	P
Centuarea rutifolia - dusty miller	A
Cimicifuga - bugbane	P
Clematis	P
Convallaria - lily-of-the-valley	P
Convolvulus - morning glory	P
Cosmos	A
Delphinium	P
Dicentra - bleeding heart	P
Digitalis - foxglove	P

Echinacea - purple coneflower	P
Erigeron - fleabane	P
Euphorbia - spurge	P
Geranium - cranes-bill (not common geranium)	P
Gypsophila - babies' breath	P
Gladiolas	B
Helianthus - sunflower	P
Helichrysum - strawflower	A
Herbs	A/P
Hyacinths	B
Lantana - trailing lantana	A
Lilly of the valley	P
Lavandula - true lavender	P
Lunaris - money plant	P
Lychnis - Maltese cross	P
Mertensia - Virginia bluebells	P
Monarda - bee balm	P
Myositis - forget-me-not	P
Narcissus - daffodils and jonquils	B
Physostegia - obedient plant	P
Papaver - oriental poppy	P
Pulmonaria - lungwort	P
Ranunculus - buttercup	P
Rudbeckia gloriosa - glorious daisy (not goldstrum)	P
Salvia - sage	A/P
Stachys - lamb's ear	P
Stokesia - Stoke's aster	P
Thalictrum - meadow rue	P
Tradescantia - spiderwort	P
Trillium	P
Trollius - globeflower	P
Vinca major - periwinkle	P





require 10-12 pounds of food daily and are by nature adaptable, very curious and opportunistic feeders. This means they will try to eat anything available. A starving deer is even less discriminating. In the spring, when gardening begins in earnest, pregnant and nursing deer may find a shortage of natural foods and need more vegetation to survive. Bucks growing new antlers may also have greater nutritional needs.

What are the options for dedicated flower gardeners? According to some, the possibilities include: dogs, soap, dried blood, human hair, netting, eight-foot-tall wire fences (nothing shorter will work), electrified fences, commercial repellents, animal waste, concoctions using peppers and shooting.

I have found a more natural and amicable solution — gardening with deer, using plants that appeal to them less. With this approach my garden has reached a truce with its four-legged foes and is now virtually a place of peace.

In researching plants that deer don't find appetizing, I settled on those that deer consistently avoid. Unfortunately, that immediately eliminated some of my favorites. I had to say goodbye to sweet peas, lupine, daylilies, hostas, geraniums, roses and chrysanthemums. Not only do these plants act as magnets for deer, they encourage the animals to browse and become interested in other plants as well.

I was amazed, however, at the great selection I could use. Of these plants, a good number have a medicinal history or are poisonous. This category includes many beauties: borage, yarrow, bugloss, lily-of-the-valley, monkshood, artemisia, foxglove, cranes-bill, oriental poppy, Virginia bluebell, purple coneflower,

Delphinium (left)
Columbine (opposite page)

lungwort, delphinium, trillium, bugbane, bee balm, columbine, marsh marigold, clematis, buttercup, meadow rue, morning glory and globe flower. (Since a number of these are poisonous, please take care to prevent young children from coming into contact with them.)

Another category of plant that deer seem to dislike is those with gray foliage. Pearly everlasting, mountain bluet, dusty miller, lavender, lamb's ear and artemisia are all very distasteful to foraging deer. In fact, they despise the artemisia family so

much that I have been able to tuck a few "yummy" impatiens between them — and most have survived.

An exciting discovery is that deer avoid the pungent taste of mints and herbs. This made available lavender, marjoram, lemon balm, bee balm, basil, oregano, obedient plant, rosemary, sage (and all salvia), cleome, garlic, chives, wild onions, savory, thyme and the mints. I was able to fill the previously vulnerable bed around my mailbox with lovely purple East Friesland sage, silver/gray silver



Artemisia

mound artemisia, two shades of lavender salvia and deep purple clematis. Not one leaf was touched.

There's another set of plants that don't seem to share common characteristics. But experience has taught me that deer avoid them. These include Japanese anemone, grape-leaved anemone, goatsbeard, butterfly weed, astilbe, canna lily, cosmos, calendula, strawflower, sunflower, gloriosa daisy, stokes' aster, spiderwort, periwinkle, ageratum, forget-me-not, gladiolas and lantana.

Some old habits die hard. I love peonies and iris. Unfortunately, deer also love their tender buds. But they don't like the leaves or full blossoms. So, I have compromised by placing black mist nets over the buds so I can enjoy the spectacular blooms. Once they open, the deer ignore them.

Depending on the natural habitat in your area, gardening successfully with deer involves trial and error. But, with experimentation and patience, you can raise a beautiful flower garden by fitting in with nature, not fighting it.

by Phoebe Olmsted, a freelance writer, photographer and lecturer who lives in Chatham



Getting Ready to Go

Mountain Biking

by Dory Devlin

More and more cyclists are leaving the smooth certainty of the road for the surprising challenges of the forest. They are taking their bikes to the woods, over rocky paths, twigs and leaves.

Why? Because it's fun. And it's a new way to enjoy the outdoors.

Mountain biking has caught on in a big way. In 1983, nearly 200,000 Americans rode mountain bikes. This year, that number is 20 million, according to the Bicycle Institute of America in Washington, D.C.

"It gives you such a good feeling — something you had when you were a kid," says Wally Tunison, president of the New Jersey Cycling Conservation Club. "It's the same feeling you had when you got your first bicycle. Here you are in your 20s, 30s or 40s and you're getting your first bike again."

Like in many sports, the right equipment is imperative when mountain biking. And, first on the list, of course, is the bike.

There are many "hybrid" bikes on the market that look like mountain bikes — with knobby tires and wide, high handlebars. But these bikes are best used on pavement, with short jaunts on wooded trails. For true off-landers, a well-constructed mountain bike is what's required.

For models with a less sturdy frame, you'll pay about \$300 to \$400. While these will give you a feel for riding a mountain bike, they likely will not endure a ride of much length through the woods.

"It would be equipped with the entry-level group of parts and typically have 21 gears, but it won't be a particularly heavy-duty bike," says Tunison, also manager of the Peddler Bike Shop in Long Branch. "It should be used mostly on the street and a little off the road."

When you get into the \$500 and up above \$1,000 range, you're talking off road. It's this kind of light but sturdy-framed bike you'll want to consider if you "want to get into mountain biking with both feet," says Tunison.

Marty Epstein, owner of Marty's Reliable Cycle in Morristown, recommends doing some research at your local bike shop before buying. Know what types of riding you'll be doing most, and always ask for a test drive because each bike feels different to each person.

Frame size and fit should also be determined by "trying the bike on" and gauging the types of riding you'll be doing. Extra adventurous riding requires more clearance over the top of the frame.

"What you want to look for is a good, strong frame," says





Mountain bike frame after a muddy ride (at left) with water bottles, helmet, pump, tool kit and gloves.

Two mountain bikers (opposite page) cruising through a field at Allaire State Park.

Gearing Up

So, you've taken the plunge and bought that new mountain bike. What else might you need? Well, as in many pastimes and hobbies, it may be hard to choose between what you really need and what you really *want*. There is a plethora of accessories you can buy — from the essential, such as helmet, gloves and water bottle, to the exotic, such as a device that continuously monitors your heart rate. Dave Fitzhenry, owner of the Highland Park Cyclery, provided the following accessory list and approximate prices.

Equipment

- ☐ Automobile bike carriers, trunk mount, \$36 to \$70, roof mount, \$200
- ☐ Bar ends for handlebars (to help in climbing), \$25 to \$50
- ☐ Bike locks — cable locks, \$4 to \$20, solid "U" locks, \$30 to \$40
- ☐ Fenders (for rain, snow or mud riding), \$22 to \$27 a pair
- ☐ Gel saddles (for a softer ride), \$15 to \$30
- ☐ Heart monitors, \$100 to \$180
- ☐ Rear racks, \$15 to \$35
- ☐ Speedometer/odometer computers, \$35 to \$45
- ☐ Tire pumps — floor models, \$13 to \$35, frame-fit pumps, \$12 to \$26
- ☐ Tires (with different treads for different terrains), \$15 to \$30 each
- ☐ Toe clips and straps, \$10 to \$15
- ☐ Tool kits (including spare tubes, patch kit, tire irons, allen wrenches), \$12 to \$15
- ☐ Triangle bags (for storage and padding for carrying bike), \$10 to \$15
- ☐ Under seat bags (for tools), \$8 to \$20
- ☐ Water bottles and cages, \$10 to \$12

Clothing

- ☐ Gloves, \$13 to \$23
- ☐ Helmets, \$34 to \$76
- ☐ Jerseys, \$30 to \$60
- ☐ Lycra shorts, \$30 to \$60
- ☐ Lycra tights, \$40 to \$60
- ☐ Mountain bike shoes, \$50 to \$100
- ☐ Protective eyewear, \$7 to \$180
- ☐ Rain suit (jacket and pants), \$80 to \$150
- ☐ Windbreakers, \$40 to \$75
- ☐ "Wickable" shirts (e.g., polypropylene) for layering, \$20 to \$30

Epstein. "As you move up in price range, the design changes — from being a more upright to a little more stretched out and with longer handlebar stems so the bike performs better off road."

He also suggests wheels with aluminum alloy rims and quick releases on both back and front to allow easy tire and tube changes.

Besides a love of the woods and a taste for adventure, you'll need some basic equipment and, as in touring, the right clothing, to make the mountain bike experience enjoyable.

Foremost is a helmet, one approved by the American National Standards Institute (ANSI) or Snell is advised. Gloves to protect your hands if you fall and to absorb the shock of navigating bumpy ground, too, are a must.

A water bottle held in a cage on the bike is a necessity "because you dehydrate faster than you realize," says Epstein. Bringing along some protein snacks also is a good idea, especially if the outing is long, or just in case a "short" ride goes beyond expectations.

Most essential is a repair kit: tubes, tire irons, allen wrenches and patches in case of a flat, and a pump to restore air.

The right clothing is key to a comfortable ride. In warm and cool weather alike a shirt made of "wickable" material (which transfers moisture away from your skin) is a good idea for a first layer. Lycra cycling shorts with padding and flat seams are best in the

summer and cycling tights are recommended in cooler temperatures. A windbreaker top, such as an anorak, is needed as the weather cools, too. Like many active outdoor sports, dressing in layers is a good idea. This allows you to adjust to changing temperature and wind

conditions and the amount of heat your body is generating.

Tunison and Epstein recommend toe clips and cycling shoes — not sneakers — to make pedaling easier. Many advanced riders are opting for clipless pedal systems that allow the cycling shoe to clip into the pedal.

With the right clothing and gear, you're ready to ride. But there's more to it than just what to wear and bring.

If you're riding on park trails, there are certain rules of the road to be aware of and follow. In many places, mountain bikers are the newcomers to the trails, which are already heavily used in densely populated New Jersey.

"Since you're someone who shares a trail, as a cyclist you have to be aware of certain things you're not aware of if you're walking or running," says Tunison, whose club has been spreading the word on trail etiquette. Since many trails are narrow, Tunison reminds cyclists they must yield to hikers, walkers and horseback riders. He suggests sounding an "inoffensive bell" or a friendly verbal warning as you approach other users of the trail, leaving it up to them whether you should ride around them.

"Get yourself oriented correctly as far as the user relationship," says Tunison. (For a Rules of the Trail handbook, you can write to the International Mountain Bike Association,

P.O. Box 412043, Los Angeles, CA 90041.)

There's a concern among frequent mountain bikers that a few rough riders will ruin the sport's reputation for those who don't ride "gonzo." Being respectful of others on the trail, never startling them or nearby animals, and avoiding excessive speeds will go a long way toward fitting in well on New Jersey's trails.

"You should follow the rules of the trail and yield to other people," adds Tunison. "Act as an ambassador of the sport. Use common courtesy. Don't just go 'banzai'; just use your brain."

On the other side of the spectrum, those starting out would do well to remember that you don't have to take the woods by storm to enjoy the sport. Choosing flat, short trails to get your feet wet is wise. And if you come to an area that seems very winding and steep, you can always get off and walk the bike.

"You don't have to go that fast," says Epstein. "If you feel insecure about it, walk down a hill, or up. You can go at your own pace. That's what neat about it; you can do whatever you want."

If you want to find someone to share the mountain biking experience and learn more about the sport, you may want to hook up with cycling clubs. Calling your local bike shop is the best way to find groups in your area.

"Like any sport, it's more fun together than alone, but it's fun alone, too," says Tunison.

And fun is what seems to be the real point of mountain biking. "It's like being a kid again. It's real fun," says Epstein. "And it's a neat thing to do with your kids. Everybody has fun. It's outdoors and healthy and you don't even realize you're doing something good for you."

Where to Go Mountain Biking

New Jersey offers many trails throughout the state that vary in length and difficulty. Following is a selected list of trails in state and county parks throughout the state. For more information about trails in state parks, contact the Division of Parks and Forestry's Office of Natural Lands Management at (609) 984-1339. For details on trails in county parks, call your county park commission or the park nearest you. Trail maps are usually available at the parks.

NORTH JERSEY

Allamuchy State Park, Sussex

County, 25 miles of trails.

Garret Mountain Reservation, Passaic County, 6.5 mile trail.

High Point State Park, Sussex County, 9.5 miles of trails, some hilly.

Loantaka Brook Reservation, Morris County, 5 miles of paved trails. Good for beginners, but often very crowded on weekends.

Norvin Green State Forest, Passaic County, 5.5 mile trail.

Patriot's Path, Morris County, 15 miles of trails, some paved, some not.

Ringwood State Park, Bergen and Passaic counties, 16 miles of trails.

Stokes State Forest, Sussex

County, 30 miles of trails.

Sussex Branch Trail,

Sussex County, 13 miles of former railroad right of way with a cinder base.

Waywayanda State Park, Sussex County, 20 miles of trails.

CENTRAL JERSEY

Allaire State Park, Monmouth County, 17 miles of trails.

Delaware & Raritan Canal State Park, Hunterdon, Mercer, Somerset and Middlesex counties, 60 miles of flat trails along the canal, Delaware, Millstone and Raritan rivers.

Huber Woods Park, Monmouth County, 6 miles of trails.

Hartshorne Woods Park, Monmouth County, 5.5 miles of trails, often steep.

Round Valley Recreation

Area, Hunterdon County, 9 miles of challenging, sometimes steep trails.

Shark River Park, Monmouth County, 7 miles of trails.

Washington Crossing State Park, Mercer County, 3 miles of trails.

SOUTH JERSEY

Belleplaine State Forest, Cape May and Atlantic counties, 30 miles of trails.

Cattus Island State Park, Ocean County, approximately 4 miles of trails.

Estell Manor Park, Atlantic County, 14 miles of trails along a branch of the Great Egg Harbor River.

Parvin State Park, Salem County, 15 miles of trails.



Students and teacher in front of one-room school house, Forked River, Ocean County, circa 1911.

In Next Season's Issue

Protecting the Delaware River Watershed
Finding the Right Stuff to Lifeguard at Island Beach
Getting Ready to Go Wilderness Camping



Wildlife in N

The Blue-spott

Though much remains to be learned about the blue-spotted salamander, one thing is very certain: it is an endangered species in New Jersey. This small amphibian, approximately 4 to 5 inches in length, can be found only in selected portions of the Upper Passaic, Pompton and Whippany floodplains, where its population has been reduced and scattered as a result of residential and commercial development.

The adult feeds on worms and terrestrial insects, while the larvae feed on plankton, crustaceans and aquatic insects. The blue-spotted salamander belongs to a group referred to as "mole salamanders" because, like moles, this amphibian lives under ground for much of its early life. The adult is terrestrial and requires a relatively mature forest with deep humus and rotting logs for its habitat. It can usually be found under logs, boards, stones and, sometimes, debris such as discarded cardboard or broken concrete.

This salamander has a blue-black ground color and is flecked with light blue or white along the sides of the body and tail — a color which closely matches the enamelware pots that people used many years ago. It is often confused with the Jefferson's salamander, even though the latter species has proportionally longer toes, grows larger (4 to 7 inches) and usually lacks blue spots.

The age at which blue-spotted salamanders become sexually mature is not known, but is presumed to be at two to three years. The amphibian will migrate to breeding ponds in late March and early April. Most of the breeding migration will take place during rainy nights. Known breeding areas include temporary woodland ponds, marshy ponds with many thick clumps of sedges, extensive red maple swamps and roadside ditches.

In all these areas, clean water is critical

NEW JERSEY Outdoors

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that habitat protection
is the most important
management tool
available for protecting
the blue-spotted
salamander.

After courtship, the female will deposit masses of three to 20 eggs on twigs, leaves or aquatic vegetation. The eggs will hatch in two to three weeks and the larvae will metamorphose (i.e., change physical form) in 90 to 100 days. Much like frogs, the larvae first have gills and look like small guppies before developing legs. At this time, the juveniles will spread out from the breeding pond.

Since finding the salamander before or after breeding season is largely a matter of chance, very little is known about this

to one or more factors. Besides predators, these include — but are not limited to — a loss or change in habitat, exploitation, competition or disease. An endangered species requires immediate assistance, or extinction is bound to follow.

Most nongame zoologists would agree that habitat protection is the most important management tool available for protecting the blue-spotted salamander. This includes maintaining breeding sites and protecting water quality, the wooded areas around breeding sites and migration corridors. Although it will not be easy, we must do all we can to ensure the blue-spotted salamander is given every opportunity to survive in the Garden State. Otherwise, we will never learn more about it or its unique place in New Jersey's complex ecosystem.

By Dave Chanda, chief of Education and Wildlife Information for the Department of Environmental Protection and Energy's Division of Fish, Game and Wildlife

16 SPRING GARDEN FAIR AND PLANT SALE This educational event includes talks, displays and demonstrations on various garden topics. Any gardening questions will be answered and soil test-kits will be available. The plant sale features annuals, unusual perennials, houseplants and shrubbery. **Hours:** 1 p.m. to 5 p.m. **Admission:** Donation **Phone:** (908) 789-3670 **Location:** Trailside Nature and Science Center, Coles Avenue, Mountainside

22 MULTI-CULTURAL FESTIVAL Performing arts, storytelling, food and arts and crafts will be featured at the first Multi-Cultural Festival — An Ethnic Experience of Minority Groups in Ocean County. **Hours:** 10 a.m. to 4 p.m. **Admission:** Free **Phone:** (908) 929-4779 **Location:** Ocean County College green, College Drive, Toms River

29, 30 MOUNTAIN LAUREL WEEKEND Come hike the trails and enjoy the colorful and fragrant blossoms of the mountain laurel in the Great Swamp. **Hours:** 10 a.m. to 4 p.m. **Admission:** Free **Phone:** (201) 635-6629 **Location:** The Great Swamp Outdoor Education Center, 247 Southern Boulevard, Chatham Township

29, 30, 31 SPRING JURIED AMERICAN INDIAN ARTS FESTIVAL The festival features nearly 100 American Indian artists and entertainers representing 40 tribes from throughout the states. Continuous entertainment, pottery, beadwork, weaving and a sculpture display will be accessible to the entire family. **Hours:** 11 a.m. to 6 p.m. **Admission:** \$6 for adults, \$3 for children over age 5, seniors are admitted free **Phone:** (609) 261-4747 **Location:** Rankokus Indian Reservation, Rancocus Road, Westhampton

May 30 through August 22 QUILTS OF NEW JERSEY, 1777-1950: CONTRIBUTIONS TO AN AMERICAN TRADITION This exhibition will display 35 quilts made prior to 1951 and gathered from private lenders all over New

Jersey. It is coordinated and co-sponsored by The Heritage Quilt Project of New Jersey. **Hours:** 11 a.m. to 4 p.m. Wednesday through Sunday **Admission:** \$3 for adults, \$1.50 for seniors, 50 cents for full-time students and children 5 to 18 **Phone:** (609) 652-8848 **Location:** The Noyes Museum, Lily Lake Road, Oceanville

June

4 BOAT TOUR OF SILVER BAY (Also June 11, 18 and 25) Take this naturalist-led tour aboard a pontoon boat and learn about the ecology of Silver and Barnegat bays. **Admission:** Free (must call between 9 a.m. and noon on day of tour to pre-register) **Phone:** (908) 270-6960 **Location:** Cooper Environmental Center, Cattus Island Park, 1170 Cattus Island Boulevard, Toms River

5 WHO LAID THE EGG? Learn about the role of chickens a century ago at Fosterfields, a living historical farm. **Hours:** 1 p.m. to 4 p.m. **Admission:** \$3 for adults, \$2 for children 6 to 16 and senior citizens, children under 6 are free **Phone:** (201) 326-7645 **Location:** Fosterfields Living Historical Farm, Kahdena Road (off Route 24), Morristown



5, 6 GARDEN STATE WINE GROWERS SPRING FESTIVAL Eleven New Jersey wineries strut their wares at this annual event. Wine tasting, food, live music and tours of the Cream Ridge Winery. **Hours:** Noon to 5 p.m. **Admission:** \$10 for adults, \$2 for persons under 21 years **Phone:** (609) 259-9797 **Location:** Cream Ridge Winery, Route 539, Cream Ridge

6 BEEKEEPING Learn about bees and beekeeping and the advent of "Africanized" bees at a historical farm setting. **Hours:** 1:30 p.m. to 4 p.m. **Admission:** \$3 for adults, \$2 for senior citizens and children 6 to 16, children under 6 are free **Phone:** (201) 326-7645 **Location:** Fosterfields Living Historical Farm, Kahdena Road (off Route 24), Morristown

6 WILD ABOUT WILDFLOWERS Horticulturist Chris Rauch will present a one-hour introduction to wildflower identification, followed by a hike through the Great Swamp to put your new-found knowledge to use. **Hours:** 2 p.m. **Admission:** Free **Phone:** (201) 635-6629 **Location:** Great Swamp Outdoor Education Center, 247 Southern Boulevard, Chatham Township

6 NATIVE AMERICAN PLANT WALK (Rain date June 20) Ever wonder how Native Americans used local wild plants for food and medicine? Find out on this educational hike. **Hours:** 10 a.m. to 1 p.m. **Admission:** \$6 **Phone:** (609) 645-5960 **Location:** Estell Manor Park, State Highway 50, Estell Manor

7 HIKE HISTORIC WHITESBOG VILLAGE Enjoy an "easy" 6.5-mile early evening hike. After sunset, hear the eerie swampland concert of frogs and toads. Bring flashlight, snacks, and water. This event is sponsored by the West Jersey Sierra Group. **Hours:** Meet at 7:45 p.m. **Admission:** Free **Phone:** (609) 267-7052 **Location:** Whitesbog Village, 1/2 mile north of Route 530 and 4.5 miles east of Browns Mills, Burlington County

Events

May

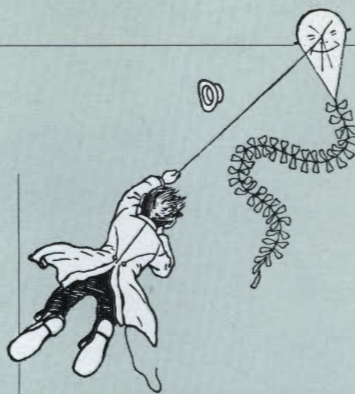
1 SPRING CRAFT SHOW AND SALE

This craft show will feature hand-made craft items along with various demonstrations. **Hours:** 10 a.m. to 4 p.m. **Admission:** \$2 for adults, children under 12 are free **Phone:** (908) 938-2253 **Location:** Allaire Village, Route 524, Farmingdale

2 SPRING EDIBLES Information, slides and samples of the various wild plants that are good to eat will be available for the whole family. **Hours:** 2 p.m. **Admission:** Free **Phone:** (201) 635-6629 **Location:** The Great Swamp Outdoor Education Center, 247 Southern Boulevard, Chatham Township

2 SPRING FESTIVAL The Metuchen Area Chamber of Commerce presents art shows, antique shows, and crafts "on the green." The displays will be accessible in the downtown business area of Metuchen. **Hours:** 10 a.m. to 4 p.m. **Admission:** Free **Phone:** (201) 548-2964 **Location:** Metuchen

2 PET FAIR The day is filled with pet-oriented demonstrations, information, and lots of fun. The fair includes a stray pet contest, a K-9 demonstration by the Union County Sheriff's Department, and free pony rides for the kids. **Hours:** 1 p.m. to 5 p.m. **Admission:** Donation requested **Phone:** (908) 789-3670 **Location:** Trailside Nature and Science Center, Coles Avenue, Mountainside



2, 3 KITE DAY FESTIVAL Celebrate spring at Terhune Orchards, a working farm, commercial flower garden and orchard. Wagon and pony rides, music, food, children's games and sheep shearing accompany kite flying as part of this annual rite of spring **Hours:** 10 a.m. to 5 p.m. **Admission:** \$3 per person; children under 3 are free **Phone:** (609) 924-2310 **Location:** Terhune Orchards, 330 Cold Soil Road, Princeton

8 ANTIQUE SHOW AND SALE

Allaire Village hosts several antique dealers which will be vending their wares. **Hours:** 8 a.m. to 4 p.m. **Admission:** \$2 for adults, children under 12 are free **Phone:** (908) 938-2253 **Location:** Allaire Village, Route 524, Farmingdale

8 BIRD WALK AT LOSEN SLOTE CREEK PARK

Observe the songbirds of spring during their peak migration on a guided walking tour of this lovely woodland. Proper footwear for trail-walking is recommended. **Hours:** 8:30 a.m. **Admission:** \$1 **Phone:** (201) 460-8300 **Location:** The Hackensack Meadowlands Development Commission Environment Center, Valley Brook Avenue, Lyndhurst

8 DON SMITH 5K RUN Fourth annual 5 kilometer (3.1 mile) race and 1 mile fun run through historic Port Republic. **Hours:** Post-registration; 7 a.m. to 9 a.m.; 9 a.m. race **Admission:** \$8 pre-entry, \$10 post-entry fee (includes t-shirt) **Phone:** (609) 652-6154 **Location:** Port Republic School, Pomona Avenue, Port Republic

8, 9 WILDLIFE ART SHOW Fifty wood carvers, painters, etchers and other artists will gather under one roof to show and sell their images of North American

wild fauna and flora. Demonstrations, food and a silent auction will be available. **Hours:** 10 a.m. to 5:30 p.m. **Admission:** Free **Phone:** (908) 766-2489 **Location:** Somerset County Park Commission's Environmental Education Center, 190 Lord Stirling Road, Basking Ridge

9 PARLOR GAMES AND OUT-

DOOR AMUSEMENTS Allaire Village offers 18th century games and amusements for children and young adults. **Hours:** Noon to 4 p.m. **Admission:** Free **Phone:** (908) 938-2253 **Location:** Allaire Village, Route 524, Farmingdale

14 FIDDLER'S MEADOW COFFEE-

HOUSE The Environment Center presents Celtic music by Noel and Sarah McQuaid along with an opening act from singer/songwriter Bob Norman. **Hours:** 8:30 p.m. **Admission:** \$4 **Phone:** (201) 460-8300 **Location:** The Hackensack Meadowlands Development Commission Environment Center, Valley Brook Avenue, Lyndhurst

14, 15, 16 EIGHTH ANNUAL POW WOW AND FESTIVAL

The New Jersey American Indian Center presents a native American gathering for song, dance, storytelling, arts and crafts, and food sales. There will be a special show Friday May 14 from 9 a.m. to 3 p.m. for students. **Admission:** for this show will be \$1 for either student or teacher. **Hours:** May 14 (9 a.m. to 10 p.m.), May 15 (10 a.m. to 10 p.m.), May 16 (10 a.m. to 6 p.m.) **Admission:** \$5 for adults, \$2 for children, \$2 for seniors **Phone:** (908) 525-0066 **Location:** Old Bridge Ice Arena, 1 Old Bridge Plaza, Route 516 and Route 9, Old Bridge

15 DINOSAUR TALES

Maxine B. Ginsberg, M.A., will present a program filled with activities and games about dinosaurs. **Hours:** 2 p.m. **Admission:** Free **Phone:** (201) 635-6629 **Location:** The Great Swamp Outdoor Education Center, 247 Southern Boulevard, Chatham Township

Celebrating Spring and N.J.'s Cultural Heritage

On Saturday, April 24, the spacious grounds of the Woodlawn Estate at Douglass College, Rutgers University, will host the finest traditional crafts, music and dance as the New Jersey Folk Festival once again pays tribute to the diverse cultural heritage of the Garden State.

The annual spring festival, in its 19th year, is an all-day, outdoor celebration of traditional arts in New Jersey. Admission is free. Woodlawn is located at the intersection of Clifton Avenue and George Street in New Brunswick.

This year's program spotlights the folk culture of Lebanese Americans in New Jersey. The culmination of several years of fieldwork and planning, this is the first time in nearly 20 years that the festival has focused on immigrants from the Arab world. Musical presentations will range from African-American blues to old timey, gospel and country, with the music of Lebanon taking center stage.

Highlights of the festival include performances from the Matar Dabke Group, a Lebanese folkloric dance troupe choreographed by Gaby Matar. Joseph Khouri and his band will head-



New Jersey Folk Festival visitors watch traditional yarn spinning.

line the show. Khouri, who hails from the New Brunswick area, will be joined by two authentic Lebanese belly dancers. Well-known vocal soloist Nassif Maroun of Somerset rounds out the Lebanese program.

In addition to these mainstage performances, festival guests can stroll the main promenade and enjoy workshops in folk arts and crafts, special activities for children, and exhibits of recordings and books related to folk arts.

As always, visitors will have a chance

to sample a wide variety of ethnic delicacies, with native Lebanese cuisine complementing the celebration of Lebanese-American heritage.

For those interested in agricultural-related activities, the 75th annual Cook College Ag-Field Day, which runs from 8 a.m. to 6 p.m., takes place simultaneously just a short walk from the Woodlawn area on the Cook College campus. Ag-Field Day features animal, livestock and plant exhibits, as well as music and food.

24 COOK COLLEGE AG-FIELD DAY

The 75th annual celebration of New Jersey's agricultural past, present and future featuring animal, livestock and plant exhibits, agricultural-related activities, music and food. **Hours:** 8 a.m. to 6 p.m. **Admission:** Free **Phone:** 908-932-9215 **Location:** Cook College Campus, Lipman Circle, New Brunswick

24, 25 SHAD FESTIVAL Celebrate the upstream return of the shad to the Delaware River at Lambertville's 12th annual Shad Festival. Features arts and crafts, live entertainment, food, shad dinner (Sunday

only). **Hours:** 12:30 p.m. to 5:30 p.m. **Admission:** Free (fee for parking) **Phone:** (609) 397-0055. **Location:** Bridge and Union streets, Lambertville

25 EARTH DAY On this special day exhibits, games, a pond study and a poster contest will all focus on the importance and continued conservation of the Great Swamp. **Hours:** 11 a.m. to 4 p.m. **Admission:** Free **Phone:** (201) 635-6629 **Location:** The Great Swamp Outdoor Education Center, 247 Southern Boulevard, Chatham Township



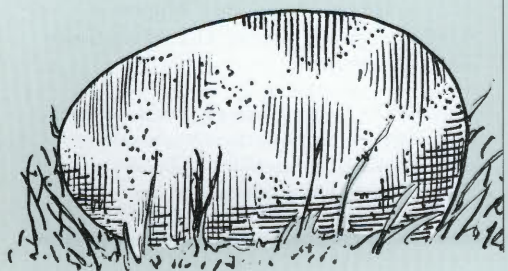
Events

April

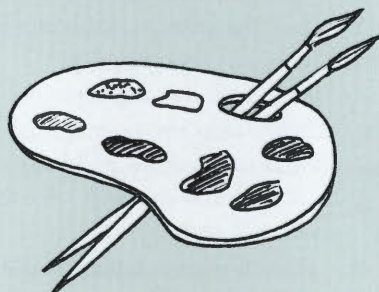
Now through May 15 QUILTS OF NEW JERSEY, 1777-1950: CONTRIBUTIONS TO AN AMERICAN TRADITION This exhibition will display 35 quilts made prior to 1951 and gathered from private lenders all over New Jersey. It is coordinated and co-sponsored by The Heritage Quilt Project of New Jersey. **Hours:** 10:30 a.m. to 5 p.m. Tuesday and Thursday through Saturday. 10:30 a.m. to 8 p.m. Wednesday **Admission:** Free **Phone:** (202) 547-4514 **Location:** The Jersey City Museum, 472 Jersey Avenue, Jersey City (At the end of May, this exhibition moves to the Noyes Museum in Oceanville.)

Now through May 16 PINE BARRENS BOTANICAL PRINTS BY ROBIN JESS Come and enjoy the drawings and prints illustrating in detail the rare and beautiful flora unique to the Pine Barrens by this talented New Jersey artist. **Hours:** 11 a.m. to 4 p.m. Wednesday through Sunday **Admission:** \$3 for adults, \$1.50 for seniors, 50 cents for full-time students and children 5 to 18 **Phone:** (609) 652-8848 **Location:** The Noyes Museum, Lily Lake Road, Oceanville

Now through May 30 THREE HISPANIC-AMERICAN MASTERS Contemporary art reflecting the ethnic culture and life experiences of three accomplished Hispanic-American artists will be on display. **Hours:** 11 a.m. to 4 p.m. Wednesday through Sunday **Admission:** \$3 for adults, \$1.50 for seniors, 50 cents for full-time students and children 5-18 **Phone:** (609) 652-8848 **Location:** The Noyes Museum, Lily Lake Road, Oceanville



Now through May 30 BRIDGE OF FIRE - TWO POTTERS EAST AND WEST Don't miss the display of contemporary ceramics by Malcolm Wright of Vermont and Takashi Nakazato of Japan, both trained in the traditional Karatsu technique dating back to the 16th century. **Hours:** Wednesday through Sunday 11 a.m. to 4 p.m. **Admission:** \$3 for adults, \$1.50 for seniors, 50 cents for full-time students and children 5 to 18 **Phone:** (609) 652-8848 **Location:** The Noyes Museum, Lily Lake Road, Oceanville



Now through June 20 JEWELS OF THEIR AGE: JURIED WORKS BY THE SOUTH JERSEY SENIORS View a juried exhibition of works in various media, including oils, pastels, watercolors, and wood and metal sculpture by the senior population of South Jersey. **Hours:** Wednesday through Sunday 11 a.m. to 4 p.m. **Admission:** \$3 for adults, \$1.50 for seniors, 50 cents for full-time students and children 5 to 18 **Phone:** (609) 652-8848 **Location:** The Noyes Museum, Lily Lake Road, Oceanville

10 CAMOUFLAGED EGG HUNT Join this ecology center's eighth annual egg hunt where the eggs are dyed natural colors so they blend into the outdoor environment. Children should be pre-registered in the following age groups: 3-4 years of age, 5-7 years of age, 8-10 years of age **Hours:** 2 p.m. to 3:15 p.m. **Admission:** \$2.50 for non-member children, \$2 for member children **Phone:** (201) 835-2160 **Location:** Weis Ecology Center, 150 Snake Den Road, Ringwood

10 THE AMAZON Jerzy Grabowski will present a lecture and a film on the wildlife and tribes of the Amazon Region. **Hours:** 2 p.m. **Admission:** Free **Phone:** (201) 635-6629 **Location:** The Great Swamp Outdoor Education Center, 247 Southern Boulevard, Chatham Township

11 EASTER SUNRISE SERVICE Allaire Village will provide Easter service at sunrise at Allaire Chapel/Gazebo if weather permits. **Hours:** Sunrise **Admission:** Free **Phone:** (908) 938-2253 **Location:** Allaire Village, Route 524, Farmingdale

17 THE MOLDER'S TRADE This presentation includes the preparation of the wooden patterns or molds for the production of iron products. **Hours:** Noon to 4 p.m. **Admission:** Free **Phone:** (908) 938-2253 **Location:** Allaire Village, Route 524, Farmingdale

17 NATIVE AMERICAN STORYTELLING Discover native cultures and the vital link between man and mother Earth. Families, teachers, and students are all welcome. Call for admission. **Hours:** 11 a.m. **Phone:** (201) 460-8300 **Location:** The Hackensack Meadowlands Development Commission Environment Center, Valley Brook Avenue, Lyndhurst

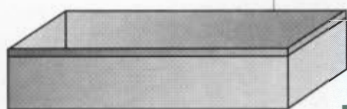
24 JUNIOR FISHING CONTEST Children from 12 years of age and under will compete in a fishing contest at the Mill Pond in historic Allaire Village. **Hours:** 11:30 a.m. to 12:30 p.m. **Admission:** \$1 entrance fee **Phone:** (908) 938-2253 **Location:** Allaire Village, Route 524, Farmingdale

24 NEW JERSEY FOLK FESTIVAL An all-day outdoor celebration of the folk arts of New Jersey, including music, crafts, food and exhibits. The festival's special theme this year focuses on Lebanese-American folk culture. **Hours:** 11 a.m. to 6 p.m. **Admission:** Free **Phone:** 908-932-9174 **Location:** Woodlawn, Douglass College Campus, George Street and Clifton Avenue, New Brunswick

Ingestion

The ingestion of plastics by marine animals is less frequent but just as threatening to their lives. Marine animals often mistake clear plastic bags and plastic sheeting for jellyfish or squid, and styrofoam pieces and plastic resin pellets for fish eggs or small aquatic animals. Even birds are likely to swallow plastic items, which take the place of real food by filling up the bird's stomach and slowly causing the bird to starve. The ingestion of plastic debris may cause illness or death from choking, intestinal blockage, ulcers, malnutrition, starvation, internal wounds or a buildup of hazardous chemicals in the animal's body.

For the following activity, you will need the these materials: a baking tray (any size) or shoe box,



a watch with a second hand, 1 1/2 cups of bird seed or popcorn, 1/2 cup of plastic pieces (Styrofoam or resin pellets), a spoon and cup per person.



Activity

Select one of the following marine animals: a whale, a duck, a pelican, a sea bird, a sea turtle, a dolphin or a fish. How does your animal look and move? What do you think it eats? How does it collect its food? Answering these questions will help you with our next activity.

Pretend that you are the animal you selected and you are looking for food. Often an animal can't tell the difference between real food and litter, such as plastics. This activity will show you how animals can mistake plastic for food.

Mix the birdseed and plastic in the tray or box. One or more persons, each representing a marine animal, will "feed" on the mixture for 30 seconds, using your spoon and placing the food in your cup.

(Please do not eat the mixture!) One person must measure your time with the watch. After the 30 seconds is up, examine the contents of your cup. Count and record the pieces in two columns, food and plastic. Use the following math equations to figure out the percentage of plastic that your animal ate in the 30 seconds.

Math equation:

$$\begin{array}{r} \text{No. of pieces of plastic} \\ \times \quad 100 \\ \hline \text{No. of pieces of food} \end{array}$$

Plastics are not considered a nutritional snack. In fact, the ingestion of plastics by marine animals is very harmful and dangerous. Animals that ingest plastic often die before help arrives since it is difficult to detect the problem. Explorers, you can help solve this problem if you:

- Recycle plastic containers and six-pack rings properly
- Reuse plastic containers for storage or craft activities
- Dispose of all trash properly
- Cut loops from six-pack yokes and other plastic before discarding them
- Learn more about marine animals and their homes
- Learn about how plastic items are made and then recycled
- Notify the New Jersey Marine Police or the U.S. Coast Guard if you see recreational or commercial vessels dumping trash into waterways.

Think About It

We challenge you to create a way that you and others can help to reduce the amount of plastics that is illegally disposed in the Atlantic Ocean. Send your suggestion to Explorer, *New Jersey Outdoors*, CN 402, Trenton, NJ 08625-0402, and we will print selected suggestions in a future issue.

To receive additional information contact:

NJ Division of Fish, Game and Wildlife
Larry Sarner, Marine Education Specialist
P.O. Box 418
Port Republic, New Jersey 08241
(609) 748-2031

"Plastics in the Ocean," a sound filmstrip, is available for free loan to groups and comes with accompanying information and curriculum materials. (Please enclose a self-addressed envelope with appropriate first-class postage to receive information by mail.)

NJ Marine Mammal Stranding Center
P.O. Box 773, 3625 Brigantine Blvd.
Brigantine, New Jersey 08203
(609) 266-0538
(Please enclose a self-addressed envelope with appropriate first-class postage to receive information by mail.)

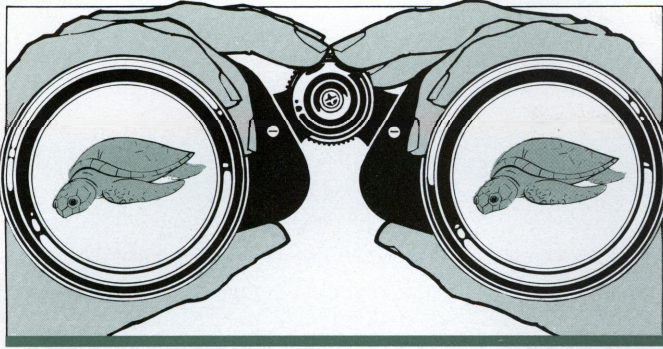
Center for Marine Conservation
1725 DeSales Street, NW
Washington, DC 20036
(202) 429-5609

**NOAA/National Marine Fisheries Service
Marine Entanglement Research Program**
7600 Sand Point Way, NE
Seattle, WA 98115
(206) 526-4009

The Society of the Plastics Industry, Inc.
1275 K Street, NW, Suite 400
Washington, DC 20005
(202) 371-5200

Note: Activities adapted from Ripples, a North Carolina Big Sweep Elementary Guide. Used by permission.

Explorer by Colleen Thomas, environmental education specialist for the Department of Environmental Protection and Energy's Environmental Education Unit.



Explorer

Hey, Explorer!

Can you remember the types of trash and materials you have seen in the water or along a shoreline, when you have walked at a beach or lake? I'll bet you've seen a lot of plastic things: bottles, bags, six-pack holders, pieces of broken plastic foam belly boards and an occasional disposable diaper. How does this litter get there? How old might some of the items be? What problems does this litter cause?

Unfortunately, humans have used the Atlantic Ocean as a "garbage can" for many years. This problem results in part from ocean-bound cargo vessels, ships and boats that dispose their solid waste at sea. The ocean also acts as a "catch basin" for rain-swept trash and litter that collects on the land, washes into storm drains and empties into waterways and shorelines. A portion of this ocean-bound solid waste is made up of plastic. There are two types: manufactured plastic articles, such as bottles, bags, styrofoam, containers, cargo sheeting and disposable diapers, and plastic resin pellets, which are the raw form of plastics.

In today's modern and convenient world, plastics have become popular because they are inexpensive, lightweight and durable. As a result, plastics have replaced many of our traditional materials such as wood, steel, aluminum and copper. To give you a better understanding of the numbers of plastic items created, in 1987, the United States produced more than 34 billion plastic bottles, more than one billion pounds of plastic trash bags and 201 million pounds of plastic to be used

for disposable diapers. Most plastics have an estimated life span of about 450 years and are considered virtually indestructible. If a plastic item is improperly discarded or not recycled, it most likely will move with wind and rain, float on water, collect in unsightly piles and become a threat to marine creatures.

While the total amount of plastic trash found in the ocean and the total number of animals killed by plastic are unknown, we do have direct evidence that plastic trash, or "floatables," can be harmful to sea animals. How? It is harmful when animals eat it (ingestion), get tangled in it (entanglement) or get trapped in it (entrapment). In the last three years, for example, the New Jersey Marine Mammal Stranding Center in Brigantine (see article starting on page 42) dealt with 21 strandings of sea animals including turtles,

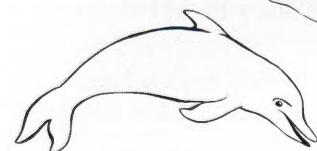
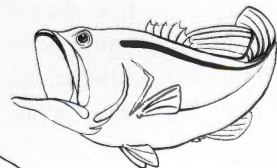
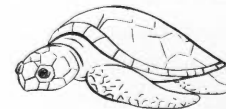
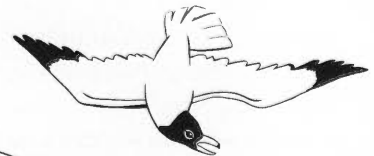
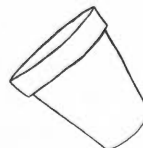
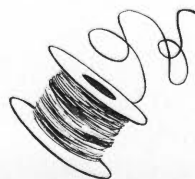
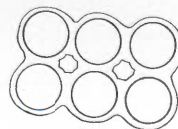
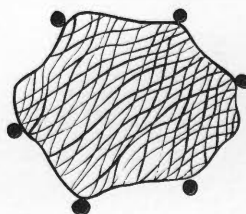
porpoises, dolphins and whales that resulted from ingestion or entanglement. Many scientists believe that plastic ingestion, entanglement and entrapment are the most far-reaching threats facing many marine species, annually killing or maiming thousands of seabirds, seals, sea lions and sea otters, and hundreds of whales, dolphins, porpoises and sea turtles. Let's take a closer look.

Entanglement and Entrapment

Animals often become tangled or trapped in open fishing nets, fishing lines, package strapping bands, six-pack rings or other plastic items that make it difficult or impossible for the animals to swim, breathe or eat. Due to their naturally curious behaviors, seals, sea lions, turtles, fish, crabs and birds are most prone to entanglement.

Activity

Match the plastic litter with the animal that it might harm. There may be more than one match for each piece of litter.



Follow-Up

State Funds Projects to Cut Pesticide Use

The Department of Environmental Protection and Energy has awarded three contracts totaling \$722,000 for pilot projects intended to reduce pesticide use and to assess how pesticides or their residues may affect human health.

Pesticides may pose a threat to human health and the environment through potential contamination of ground water (NJO Summer 1992).

The recipients of the awards are the New Jersey Department of Agriculture, the Rutgers University Cooperative Extension Service and the Environmental and Occupational Health Sciences Institute, which is jointly sponsored by Rutgers University and the University

of Medicine and Dentistry of New Jersey. The awards are part of the DEPE's overall pollution prevention program.

Under the agreement with the DEPE, the Department of Agriculture will use \$210,000 to develop and evaluate biological controls for a variety of pests in New Jersey. An additional \$40,000 of the grant will be used to explore and develop management practices for loading, handling and disposing of pesticides, including washing pesticide application equipment. Two pesticide containment facilities for storing and mixing pesticides will be built as pilot projects to demonstrate ground water quality control measures.

The Rutgers University Extension Service will use \$272,000 to develop Integrated Pest Management programs, which use other methods before relying exclusively on pesticides to keep crop damage

caused by pests to a minimum. The extension service also will produce educational materials for use by the agricultural community and the public.

With the \$200,000 award to the Environmental and Occupational Health Sciences Institute, researchers will provide guidance to the DEPE Pesticide Control Program in assessing the risk of pesticide products used in the home and workplace as they relate to indoor air. The research will include characterizing the risks of exposure to pesticides as well as reviewing the current approach used in sample collection and analysis for pesticides in air, soil, water and on other household surfaces.

Funding for the projects will come from revenue generated by pesticide licensing fees collected over the past three years.

Now It's the Historic Preservation Office

The former Office of New Jersey Heritage is operating under a new name — the Historic Preservation Office — to better help identify its function.

Department of Environmental Protection and Energy Commissioner Scott Weiner made the change based on a recommendation by the New Jersey Historic Sites Council, which is working with the DEPE to improve the state historic preservation program. The council, which consists of 11 members from the public sector appointed by the governor, serves in an advisory capacity on historic preservation matters.

The council, along with the New Jersey Historic Trust, the New Jersey State Review Board for Historic Sites, and Preservation New Jersey, has undertaken a study of statewide historic preservation programs. In addition to an opinion survey taken last year, a series of regional public

meetings will be held to solicit public input. The study recommendations will be discussed at a statewide historic preservation conference on May 14 in Cape May.

For more information on the study or the conference, call the Historic Preservation Office at (609) 292-2023.



The 1908 Spanish mission-style Church of the Redeemer, Longport Borough, Atlantic County, which was recently added to the New Jersey Register of Historic Places.

7 Sites Added to Historic Register

Seven sites, including the Carnegie Library in Camden and the Raritan Bridge connecting Raritan Borough and Hillsborough Township in Somerset County, recently have been added to the New Jersey Register of Historic Places.

The main building of the Camden Free Public Library opened in 1905, made possible by a \$120,000 endowment from Andrew Carnegie. Over the course of his life, Carnegie donated more than \$59 million for the construction of more than 2,500 libraries throughout the English-speaking world.

The Camden Library, constructed in Neo-Classical Revival style, was closed in 1986 as a result of both municipal budgetary problems and structural deterioration. However, Camden is exploring options for the restoration and re-use of the impressive building.

The Raritan or Nevius Street Bridge built across the Raritan River, is noteworthy for its engineering and construction. It is the oldest documented metal truss highway bridge in Somerset County, having been built in 1886 by the nationally recognized Wrought Iron Bridge Company. The bridge, part of the Metal Truss Bridges of Somerset County multiple property nomination, remains remarkably complete, making it one of the least altered bridges of its kind in the county. In addition, the bridge played a prominent role in the industrial and residential development of the area as a key link in the overland transportation network.

Also added to the New Jersey Register of Historic Places were:

❑ The Church of the Redeemer in Longport Borough, Atlantic County, which was built in 1908 on land donated by pharmaceutical giant Joseph Price Remington and has both architectural and historic significance. The structure was built in the Spanish Mission/Colonial Revival style with unusually fine stained glass windows. The church was built for the Agassiz Microscopical Association, a scien-



The Newton Town Plot Historic District in Newton, Sussex County, at the corner of Main and Spring streets.

KEVIN WRIGHT

tific and religious movement that preceded the Protestant Episcopal church in Longport.

❑ The Mott Hollow Historic District in Randolph Township, Morris County, a well-preserved early 19th-century center of commercial activity. The Mott family ran extensive water-powered milling operations that flourished under the trade embargo in effect prior to the War of 1812. Today, the 33 historic properties of Mott Hollow Historic District are primarily residential.

❑ The Johnsonburg Historic District in Frelinghuysen Township, Warren County, which exemplifies the rural, agricultural society of 18th- and 19th-century New Jersey. As one of northwestern New Jersey's oldest communities, it has both historical and architectural significance. The buildings were designed in a style typical of rural settlements in the 19th century. The surviving general store and hotel in Johnsonburg, along with documentation of their activities, provide a rare glimpse into the industrial life of an isolated agricultural community. Though the district is residential today, it still clearly reflects its traditional role as a local agricultural service center.

❑ The Washington Valley Historic District in Morris and Mendham townships, Morris County, which is representative of New Jersey's agrarian traditional and architectural history dating back to the 18th century. The district is made up of 153 historical properties. Seven surviv-

ing "gentleman" estates built around the turn of the 20th century are of special interest. Resulting in part from the general movement of people during this time from cities to the country, the seven estates help to provide the Washington Valley District with a unique historical character.

❑ The Newton Town Plot Historic District, which has both historical and governmental significance. The district conforms in large part to the original survey conducted for the county seat of Sussex in 1762 by Jonathan Hampton. The construction of the Sussex Railroad in the mid-19th century increased the importance of Newton, making it a commercial, as well as a governmental, center. The 56 historic buildings in the district illustrate Newton's growth from early settlement to contemporary town.

The New Jersey Register of Historic Places is administered by the Historic Preservation Office in the Department of Environmental Protection and Energy's Division of Parks and Forestry. The department is recommending that all seven properties also be listed on the National Register of Historic Places. The national register is the official list of nationwide resources significant in American history, architecture, archaeology, engineering or culture. Register listing ensures that public agencies consider what effect federally sponsored or assisted actions will have on historic properties.

Wildlife Posters Available

The Division of Fish, Game and Wildlife is offering a series of three full-color posters of native New Jersey wildlife. One poster is devoted to fish, the second to birds and the third to mammals. (The bird and fish posters are pictured at right.) Brief profiles of the species are included on the back of each poster.

The posters are available for \$2.50 each or \$7 for the set of three, along with \$3 for

postage and handling per order. The fee for one set of posters will be waived for educators, except for the \$3 mailing charge. Educators must provide a school address for shipping to qualify for the waiver of poster cost. To order, make checks payable to the Division of Fish, Game and Wildlife and mail to: "Posters," Division of Fish, Game and Wildlife, Box 389, RR 1, Oxford, New Jersey 07863.

Brick Township Fisherman Wins Governor's Tournament

A Brick, Ocean County, man took home the grand prize at the Governor's First Annual Surf Fishing Tournament at Island Beach State Park, Ocean County.

David McGoldrick won the Governor's Trophy after catching a 29.5-inch albacore tuna. His name will be engraved on the Governor's Cup, which will be permanently displayed at Island Beach State Park.

Albacore, blackfish, bluefish, fluke, kingfish, striped bass and weakfish were eligible for entry in the fall tournament. Of these, albacore, bluefish and fluke were the species submitted.

Overall length determined the grand prize winner, as well as the first, second and third place winners in each age group for each of the species categories. First, second and third place winners received a variety of donated surf-fishing tackle and gear.

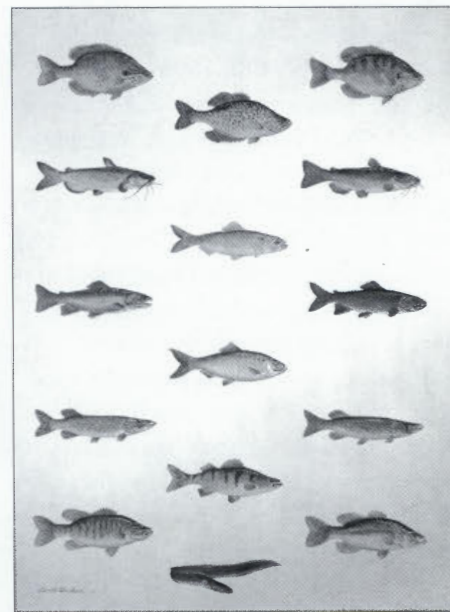
The event was sponsored by the Department of Environmental Protection and Energy, the New Jersey Federation of Sportsmen's Clubs, the Jersey Coast Anglers Association, the New Jersey Beach Buggy Association and the Sportfishing Promotion Council of America.

Other categories and the winners were:

<input type="checkbox"/> Albacore	Second Place — Edward Brevel, Jr., Haledon
<input type="checkbox"/> Bluefish: Adults	First Place — Frank Ullmer, Toms River Second Place — Thomas Puzino, Saddle Brook Third Place — Wayne Haraka, Pompton Lakes
<input type="checkbox"/> Bluefish: Teens	First Place — Joe Kerly, Toms River Second Place — Mike Weber, Bethlehem, Pa. Third Place — Pat Hullfish, Plainsboro
<input type="checkbox"/> Bluefish: Under 12	First Place — Steven Koenigstein, Toms River Second Place — Paul DeSilva, Toms River Third Place — Robert Phillips, Little Egg Harbor
<input type="checkbox"/> Fluke: Adult	First Place — Richard Cravello, Rochelle Park Second Place — Keith Germond, Trenton
<input type="checkbox"/> Fluke: Teen	First Place — Robert Ivan, Bound Brook Second Place — Steven O'Brien, Toms River
<input type="checkbox"/> Fluke: Under 12	First Place — Mark Sylvester, Philadelphia



If it lives and flies in New Jersey — Division of Fish, Game & Wildlife poster shows off native feathered friends and the illustrative art of Carol Decker.



If it swims in our waters — Division of Fish, Game & Wildlife poster highlights native New Jersey fish species.

Volunteers Needed to Fence Nesting Sites

The New Jersey Division of Fish, Game and Wildlife is seeking volunteers to help fence nesting areas for piping plovers, small shorebirds that are listed as endangered in New Jersey and most East Coast states.

Piping plovers are robin-size birds that have dry sand-colored backs, orange beaks with black tips, and black brow bands and collars. They arrive in New Jersey about mid-March after leaving their wintering grounds along the coast of the southern United States. These shorebirds will set up nesting territories on the beaches of the Northeast, including along the coast of New Jersey from Cape May to Sandy Hook.

For information on how to volunteer to help fence the known nesting areas in New Jersey, write to the Division of Fish, Game and Wildlife's Endangered Species Program, CN 400, Trenton 08625-0400.

For DEPE Info

For information, publications, notices, regulations and other materials on environmental and energy-related issues, write to or visit the New Jersey Department of Environmental Protection and Energy's Public Access Center, 401 East State Street, 1st Floor, CN 402, Trenton 08625-0402, or call (609) 777-DEPE. The center is open weekdays from 9 a.m. to 5 p.m.



DEPE Action Line
To Report Abuses of
the Environment,
Call:
609-292-7172
24 hours a day



ALIVANY

Newly opened barrier-free fishing site on the Pequest River.

Barrier-free Fishing Site Opens at Pequest

People with disabilities can enjoy a new barrier-free fishing site constructed along the Pequest River in Warren County as part of a joint effort by the New Jersey Division of Fish, Game and Wildlife, Ramsey Outdoor Store and the North Jersey Chapter of Trout Unlimited.

Located off the parking area at the Route 46 entrance to the Pequest Trout Hatchery and Natural Resource Education Center, the site now can be reached by following a gently graded path of gravel to the river's edge.

The project is an extension of Ramsey Outdoor Store's involvement in Project Access, a private New York-based organization that helps to make fishing accessible for people with disabilities at major fishing areas in the nation.

"This is the type of joint venture between government agencies like the division and its volunteers, the private sector and conservation groups that is so valuable in making the fish and wildlife

resources of New Jersey available to everyone," says division Director Bob McDowell.

Volunteers from the division's Wildlife Conservation Corps assisted Ramsey Outdoor Store employees and Trout Unlimited members in shoveling, raking and packing the gravel mix. A fishing platform with safety railings at the river, held in place by compacted stone blocks, completed the project. The cost of materials was shared by Ramsey Outdoor Store and the North Jersey Chapter of Trout Unlimited.

The parking area and access site are open year-round to licensed anglers. Since the site is within the Pequest River Trout Conservation Area, check the freshwater fishing issue of the division's *Fish and Wildlife Digest* for specific regulations. To obtain a copy of the digest, visit your local sporting goods store or call the Pequest hatchery at (908) 637-4125.

Rescue Nets 4,500 Fish in Pemberton Lake

About 300 volunteers helped move more than 4,500 fish to other local waters when Mirror Lake in Pemberton Township, Burlington County, was drained recently to allow for rebuilding of the main dam.

The four-day relocation project last fall was a cooperative effort among the New Jersey Division of Fish, Game and Wildlife, the Pemberton Township Environmental Commission and local volunteers.

Staffers from the Division of Fish, Game and Wildlife used a special shock boat that sends an electrical current into the water, causing the momentarily stunned fish to float to the surface. Volunteer crews followed behind in canoes, scooping up the fish with nets. The fish then were sorted by species and transported to nearby Pemberton Lake and other local waters.

The fish collected included: nearly 600 largemouth bass, some weighing up to 7 pounds; more than 2,000 adult bluegills and crappies; and 1,500 young bluegills and brown bullheads.

Eleven huge carp weighing up to 30 pounds also were removed from the lake. Although state law prohibits the stocking of carp, the fish were permitted to be moved from the drying lake bed downstream to safety.

After the \$3.5 million restoration of the dam has been completed, the division will restock the lake with bass, sunfish and catfish.



BILL MAHLER



BILL MAHLER

Volunteers (above) wait to scoop up fish at Mirror Lake after Division of Fish, Game & Wildlife shock boat turns on the juice. A volunteer (at left) ferries a large carp to a new home.

Speakers Available on Endangered Species

Is your club, school or sportsmen's group interested in a qualified speaker on New Jersey's endangered wildlife?

The New Jersey Division of Fish, Game and Wildlife and the Friends of Endangered and Nongame Wildlife, Inc., a non-profit group, have organized a speakers bureau to help educate the public about the importance of protecting endangered species and supporting the state's tax checkoff for wildlife.

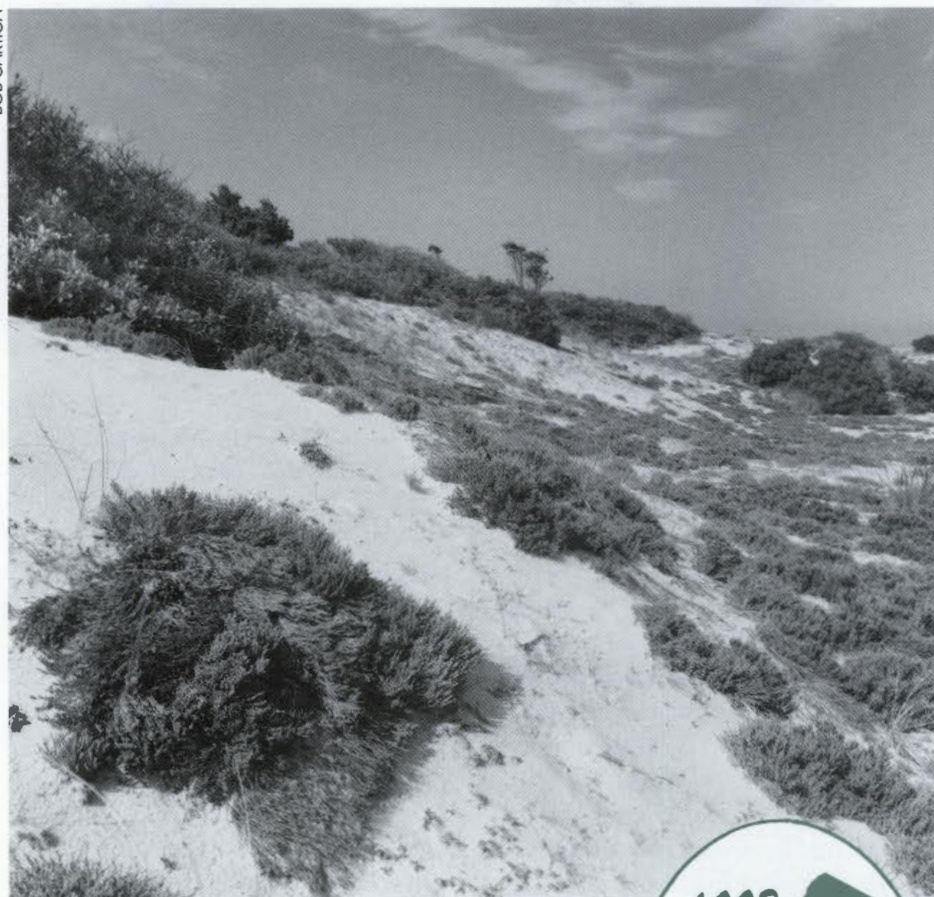
Wildlife Conservation Corps volunteers have been trained and are available to speak to sportsmen's groups, clubs, civic and service organizations and schools. If your group is interested in scheduling a speaker, please call Bill McDermott, coordinator of the speakers bureau, at (609) 628-2436 or (908) 735-8975. If you would like to become a member of the speakers bureau, write to Steve Toth, volunteer coordinator, Division of Fish, Game and Wildlife, Endangered Species Program, CN 400, Trenton 08625-0400.

Missing an Issue of New Jersey Outdoors?

Back issues of **New Jersey Outdoors**, when available, may be obtained at a discounted price of \$3. To order copies, call 1 (800) 645-0038.



BOB CARTICA



Dunes at Island Beach State Park.

Get Your State Park Pass — and Save

Now that spring's here, don't forget to purchase your 1993 State Park Pass. The pass costs \$35 and waives all parking fees at New Jersey parks. Parking costs generally range from \$4 to \$7, so the pass is a bargain for frequent visitors. New Jersey residents who are age 62 or older or are totally disabled may apply for passes without cost.

To obtain an application for a park pass, call or write any state park service location

or the Department of Environmental Protection and Energy, Division of Parks and Forestry, 501 East State Street, CN 404, Trenton 08625-0404, Attention: State Park Service. Or you can call (609) 292-2797.



Did You Know . . .

More than 98 million Americans participated in some wildlife-related activity in 1991, spending \$59.5 billion, or about 1 percent of the total Gross National Product.

— From the U.S. Fish and Wildlife Service's 1991 *National Survey of Fishing, Hunting and Wildlife-Associated Recreation*

Cutting the Grass Without the Gas

One hundred customers of Jersey Central Power & Light Company are trading their gasoline-powered lawn mowers for cordless electric models this spring as part of a national research program.

The program, called "Envirolawns," is being sponsored by the National Consortium for Emission Reduction in Lawn Care, made up of the federal Environmental Protection Agency, the Edison Electric Institute, the Electric Power Research Institute and 15 participating utilities throughout the country. The project will evaluate the best ways of reducing the uncontrolled release of emissions from power lawn equipment.

"An EPA study concluded that non-road engines, such as those found in lawn mowers and vehicles, are much larger contributors to ozone and carbon monoxide pollution than expected," says Eugene J. McCarthy, vice president of customer services and marketing for JCP&L. "Using a typical gasoline-powered lawn mower for one hour creates volatile organic compound emissions equivalent to driving an average car 50 miles and a new car 80 miles."

The cordless electric lawn mowers have many attractive qualities. They are quieter than typical gasoline-powered mowers, thereby decreasing noise pollution. Although fully recharging the battery takes 20 hours, the battery can be charged 75 percent to 80 percent in just three hours. A 10,000 square-foot lawn can be cut on one full charge.

JCP&L received nearly 3,700 responses to its advertisement of the program. The 100 winners of the free electric mowers were chosen by lottery and were required to trade in their old gasoline-powered mowers. The old mowers will be sent to the EPA for emissions testing. Winners of the cordless models will be asked to provide feedback about their performance.

JCP&L is the first utility in the state to participate in the national research effort.

Bookshelf

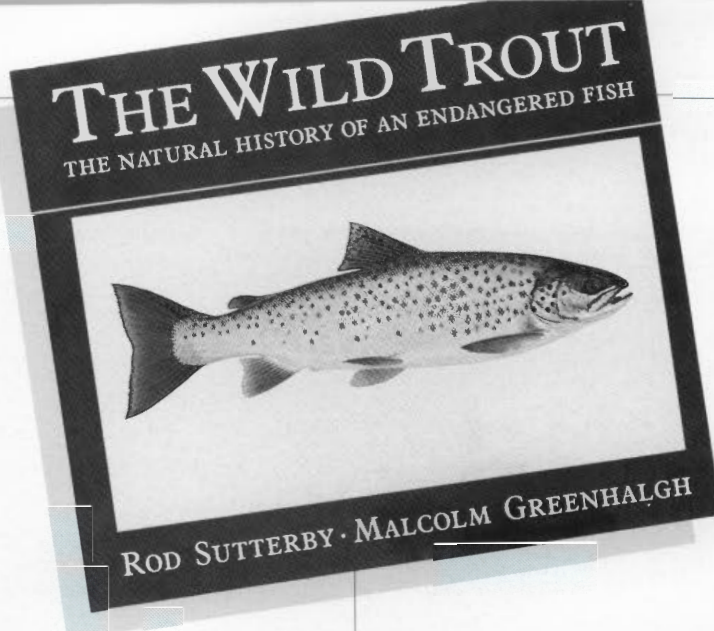
Building by the Book . . . Pattern-Book Architecture in N.J., by Robert P. Guster and Janet W. Foster, published by Rutgers University Press, explains and illustrates the rich pattern-book legacy that influenced architecture in New Jersey, from the colonial era to the advent of World War II. Cost is \$34.95 (hardcover). Available in bookstores. For more information, call toll-free: 1 (800) 446-9323.

Bridges to the Natural World, by Karl Anderson, Patricia F. Kane and Dale A. Rosselet, sponsored by the New Jersey Audubon Society, is a natural history guide for teachers of grades Pre-K through 6, that contains more than 60 lesson plans and activities that help children to learn and explore the beauty of New Jersey's outdoors. Cost is \$25 (paperback). For more information call the New Jersey Audubon Society at (908) 766-5787.

Extraordinary New Jersey, by Scott Barrow, published by Foremost Publishers, is a photo essay that explores the back roads and highways across the state, capturing New Jersey's familiar landscapes and natural habitats in new and unexpected ways. Cost is \$35. For more information, call Foremost Publishers toll-free at 1 (800) 999-1075.

Guide to the Jersey Shore . . . from Sandy Hook to Cape May, by Robert Santelli, published by the Globe Pequot Press, is a fun-packed guide for family day trips and vacations along each of New Jersey's nine district coastline areas. A colorful description of the local folklore and history of each district is included, as well as helpful restaurant and activity listings. Cost is \$11.95. Available at bookstores. For more information, call (203) 395-0440.

The Literature of Nature, by Robert J. Begiebing and Owen Grumbling, published by Plexus Publishing, Inc., is a comprehensive anthology of poems, short stories, essays and diary entries from 50 of the foremost British and American nature writers of the 19th and 20th centuries.



Cost is \$50 (hardcover) or \$35 (paperback). Available at bookstores. For more information, call Plexus Publishing at (609) 654-6500.

1992 Site Status Report, prepared by the Department of Environmental Protection and Energy's Site Remediation Program, contains information and descriptions of 638 environmentally contaminated sites in New Jersey where cleanup activities are being conducted or anticipated. The sites are listed by county and information on location, funding, type of contaminants, and the status of cleanup activities is included. Cost is \$55. For more information contact the New Jersey Department of Environmental Protection and Energy at (609) 777-1038.

Recipes from an Ecological Kitchen . . . Healthy Meals for You and the Planet, by Lorna J. Sass, published by William Morrow & Co., provides over 250 recipes for healthy alternatives to meat-centered diets, offering a practical solution for everyone who recognizes the value of a healthy diet, while caring for the environment. Cost is \$25 (hardcover). For more information call (413) 247-9325.

A Watershed Management Plan for Barnegat Bay, a report prepared by the Department of Environmental Protection and Energy, presents a plan to protect and preserve the Barnegat Bay watershed area, as presented to the State Legislature. Available free by contacting the New Jersey Department of Environmental Protection and Energy at (609) 292-2113.

The Wild Trout: The Natural History of an Endangered Fish, by Rod Sutterby and Malcolm Greenhalgh, published by Voyageur Press, describes the origins, evolution and natural history of the three species of trout and their varieties. More than 40 paintings, drawings and sketches of individual fish record the features of this endangered species, while a compelling case for their protection is made. Cost is \$40 (hardcover). To order, call toll-free: 1 (800) 888-9653.

Wildflower Handbook . . . A Resource for Native Plant Landscapes, by the National Wildlife Research Center, published by Voyageur Press, explains the different methods of landscaping with native plants, shrubs, grasses and trees on various scales, from home gardens to large natural areas. Native plant organizations, programs, and other information sources for each region of the country are also included. Cost is \$12.95 (paperback). To order, call toll-free: 1 (800) 888-9653.



Outings

ing equipment salvaged from the depths of the mine is displayed alongside many beautiful and unique minerals retrieved from the various levels of the famous deposit.

The Sterling Hill Museum exhibit hall is divided into several areas. One area focuses on Sterling Hill and one on the Franklin mine. Classic mineral specimens and fluorescent minerals exclusively from the area are displayed. Mining technology and minerals from other parts of the world are also shown, as well as ore cars from gold, silver, and zinc mines; specimens of gold, silver, and zinc ore; glacial erratics of pure copper from Michigan weighing 1,000 pounds each; and mining memorabilia from Sterling Hill and Franklin.

Another area features exhibits on loan from museums, historical societies, and private collectors. These exhibits will change periodically, making additional visits worthwhile.

Four kilometers to the north of Sterling Hill is the equally educational Franklin Mineral Museum. While Sterling Hill concentrates on the process and history of mining, Franklin focuses on minerals. In addition, the museum displays much of the history of Sterling Hill in the form of manuscripts, archives, letters, records, and photos.

Digging Up the Past

The earliest recorded years of this famous deposit shows a site largely neglected after initial interest by 17th century Dutch prospectors.

The ore outcrop of the Sterling Hill mine, carved clean by the last great glacier that inched through this valley, is visible for miles. Dutch prospectors, who easily found the deposit, thought they had found copper, since some of the ore was reddish-brown like cuprite, the oxide of copper. But after testing, they discovered that it was not copper after all. This ore was too complex for their early mining technology and they could not smelt it successfully.

They finally abandoned the outcrops, beginning decades of neglect for this mineral-rich deposit. It wasn't until 1774 that the owner of the mine, Lord Stirling (from the English spelling) made a serious at-

tempt to understand the complex ore.

He sent several tons to Europe for analysis, but it took several more decades for the true nature of the ore to be discovered. In 1810, Dr. Archibald Bruce published one of the first mineralogical papers in this country. It accurately described the red ore at Sterling as zincite, an oxide of zinc. By the end of the 19th century, production of zincite and its companion ores Franklinite and Willemite was accomplished on a profitable basis.

Although the Franklin mine was known for its high-quality zinc ore, this deposit has world-wide recognition for another reason: 325 mineral species, almost 10 percent of all minerals known, occur in this deposit. No other site has produced such a complex array of minerals.

Among the 82 chemical elements found in the ore body is Manganese, which, when found in trace amounts in minerals, causes them to light up with a brilliant fluorescence when exposed to ultraviolet light. Visible in daylight as dark bands plunging through white limestone, at night, when exposed to ultraviolet light, the outcropping mineral veins produce a rainbow of bright colors that blend into the

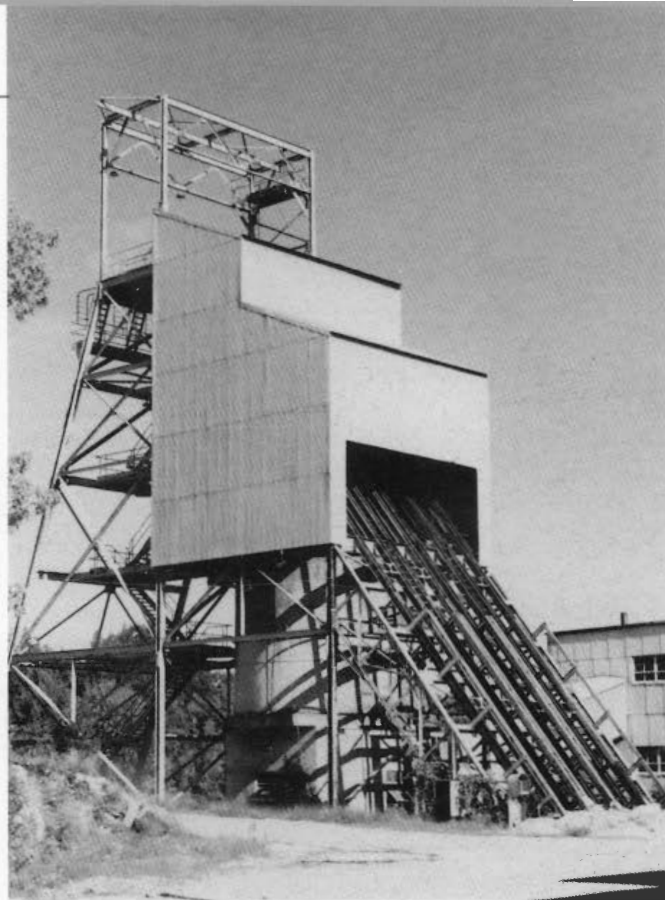
hill and out of sight. Deep in the perpetual darkness of the mine, the ultraviolet light shows the rainbow continuing its plunge.

From Excavation to Education

The Hauck brothers have succeeded in turning a working zinc mine into an educational mining museum and field laboratory for continued scientific research. Further acknowledgment of their achievements came in 1991 when the Sterling Hill Mining Museum became a National Historic Site.

The Sterling Hill Mining Museum, which operates as a non-profit foundation, caters to school science trips, professional geologists, or day trippers. Visitors from all continents have already toured the site since its opening in August 1990, demonstrating that it is a world class tourist attraction. The museum is located off Sussex County Route 517, north of Sparta. Take Interstate 80 to exit 34B for Sparta and follow Route 15 north of Sparta to Route 517. For information, call 201-209-7212.

Eva Young and Fred Young are amateur geologists and freelance writers. Fred Young lives near the Sterling Mine in Lafayette, Sussex County; Eva Young currently lives in Chapel Hill, NC.



BERNARD T. KOZYKOWSKI

The headframe at Sterling Hill where the ore was pulled out of the mine shaft.

Mining History at Sterling Hill

"You don't have to go to Colorado to see mining," says Dick Hauck, co-owner, with his brother Bob, of the Sterling Hill Mining Museum. "It's right here in Ogdensburg, New Jersey. The history, the geology, the mineralogy, all in a panorama of natural beauty. And you don't have to be a miner to experience mining at Sterling Hill."

History abounds at this Sussex County site, which was a source of iron before the American Revolution and was mined for zinc from the 1830s until the 1980s. In over a century and a half of operations, more than 12 million tons of zinc ore were extracted from the Sterling Hill Mine, and 22 million tons from the adjacent Franklin Mine, which taps the same deposit.

A Walking Tour

Dick Hauck begins the walking tour of the Sterling Mining Museum — and our introduction to the experience of mining — at the adit, or entrance to the mine, which, in the early years, connected to a network of nearly 55 miles of underground tunnels. Most of these tunnels are now inaccessible. Just inside the adit is the lamp room, carved out of limestone, where the miners picked up their battery-operated lamps and safety equipment and began their day's work.

Past the lamp room is the giant hoist and elevator that lowered the miners into the mine that, in some areas, reached depths 2,850 feet — more than half a mile — below the surface. To the left is another tunnel blasted out of solid limestone. Like the rest of the deposit, it was once eight to ten miles beneath the floor of a Precambrian ocean.

Continuing along the well-lit tunnel, the tour leads into a 10 foot high, 30 foot-long room which, Hauck explains, is the western extension of the ore body. Bright lights shine through the dull gray rocky room. The lights are turned off and after a few seconds of darkness, ultraviolet lights

are switched on. What had been gray seconds ago suddenly becomes brilliant bands of orange, red, blue, green, and violet, streaking down the walls and disappearing into the solid rock floor. This is one of the world's great natural wonders: fluorescent rock in a place where it was deposited eons ago in dimensions unmatched anywhere on earth. This is the Rainbow Room, the highlight of the mine tour.

There is as much beauty above the ground as there is below. Exiting the Rainbow Tunnel, the tour leaves the underground portion of the mine and looks over huge mine pits, known as the Passaic and Nobel pits. Tilting at a 55 degree angle and plunging into the hillside, ore outcrops in these ancient pits give silent testimony to the faulting and folding that occurred during the early formation of this deposit. Adjacent to the pits is a large, open field used for group outings and picnics.

The tour moves away from the pits and arrives at the nature trail. This trail is designed, as is all of the tour, to be wheelchair accessible and provides an attraction for people who want to see more than geology. The trail winds through a wide variety

of trees and plants common to limestone soils. Several wooden ties used by mule-drawn ore cars are still in place on this, the state's earliest mine road, Hauck says.

While excavating another area of the property during early site preparation, Hauck came across an old foundation. Complete excavation uncovered the basement of an old mill.

"It was like the feeling of opening King Tut's Tomb," he says.

Hauck discovered underground rooms measuring 77 feet long and 16 feet wide. In these rooms, miners would pick up their equipment and their blasting caps in preparation for the day's work.

The tour continues to one of the older buildings on the property, which contains the "change house" for the workers. When the mine was in full production, 500 people were employed there. Wire baskets, used by the miners to hold clothes soaked by a shift's work underground, still hang from the ceiling. The change room is also where the museum's exhibits are featured.

A Lode of Exhibits

The exhibit room was designed by Al Jahle of Langhorne, Pennsylvania, creator of exhibits for such other institutions as the Franklin Institute in Philadelphia. Old min-

The Sterling Hill exhibit hall in the miners' change house.



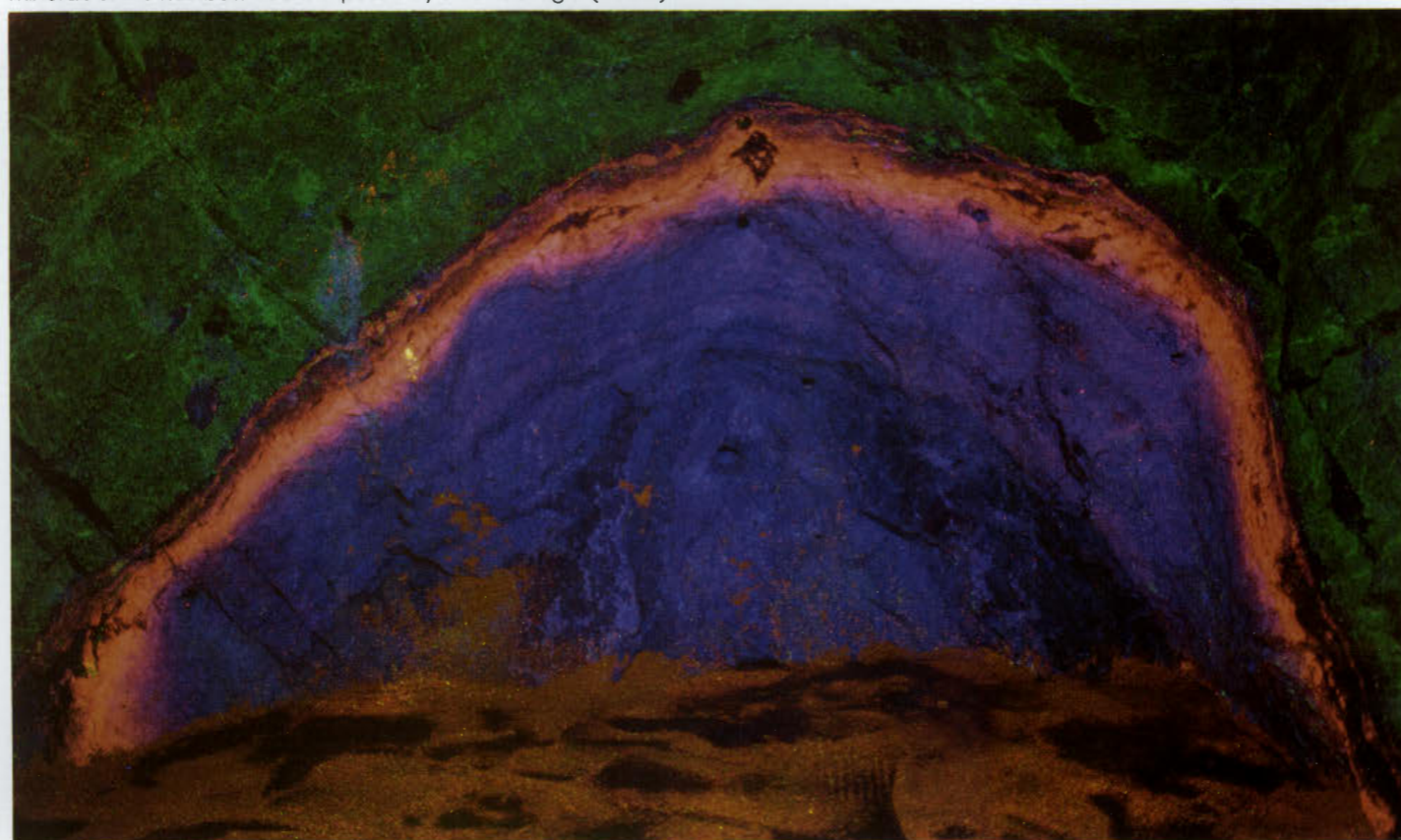
BERNARD T. KOZYKOWSKI

Outings



RALPH THOMAS

Sterling Hill's "Rainbow Room," with the dark band of zinc ore seen in visible light (above). The minerals of the Rainbow Room exposed by ultraviolet light (below).



RALPH THOMAS

The Rope Starts Here

Cradlerock's programs can range from one to five days at a cost of \$125 to \$200 a day per person. Like most adventure-based training companies, Cradlerock also arranges programs in sailing, orienteering, cross-country skiing, camping and rock climbing. Cradlerock is headquartered in Princeton, and can be contacted by calling (609) 924-2919.

The Adventure Network is located in Chalfont, Pa. Its corporate program is called the

Corporate Ladder, but it also has a clinical program for substance abusers called Adventures in Sobriety, and a joint venture with Cradlerock called Tools for Change, which offers outdoor experiences and structured group therapy. For information, call (800) 398-3451 or (215) 997-7727.

Outward Bound has a center in New York City. It has two corporate programs — one that runs one to three days and another that runs four to nine days. Its wilderness experiences can range from white water rafting to desert trekking to dog sledding.



CRADLEROCK OUTDOOR NETWORK, INC.

Corporate programs cost \$150 to \$300 a day plus expenses. They can be reached at (212) 608-8899.

Participants learning how to achieve group solutions by passing team members through a rope "spider web."

Adventure-based Training — From Boot Camp to Board Room

Adventure-based training has its roots in military obstacle courses used in basic training. According to David Pastorok, who runs the Adventure Network out of Chalfont, Pa., and often works with New Jersey corporations, the French navy in the late 1800s used rope courses for conditioning.

Today's adventure-based companies trace their beginnings to Outward Bound, which got its start in England during World War II.

When the Blue Funnel Shipping Line began losing ships and sailors to German submarines, it asked Kurt Hahn, an educator, to teach the seamen survival skills. Hahn had created the Gordonstoun School in Scot-

land, which used outdoor experiences to help develop students. Hahn devised a month-long outdoor program in survival and marine skills and called it Outward Bound, a nautical term used to describe the moment a ship leaves safe harbor and faces the challenges of the open ocean. It was very successful and sailor survival rates improved dramatically.

This kind of training came to the United States during the Depression when the Civilian Conservation Corps, which put unemployed people to work, adopted Hahn's model.

In the 1960s, an Outward Bound School was formed in Colorado. "The original programs provided expeditions for young boys, often in trouble, that lasted for several

months," said Linda Booth, director of marketing and professional development programs for the New York City Outward Bound Center.

Since that time, the industry has seen steady growth with more than 100 training organizations offering adventure-based training today. In fact, according to the Association of Experiential Education, a professional, non-profit association for adventure-based training companies, its membership has risen 53 percent since 1988.

Most companies offer two types of outdoor experiences:

❑ Wilderness programs, where participants camp outdoors and engage in such activities as cliff climbing, white-water rafting and sailing.

❑ Challenge courses of high and low ropes.

In the 1970s, corporations discovered adventure-based training, and today, according to a survey published in *Training and Development* magazine, 13 percent of training directors surveyed reported their organizations currently use some form of outdoor-based training.

Christopher Roland of Roland/Diamond Associates, Inc., who tracks the industry and is one of the authors of the survey, estimates that adventure-based training is more than a \$100 million a year industry. Many former military recruits might today marvel at the fact that the rigors of basic training they endured have evolved into a growth industry.

known in the industry as a "ropes course," with a high and low section. The low course is a series of group activities and exercises, none above eye level, that require teamwork, creativity, and some balance, agility and coordination. Cradlerock employees create story lines with these exercises that feature titles like the Alligator Pit and the Spider Web. The high ropes course is more of a personal challenge for participants, who get to test their nerve on a series of obstacles strung in the treetops.

An invitational day for companies interested in seeing what adventure-based training is all about attracts a diverse group of people. Industrial firefighters, a medical administrator, corporate trainers and business executives gather around a campfire for breakfast of bagels, juice and coffee. Cradlerock's George Chewning, the lead trainer for the day, explains what they can expect.

"We want you to be safe," says Chewning. "We want you to have fun, but we want you to be thinking about adventure."

They are to try out new behaviors and ideas in this outdoor laboratory. "Whatever process you use here in the woods is pretty much the same process you will use in the office," he says.

After warm-up exercises, it's off to the low ropes course. There are trust falls, where each member of a team falls into the arms of team-

mates. There is a commitment bridge, where two people stand face to face, palm to palm, on parallel wires that widen further and further apart. Supporting each other, they must see how far they can go without falling.

A third exercise is the spider's web, a giant cat's cradle of thin bungee cord strung between two trees. Against a time limit, a team must pass through the web's holes without touching the cord. Once a hole is used, it cannot be used again.

After each activity, Cradlerock trainers analyze what went on and ask for comments from team members.

One participant is Terry Senk, president of Emergency Response Training Associates, a Flemington firm that trains corporate and industrial firefighters and emergency response teams. She has brought industrial firefighters from Merck, the giant pharmaceutical corporation.

"We're hoping to learn ways to cooperate in training rather than intimidating people by it," says Senk. "We want to build teamwork and learn how to support each other. And this is so much fun. If you can get people to have fun, they let down a lot of image and ego."

After lunch, the participants tackle the high ropes course. "We want you to try to take it a step further than you'd thought you would go," Elmer says.

Participants are harnessed and given hard hats as they learn about such climbing gear as carabiners, pear links and squeeze checks. Encouraged to try whatever they are comfortable doing, it is surprising how quickly people want to see just how far they can push themselves.

But is adventure-based training really applicable to the everyday business jungle? It does have its detractors, who say it is not really effective and can be dangerous. But, most who go through the training can only sing its praises.

"I'm in the hospitality business," says Darlene Duttry, director of sales for the Chauncey Conference Center, which arranges meetings and conferences for corporations in the tri-state area. "It is a service industry and there is a great deal of interaction between departments. If our people take this training, it will strengthen the teamwork — the end goal being better service to our clients."

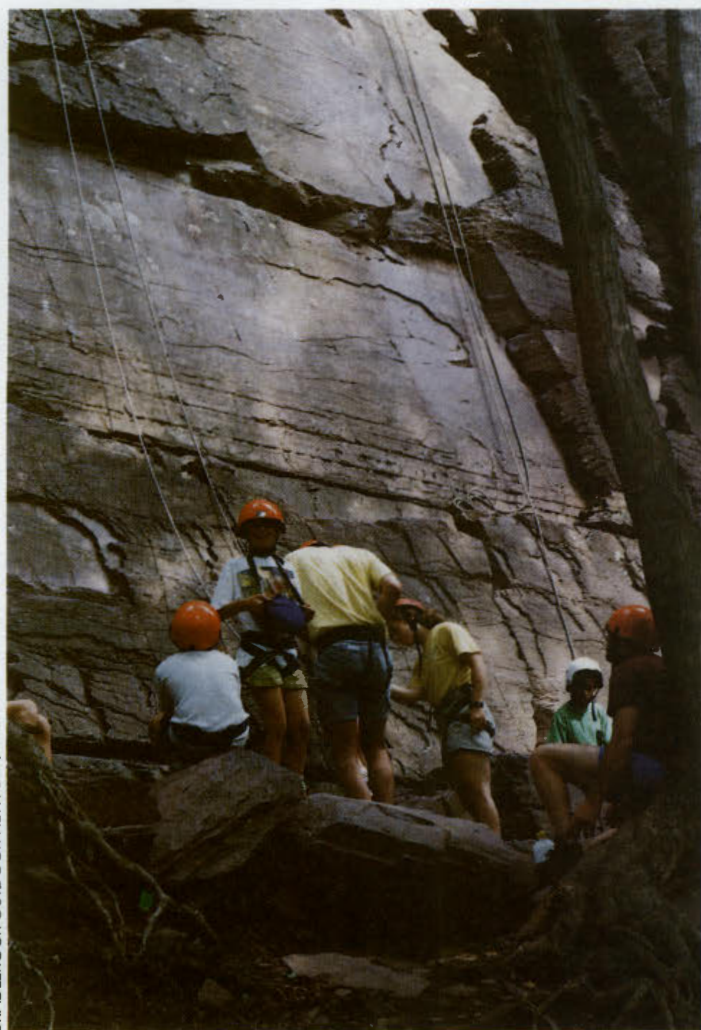
"The environment is exciting, and they don't have you dealing with just common problems," says Jeff Tener, who manages Hanks' American Express Travel Services office. "They put you through things that really are out of your scope and it challenges you more. The activities really made us work together."

For Hanks, back on the ground and her heart beating normally again, it was a worthwhile experience.

"It really pushed me," she says. "I need to be more independent, so this was a good challenge for me — although it was a real Maalox moment."

Cradlerock participants learn rock climbing and rappelling techniques on cliffs in Bucks County, PA.

Tom McDonough is a freelance writer who lives in North Bergen.



CRADLEROCK OUTDOOR NETWORK, INC.

Tired of the Corporate Ladder? Go Climb a Rope

by Tom McDonough

Elizabeth Hanks' heart is pounding as she balances herself on the slender rope, strung between two trees, some 50 feet above leaf-covered forest floor. She is to tightrope walk the line to a platform, where a rope bridge waits to take her to third tree, so she can be hooked to a pulley and cable and "zipped" back to the forest floor below.

Hanks is training for her job as an in-house American Express Travel Services meeting planner for Rhone-Poulenc Rorer, the pharmaceutical company that manufactures Maalox. However, this is far removed from the normal seminars she might have expected to attend. Hanks is one of 40 businesspeople who are taking part in a day-long, adventure-based training session in the woods outside of Lawrenceville, New Jersey.

Adventure-based training has become very popular in recent years. Corporations, schools and programs dealing with troubled youths and substance abusers have turned to this type of training as an alternative to traditional teaching and rehabilitation methods.

Companies use adventure-based training because, faced with increasing competition and the need to be more productive, they are seeking ways to make employees more creative, better at solving problems and more team oriented.

The wilderness is the ideal classroom to teach concepts such as teamwork and problem solving, say adventure-based training companies, because it is learning by doing and requires both the mind and the body.

"And learning happens best when the mind and body are engaged," says Linda Booth of Outward Bound, the organization that started outdoor training some 25 years ago in England. It is now the largest non-profit adventure education organization in the world, with schools in 17 countries.

Hanks is receiving her training at Cradlerock Outdoor Network, Inc., a New Jersey-based, full-service adventure training firm and a leader in building outdoor challenge courses in the United States, Great Britain and Canada.

"We're dedicated to facilitating safe, stimulating outdoor experiences that combine an understanding of the natural world with an appreciation of each individual's connection to it," says Warren Elmer, who founded Cradlerock in 1984. "It's about promoting cooperation, confidence and creative approaches to work and life."

Cradlerock's challenge course in Lawrenceville is what is commonly



A corporate training participant tackles an inclined log exercise.

TOM McDONOUGH

were already dead when they washed ashore, while others were either too ill or too badly injured to be treated. The center's figures for 1992, for example, show a total of 114 strandings. Of these, 42 were cetaceans (porpoises, dolphins or whales) and only four came in alive. Of these four, none survived. Seals fared better. Almost two-thirds of the 21 seals of different species that became stranded in 1992 recovered. Of the 51 turtles that became stranded, 13 were alive and ultimately released.

The causes of strandings vary. Accidental netting by commercial fishing operations causes some injuries, Schoelkopf says. But the MMSC also treats animals that have collided with boats and ships, been cut by boat propellers, been hurt on the water intake of a nuclear power plant, and attacked by sharks. Sometimes an animal is ill and becomes disoriented because of parasites in its skull or intestines or because it has liver problems.

Ocean pollution also plays a definite role in strandings. Unsuspecting marine mammals will ingest man-made items such as latex, plastic fast food wrappers and plastic straws. Some animals become entangled in polypropylene and monofilament lines, floats, steel leaders, and plastic six pack rings. (For a related article see "Explorer," page 58.)

Other common causes include injuries, illnesses such as pneumonia and simple inexperience. But the most common cause of death is not ocean pollution, but old age.

On the other end of the age spectrum, inexperienced young animals, such as dolphins, can become lost, not necessarily because their sonar capabilities are disrupted but because they may be too young to have learned how to use their homing skills yet.

When asked whether the animals in the MMSC's care know

Loggerhead sea turtle being taken from stranding center pool to be released in ocean.



MICHAEL BAYTCH

on some intuitive level that the staff is trying to help them, Schoelkopf reveals an unexpected trait in seals that runs counter to their often comic image from circuses and animal shows: they bite and are ill-tempered. "Most seals are normally nasty," he says. "Maybe they have good reasons to be. While here at the center, they hold their own. They usually recognize the feeder."

Other animals are friendlier. "Dolphins are more accepting of people," Schoelkopf says. "They make the best of it. When they recognize certain people, they show playful signs, like a tail slap, or they might hold your hand in their mouths."

Most of the strandlings that come to the MMSC are released into the wild. If possible, the staff tries to release them in the geographical area in which they would normally be found. They are not automatically returned to the site of their original strandings. In special cases, an animal is sent to another facility for further rehabilitation or a permanent home. But finding such a place is one of the most frustrating aspects of the center's work.

Schoelkopf and Dean have discovered that many aquariums don't like to take strandlings because they're afraid of infecting their own stock. Dean says the center might be forced to destroy more animals because the federal government does not offer assistance in marine animal placement.

The financial resources available to Schoelkopf and Dean are precarious. Just as there are no guarantees that a stranded animal will ever be released back in the wild, Schoelkopf and Dean never know from year to year how much money will go into making up the center's operating budget, which is based on private donations, gift shop sales, membership fees, and educational programs. Nor do they know how many animals they will have, or how many laboratory tests will be needed. In 1991, for example, the center's overall budget was approximately \$300,000. Nearly half this amount went directly to pay for rescuing and treating the 112 stranded animals the center recorded that year. This year, for the first time, the MMSC received a \$15,000 grant from the New Jersey-based Geraldine R. Dodge Foundation. The center receives no money from the state or federal government.

"Sometimes we're ahead, sometimes we're behind," Dean notes.

Before he goes off to hand-feed the harbor seal which is waiting for him, Bob Schoelkopf wants to leave a message for the residents of New Jersey and tourists who visit the shore during the summer: "When you come to the seashore, you are in the animals' backyard. Don't dump your used motor oil into the water or throw your trash around. Realize what is underneath the water's surface. The animals in our waters are a barometer of the ocean and the ir he alth can be a barometer of the environmental choices we make each day."

For more information on the Marine Mammal Stranding Center, call 609-266-0538.

Larisa K  n   is a freelance writer who lives in Princeton. She became a member of the MMSC after conducting interviews for this article.

volunteer who served as a hospital corpsman with a Marine reconnaissance team, and a dolphin trainer in Atlantic City, Schoelkopf's decision in 1976 to work with strandings evolved from a realization that there wasn't much he could do for captive marine animals. But he could help the ones still out in the wild — by giving them a second chance.

Schoelkopf and Dean created the original MMSC in an old fishing shack at Gardiners Basin. Operations were moved to Brigantine in 1983.

The MMSC responds to each and every reported stranding, but it is set up only for short-term care. A network of nearly 600 volunteers statewide provides information on strandings. Only three paid staff members minister to the animals, augmented by a paid support staff of three and roughly two dozen volunteers who work on a rotating basis at the center. With such a small crew, paid staff will often put in a full day and then work overtime without pay with the volunteers. When asked if there is a typical day at the center, they answer in unison: "There is no such thing." There is no nine to five and there is no time off for weekends or holidays, which is when the center really gets busy, they say.

Dean, a native of Ocean City and a former marine mammal trainer in her own right, is very protective of the animals at the center. She still marvels at the insensitivity demonstrated by certain visitors to the center, adults and children alike.

"People think that this is a petting zoo," she says while on her way to check on a recently rescued, emaciated, four or five-week-old male harbor seal. "They don't care if the animal is sick. Sometimes kids throw stones at the animals."

A juvenile hooded seal in a holding room before being transferred to a pool.



MICHAEL BAYTOFF



MICHAEL BAYTOFF

Dean, Schoelkopf and Bob Schoelkopf Jr. rescuing a dolphin on the beach in Brigantine.

The seal is resting in a caged and glassed-in section of the small compound. He has long, quill-like whiskers around his snout. His dime-thin nostrils open and close rhythmically as he slowly blinks his shining dark eyes, wondering at all the attention.

The technical procedures undertaken when a marine animal arrives at the center depend upon the species and the problems involved. In the case of the recently rescued harbor seal, Schoelkopf and Dean brought it to the MMSC in the center's animal ambulance and administered first aid, fluids, food and medication before placing the animal on an hour-by-hour "watch." To make the best use of their limited resources, the center does not go out for a rescue unless the stranding is confirmed through the police or the MMSC's volunteer network.

While not permanent residents of New Jersey waters, seals, dolphins, porpoises, sea turtles and whales are migratory natives, like eagles and ospreys, according to Schoelkopf. In 1976, there were five strandings reported to the then-New Jersey Department of Environmental Protection. Since that year, the MMSC has responded to 990 strandings. Contrary to many people's impressions, the majority of these 990 animals did not survive. Many

Keepers of the Sea's Lost Souls

by Larisa Káné

A rare striped dolphin in the MMSC's outdoor pool. After being rehabilitated and transferred to a Miami aquarium, the dolphin died suddenly and unexpectedly.

"We have to yell and scream to get some of our animals to go back into the water," says Bob Schoelkopf, founder and director of the Marine Mammal Stranding Center (MMSC) in Brigantine. It is no wonder. After only a short stay at the center under the care of a group of unique surrogate parents, the animals know a good thing.

Since 1978, the splendid remoteness of Brigantine Island — with its heart-stopping displays of migratory birds — has provided the backdrop for the MMSC, a private, nonprofit organization founded primarily to rehabilitate and release stranded marine animals. Its stock-in-trade is rescuing and rehabilitating injured, sick, lost, or otherwise stressed or incapacitated seals, dolphins, porpoises, whales and turtles. The center also helps determine what causes the deaths of stranded marine animals and works to educate the public about dangers to sea mammals. It is the only center of its kind in New Jersey that is licensed by both the state and the federal government to do such work.

The MMSC was the first marine mammal stranding operation in the United States to have a paid, full-time staff on call 24 hours a day. It has the only internal monitoring network of its kind in the world: a closed-circuit television system with each individual screen divided

into four sections, enabling the staff to watch the animals in its care at all times.

Schoelkopf and his wife, Sheila Dean, the center's co-director, do not have stars in their eyes. While they are compassionate animal lovers, they do not allow either sentiment or expediency to interfere with their judgment as to what is best in a natural context for each "stranding" that comes to the center.

When well-meaning bystanders see a dead marine animal washed up on a beach, they often express how sad a situation it is. But it's not necessarily sad, if natural causes are involved.

"The sad part is when you see a turtle whose shell has been cut right through by a propeller, or you learn that two baby dolphins — newborns — have been hit by boats, or you find a seal with a noose around its neck or buckshot in its face," Schoelkopf says. "The hardest thing is to play God. Should it live or should it die?"

After a career including work as a nature and conservation teacher at a Boy Scout camp, an animal trapper for the Pennsylvania State Game Commission, a Navy combat diver, a Vietnam



Bob Schoelkopf and Sheila Dean.

MICHAEL BAYTOFF



water per minute. Remaining at a temperature of 52 degrees Fahrenheit year round and capable of maintaining a continuous flow, the water supply at Pequest is a critical factor in enabling the facility to produce quality trout for New Jersey year after year.

Between 1984 and 1992, a total of 6,550,800 trout have been stocked from the Pequest hatchery. In 1987, a limited fall trout stocking program was initiated. This program allows the Division of Fish, Game and Wildlife to offer catchable size trout in the fall, which gives anglers the opportunity to enjoy their sport amidst the fall colors.

The success of the first 10 years of production can be attributed to the anglers of the state who purchase fishing licenses and trout stamps. Operating without funds from the state treasury, all stocking programs of the Division of Fish, Game and Wildlife are dependent on the revenue from license sales and the federal excise taxes on fishing equipment. It is truly a "user-pays" system. The sportsmen and women of New Jersey have always been supportive of the division's programs, and the division, in turn, strives to provide the maximum possible opportunities for recreation.

In addition to recreation, the state's 225,000 licensed trout anglers — plus another 100,000 anglers under age 14 or over age 70 not required to have licenses — also help support New Jersey's businesses. They contribute an estimated \$35 million to the state economy each year. That pays for a lot of tackle, bait, clothing, equipment, food and lodging.

So what about the trophy trout you caught? Whether broodstock from Pequest, a tough survivor from a stocking of production trout, or a naturally produced offspring of a "native," chances are the Division of Fish, Game and Wildlife had a hand in nurturing whatever's at the end of your line.

Whether you prefer fishing as a solo pursuit along a quiet stretch of water or as a family pastime at your favorite spot with a picnic lunch, remember that the division is doing its part to help you be successful. Enjoy the outdoors as you try to land a big one, and take pride that a state as densely populated as New Jersey offers some of the best fishing around.

Brook trout in Pequest raceways prior to release in the state's streams and lakes.

Jeff Matthews is superintendent of the Pequest Trout Hatchery and has been a Division of Fish, Game and Wildlife staff member for 16 years

Paul Tarlowe is a Wildlife Education Specialist for the division based at Pequest



A



B



C



D

from the trout. This is accomplished by a process known as "stripping." Stripping is manually applying pressure to the trout's abdomen, forcing females to expel their eggs and males to expel milt, the fluid containing the sperm. Eggs and milt are mixed in plastic basins to achieve fertilization. The fertilized eggs are placed in incubators where running water supplies them with oxygen until hatching in 28 to 35 days.

Upon hatching, the young trout are called "sac-fry," so named because the yolk sac remains attached to the trout's abdomen. The sac-fry are taken from the incubators and placed in fiberglass tanks in the main portion of the nursery. The yolk sac nourishes the young fish for about two weeks. Once the yolk sac is absorbed, the fry are able to swim and will be supplied with special fish food up to eight times a day by automatic feeders suspended over each tank.

In the spring after a three month growing period, the three to four inch "fingerlings" are sorted by size and moved to the outside raceways. There a specialized feeding truck distributes pellet-sized food four times a day to each 100-foot section of the raceway. Each of these sections contains 12,500 to 15,000 of either brook, brown or rainbow trout.

After the summer growing period, the fish are again sorted by size. They are fed food in amounts calibrated to make the trout obtain an average 10.5 inches by the spring stocking season. In mid-March, prior to opening day, the hatchery trucks begin rolling, stocking the lakes and streams of New Jersey with quality trout for angler recreation. Also during this stocking season, excess and spent broodstock are liberated with the production stock. The broodstock range from 15 to 23 inches and weigh on average three to eight pounds. These trophy-size fish provide for some real excitement when you find one on the end of your line.


New Jersey anglers have become accustomed to quality brook, brown, and rainbow trout thanks to modern technology and the hatchery's high-quality water supply. The hatchery utilizes six artesian production wells in the Pequest Valley to supply up to 7,000 gallons of

A. Stripping eggs from an adult female rainbow trout.

B. Trout in the sac-fry stage, the first stage after developing from eggs.

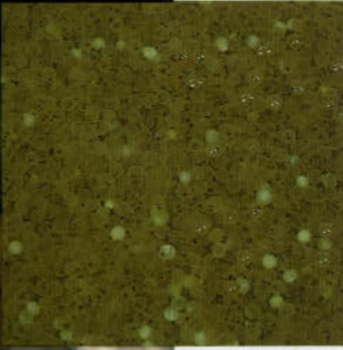
C. Dead sac-fry are separated and discarded.

D. The raceways at Pequest where trout are held by species until stocking.



A lone fly fisherman tries his luck
at the Ken Lockwood Gorge
on the South Branch of the
Raritan, Hunterdon County.

Fertilized Trout Eggs (below).



Nature, Nurture and the Origins of New Jersey Trout

by Jeff Matthews and Paul Tarlowe

Have you ever wondered about the trophy-size fish you or a family member might reel in during trout season? Was it born in the water in which you might catch it? Or was it a hatchery fish that had survived for years in the wild? Or could it perhaps be one of the "broodstock" fish you may have heard about?

Unless it is a colorful brook trout in one of the state's wild trout waters, there's a good chance the fish that ends up on your line had its start at the Pequest Trout Hatchery and Natural Resource Education Center in Warren County. While some waters support reproducing populations of wild trout, the majority of trout caught by anglers in New Jersey are raised by the New Jersey Division of Fish, Game and Wildlife's Bureau of Freshwater Fisheries at Pequest.

Over the past 10 years, Pequest has earned a reputation as one of the finest trout hatcheries in the nation. This did not come about by accident. Having a reliable water supply, using the latest in trout culture technology and following stringent disease-prevention guidelines enable the staff at Pequest to reach production objectives every year.

The story of trout at Pequest began in the fall of 1982 when the first disease-free eggs arrived at the facility. A total of 560,000 rainbow trout eggs came from the federal hatchery at White Sulphur Springs, West Virginia. An additional 680,000 brook trout and 610,000 brown trout eggs were obtained from the North Attleboro National Fish Hatchery in Massachusetts. After hatching and a 17-month growing period through the spring of 1984, the first trout were released in New Jersey lakes and streams from the new facility. Also from this first hatch came broodstock to provide future supplies of eggs and sperm. Today a quality broodstock population is maintained as the hatchery's own egg source.

Each year a production cycle begins in early fall when the staff collects and fertilizes eggs







Great and snowy egrets sharing a peaceful habitat.

Yellow crown night heron (right)

A pair of northern harriers on the ground near a piece of driftwood (opposite page).

Photographer Rich King of Toms River began using a camera to document his surroundings while fishing. He has worked intensively to capture the wildlife of Island Beach on film since the mid-1980s.





Black-crowned night
heron (above)

Red fox (opposite page)

Green back heron (right)







Island Beach State Park's dunes and beach provide a habitat for diverse wildlife.

Diamondback terrapins (left).

Another World Just Behind the Dunes

At Island Beach State Park in Ocean County, a whole world exists beyond the shore front that lures thousands of visitors each summer. Salt marshes protected by primary and secondary dunes provide a varied habitat for many permanent and seasonal residents, some of which are pictured on these pages. Island Beach's 10-mile-long shoreline survives as one of the few remaining barrier island ecosystems in the densely populated northeast. Despite its immediate protection by the state, even distant development can upset the balance of this natural habitat and threaten its wildlife inhabitants. "Shouldn't their habitat have as much right to exist as ours?" asks photographer Rich King. We hope the images here begin to provide an answer.



Nineteenth century lunch pails and coat pegs in the foyer of the Millbrook School, Delaware Water Gap National Recreation Area.

relocating the school. It was later moved to a site on municipal land adjoining the library and senior citizen center. Subsequently, Michael Reger Jr., a local Boy Scout, became interested in the school and adopted it as an Eagle Scout project. Along with other scouts and volunteers he recruited, Reger spent many weekends scraping and repainting the exterior, repairing broken windows and woodwork and landscaping around the building.

A few preservation efforts have been well-planned. In Newark, in 1938, with the help of the Works Progress Administration, a 1784 stone schoolhouse from the Lyons Farm was moved to the garden of the Newark Museum where it was preserved and furnished to replicate the late 1700s and early 1800s. Originally, Lyons Farm was three miles from the small settlement of Newark, but the town expanded to include the school's original site, qualifying the schoolhouse as the oldest remaining Newark school.

Still other schools, like the Forked River school, have been preserved but are subjects of ongoing struggle to find funds and support for necessary upkeep. The school was built in 1860. In 1884, a second room was added, giving it the form it retains today.

Those who work at saving one-room schools fear the natural amnesia that attends their disappearance from the landscape.

"We have whole generations of people growing up who have no idea what an inkwell is, or what pens that had to be dipped were like," says Martha Smith, one of the authors of *Chickaree in the Wall* (Ocean County Historical Society, 1987), a history of one-room schools in Ocean County. Smith, and her co-authors, Carolyn M. Campbell and M. Peryl King, saw writing their book as a way to share information about the "colorful era of the one-room school, the foundation of our present educational system." The book contains what the writers believe is the only complete county-wide inventory of New Jersey's one-room schools — both existing and vanished. The authors hope that the list of existing buildings can spur their current owners to consider preserving them.

"I guess it all depends on how you view history to begin with,"

One-room School Lessons for Today

Educators today recognize that many lessons taught by the one-room schoolhouse are still worth learning, says Dr. Tynette Hills, coordinator of the Office of Early Childhood Education for the New Jersey State Department of Educa-

tion. Hills says that teaching with a thematic approach — as Julia Weber Gordon did with newspapers (see article) — has been adopted in classrooms, whole grades and even entire schools. Thematic learning provides several advantages, Hills says, because it supplies a context for meaning and fosters a multi-discipline approach.

"Learning doesn't take place in isolation," she says. "Children don't just learn math

when they study math or just reading when they study reading. People make a mistake when they think children are only learning one thing at a time."

There's also considerable evidence to support the effectiveness of a process that took place in one-room schools that today is termed "cooperative learning." Cooperative learning was common in many multiple-grade one-room schools where children often

taught — and learned from — each other while the teacher was occupied with others.

"Researchers have found that when older children help more novice learners, or children of the same age help each other, it can boost learning," Hills says. "That's because the process takes into account the fact that not all children learn in the same way or at the same rate."



PRISCILLA E. HAYES

says Medford's Barbara Crankshaw. "Since I love history so much, I try very hard to teach children what's inspired me: that history is people and that people don't change." She warns of the consequences of destroying such authentic examples of history like one-room schoolhouses: "If we demolish our past history, we have no idea where our roots are — and plants cannot grow without roots. You can't go to the future unless you know where you've been."

Priscilla E. Hayes is a freelance writer from Robbinsville.



also provided firewood or coal for heating, as well as schoolbooks and supplies. Teachers, often little older than their charges, boarded with local families. Student attendance varied according to weather, distance of the home from the school and whether the child was needed for extra labor at home or on the farm on any given day.

Over time, better transportation and changing attitudes about education led to closing the hundreds of one-room schools in New Jersey. Gordon's Franklin Grove school was one of the last in New Jersey and her published diary notes that the community, when faced with the choice between sending students to their little school or a centralized school, opted for the former. But, in the end, the school closed as the community, which Foley remembers as "nothing but bears and wildcats," was swallowed up by the growing suburbia of Hardwick Township. Before beginning his own career as a teacher, Foley actually helped remodel the one-room schoolhouse he had attended into a summer home.

Rescuing a Vanishing Past

Many of these schoolhouses have not even survived as homes, but have been demolished to make room for something else. Some have even been destroyed by natural forces. Such was the case with Sea Haven, built on Tuckers Island in 1895. Tuckers Island, which was located at the southernmost end of Long Beach Island, opposite Tuckerton on the mainland, was a summer resort and year-round home to Life Saving Service personnel and their children. In the 1930s, the Sea Haven school was washed away by a storm. Subsequent storms gradually destroyed the island, which entirely disappeared by 1955.

Union School #45, Washington Township, Mercer County, being moved to municipal property. The rescued school #45 (bottom left) at its final resting place.

But across the state, a few one-room schoolhouses have survived, either by luck, or through the struggle of individuals who believe they still can teach us vital lessons about the past.

One such person is Barbara Crankshaw of the Medford Historical Society. Each year, Crankshaw participates in a program that brings students to visit the former Cross Keys school, a one-room school that was saved, moved and restored when a fast food restaurant threatened its former site.

"I come in period attire, dressed like a 19th century school teacher," Crankshaw says. "We raise a U.S. flag that has 37 stars and introduce the students to the 19th century by way of 1857, the year the schoolhouse was built. We point out to them what was going on in the history of the world at that time, things that the children would have experienced in the school themselves. Then, after the presentation inside, we take them outside to experience a 19th century recess, with hoop games and all kinds of activities the kids would have taken part in around 1857."

Crankshaw gets lots of letters back from the children that demonstrate her program succeeds in showing that history is more than a dry collection of dates and snippets of information.

"It's always fascinating to them that some kid could get along just fine without a VCR and without a Nintendo and it amazes them that the simple little things that the children played with are still fun now," Crankshaw observes.

Crankshaw also points out things that happened in the mid-1850s that still affect the children's lives today, like the discovery of oil. She points out how oil has changed the way we travel and even the clothes we wear — through the development of petroleum-based fabrics such as polyester. The children get a better sense of historical relationships as a "chain" of events, with one link leading to the next and the next, down the timeline.

Millbrook School, a one-room schoolhouse in the Delaware Water Gap National Recreation Area, is part of a whole village designed to give children — and adults — the same kind of living history lessons about the 1870s. The tiny schoolhouse was moved down the hill by villagers in 1868 when the basement threatened to collapse and it remains on the site where it stood for decades while the village was still bustling. The staff of the Recreation Area and a private group, the Millbrook Village Society, make the building available for school groups and on special occasions. Visiting the school provides a vivid picture of what attending a 19th century school was like.

Saving the Millbrook school happened somewhat by chance, a fortunate by-product of the development of the surrounding recreation area. Other schools have been saved by even more unusual strokes of luck. In Washington Township, Mercer County, Union School #45, one of several original one-room schoolhouses in the township, was to be demolished for construction of Interstate 195. One of the school's former students, Russell Hulse, could not bear to see it destroyed. The school was where he'd met Maud Scudder who became his wife. Hulse donated an acre of his family farm for

This student-produced work contained chapters on such topics as "Inventing the Alphabet" and "Books in the Middle Ages."

Gordon let her imagination loose to challenge her charges. She took students — many of whom had not been out of the township — on field trips to museums and the shore. She also emphasized art, music, drama and culture in other ways.

Former student John Biddle Foley says, "Some of the kids used to come to school in hip boots. It was a pretty rural operation. Our school board in Hardwick felt it had met their educational obligations to the school if they made sure the flagpole was painted and the floor was oiled — to lay the dust, I guess." But Gordon had other ideas. Foley describes how they used to run a wire across the front of the single classroom and hang a sheet on it to create a "stage" which was illuminated by a kerosene lantern.

In fact, Gordon tried to provide more light for puppet shows by plugging an electric lamp into the cigarette lighter of her car. At this point, the school board, which considered this a fire hazard, electrified the schoolhouse.

One-room schoolhouse teachers had to be imaginative about more than just the curriculum. Doris Georgeson, who began attending the Forked River school in 1923, remembers such a teacher. Although Georgeson recalls thinking the teacher was "ancient and ready to die," the instructor was in her late teens and this was her first teaching job. But she was resourceful beyond her years.

"The teacher knew that the families didn't have a lot, so she had those who got newspapers to bring them in," Georgeson says. "If you came to school in the morning and it started to snow or rain hard, or turn colder in the afternoon when it was time to go home, the teacher would line the inside of your jacket with layers of newspaper to keep you warm. The children who lived the furthest from school got the most layers of newspaper."

Beginning in 1927, Georgeson attended another Ocean County one-room school in Lanoka. She remembers that on winter days when the weather was too bad for the children to play outside the teacher would play records on her wind-up Victrola. Even this became an educational exercise.

"She would play the classics, and every day for ages she'd play the same ones in the same order over and over again," Georgeson says. "And then all of a sudden she would play them in a different order and you had to tell her which one was what."

Small by Necessity

Communities with a commitment to educating their children originally had little choice but one-room schoolhouses because of the difficulty of transporting students to more centralized — and more distant — schools. For the same reason, the one-room school, which generally was intended to cover grades one through eight, might end up being a child's only formal education. At first, parents paid tuition to cover the teacher's salary and other costs, and

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Gordon today.

"In a one-
teacher school
you don't teach
grades, you
teach children."

— Julia Weber Gordon



Gordon (at the far right in the picture above) with some of her Franklin Grove students after school, 1939.



Franklin Grove students inspecting a nature find, 1939.



Students in front of Franklin Grove's student-built playhouse, 1940.

B&W PHOTOS ON THIS PAGE
COURTESY OF JULIA WEBER GORDON

Sea Haven School,
Tuckers Island, circa 1912.
Neither the school nor
the island exists today.



OCEAN COUNTY HISTORICAL SOCIETY

One Room, “Three R’s” and More

by Priscilla E. Hayes

When you think of a one-room schoolhouse, you may picture a drafty, cramped room, with children huddled together on long benches. A place where children wrote their lessons on slates instead of paper and the boys’ and girls’ bathrooms meant a unisex outhouse.

It’s true that many one-room schools were short on everything from paper to books to desks. Often a wood or coal-burning stove in the center of the room provided the only heat. And the absence of running water did mean the use of outhouses, and also hand-pumped buckets of water for drinking, cooking and cleaning. Despite lacking “modern conveniences,” one-room schools had many positive attributes that are recognized today by people trying to preserve this special part of our past. And these advantages are especially treasured by those who had the opportunity to attend or teach at these schools, some of which were still in use as recently as the first half of this century.

Small is Beautiful

“I’m sad that the multi-age grouping of children for learning is gone,” says Julia Weber Gordon, who taught in a one-room school from 1936-40 and recorded her experiences in *My Country School Diary* (Harper & Brothers, 1946). “One of the big things the children learned in a one-teacher school was how to help the little ones. And the little ones had something to look up to. All they can think of in a graded school is what mischief they can get into.”

What Gordon believes the children learned first and foremost at her one-room school was the essential skill of getting along with all kinds and ages of people. Gordon’s school, located a few miles north of Blairstown in the hamlet of Franklin Grove (now absorbed into Hardwick Township), also gave her the opportunity to teach in ways not possible when she taught a single grade class.

“In a one-teacher school you don’t teach grades, you teach children,” Gordon explains. “You can take your time with the ones who are slower.” And, she stresses, the multi-grade format provided flexibility. A child who could read beyond grade level, for example, would be welcome into a more advanced learning group.

In addition to academics, Gordon’s pupils learned skills that ran the gamut. All the children helped prepare, serve and clean up after hot lunches. When the older students complained that the younger ones were too noisy, the whole school helped solve the problem by undertaking a project: building a playhouse outside where the younger children could be as noisy as they wanted.

The format of the one-room school encouraged one learning project to flow naturally into another. All the students wrote and produced a newspaper about school activities several times a year. They then wanted to see what a real newspaper operation was like, so they visited the offices of *The Easton Express*, (now *The Express-Times*) a newspaper they received daily in school (along with *The New York Times*). The trip led to questions on how printing and writing developed and ultimately to the creation of a book written, bound and distributed by the entire school, *The Book of Records*.

He knows by heart the numbers of that fire: "In one weekend, April 20-21, we lost 4 percent of the state, almost 200,000 acres of woodland, almost 400 structures, seven people killed, \$8.5 million in property damage, 186 homes, and 197 outbuildings, churches and businesses. Since '63 there's been a tremendous amount of development, right in these fire-prone areas. If we ever had similar weather conditions, we could have a disaster of equal or greater proportions."

In fact, growing development in fire-prone areas complicates the job of fighting fires. "Setting 'backfires' is a tactic used to stop a head fire. Fires are set into the wind to burn out the fuel between a road and the main fire. Obviously, this tactic can't be used as easily when homes are in the way," Hughes says.

Schweitzer says the presence of humans often keeps natural fires from taking place. There's an argument on now as to whether hot wildfires should actually be encouraged, since they preserve the habitat so many rare species need to thrive.

He says there are a number of moths and butterflies being

considered for designation as federally endangered or threatened species, in part because of changes in forest fire patterns. "Generally we suspect there are not enough hot fires, that the habitats are being lost because they're not getting burned frequently enough," he says. "But what's ecologically desirable — and that would be — isn't necessarily that safe. You can't allow 90,000-acre wildfires where there are people."

If people can create a compromise as successful as the forest fire's balance between destruction and growth, perhaps the delicate and fierce nature of the Pine Barrens can be better preserved.

A former correspondent for The Philadelphia Inquirer, Tina Kelly wrote extensively about environmental and natural subjects in New Jersey. She is currently a reporter for The Patriot Ledger of Quincy, MA.

**To Report a Forest Fire,
Contact the State Forest
Fire Service in Your Area:**
Northern 201-827-6100
Central 609-726-9010
Southern 609-625-1121

Only You Can Stop Forest Fires. Really.

Spring is the most significant forest fire season in New Jersey, with the height of the danger found from March 15 to May 15. Though one wouldn't expect the lushest, greenest season to be the most volatile, it's when the atmosphere warms up, the sun's angle increases, the relative humidity is lowest and the winds are strongest. Without full-grown leaves on the trees, more direct sunlight makes it to the forest floor, hitting leaves and pine needles left over from the previous fall.

"If you don't have April showers, you can have a bad fire year," says Joseph Hughes, assistant state forest fire warden with the New Jersey

Forest Fire Service. Last year, the dangerous period lasted longer because of late frosts that killed some of the budding leaves, infestations of pine looper moth, which defoliated 200,000 acres, and half the normal rainfall. The result: the largest number of acres burned in 15 years — 23,000 acres with 5,500 of them on June 16 alone, the largest single fire in the state since 1971.

Nature creates a higher or lower risk of forest fires, but people start 99.9 percent of them, at least in New Jersey. Of more than 1,400 fires in a given year, only four to six are caused by lightning.

"The more people you have, the more risk you have in the forest," Hughes says. "Risks come from campers, hunters, people smoking or burning trash, and from arsonists. Also, there's been a

tremendous number of people building homes in the forest now and it has basically increased the risk of disaster in the state."

Naturalist Eugene Vivian has seen and studied the effects of fires in the Pine Barrens. "One of the main causes is tossing cigarettes out the window; that's a bad thing," he says. "Once in awhile a campfire gets away, or people are lighting fires when it's windy."

"People who go out in the forest should just be careful with fire," Hughes says. "Cigarettes should be field stripped, so they're not thrown out lit and whole. Pipes and cigars should be thoroughly out." He also says campers should know and obey the local campfire regulations at their sites, and only build fires where they are permitted.

"Before they leave the

campground, they should make sure they have thoroughly doused the fire with water, and it's entirely out," he says. "And if someone sees someone light a fire, the state Forest Fire Service would like to know about it. It's illegal to discharge lit material in the forest area. If you see someone throwing a cigarette out a car window, or starting a fire any other way, take down the license plate number and report it."

For people who live in areas where there are frequent forest fires, particularly in the Pine Barrens, Hughes says it's important to leave a lot of space between the forest and the house. "There should be a minimal firebreak of 30 feet around homes, and up to 100 feet in high hazard areas," he says. "You don't want to have a continuous wall of fuel to take flames from the forest to your home."

Vivian says another plant that follows fire is turkey beard, with a foamy white flower that looks like a tuft of grass. Even though they were blooming during last year's fires, many survived the fire in the median of the Garden State Parkway. The areas burned last spring should show quite a bit of the pretty yellow Pine Barrens hudsonia this spring, as well as an increase in little blue stem grass. The pine barren gentian, a spectacular deep purple flower, also blooms well after fires.

There are simpler ways to tell there's been a fire in the woods. "The easiest way is by tree blackening," Vivian says. "That lasts 50 years or more, because the carbon does not decompose by any bacterial or fungal action. You can look at that, as far as we're concerned, forever, a lifetime."

Windisch has studied the pygmy pine forests in the pine plains, which straddle the Ocean and Burlington county lines. In such areas, where hot fires are common, it takes only four or five years for the trees to grow back to their original height and start producing cones again.

Regrowth at the forest floor only months after last spring's fire.



MICHAEL BAYTOFF

"They're really the most adapted to the very severe and frequent fires," Windisch says. "For forests that have more tree-sized oaks, it'll take them 20 to 30 years to get back to their full stature from the sprouts, and 20 years or more for them to start producing acorns again."

Sometimes, however, the forest isn't so lucky. "When you have a very severe forest fire and it occurs late in the year, it can be so intense that it kills all the dormant buds," Hughes says. "I've seen areas where five years later there's nothing growing at all."

Animals as well as trees depend on a natural fire cycle. "Those that can't survive fires in the short term depend on them in the long term," Schweitzer says. "If they're wiped out by a particular fire, others move in from some place outside the fire."

Wildlife generally runs away from a fire, though animals don't always succeed. Hughes has on occasion seen deer, rabbits, and turtles that have been killed in fires. Those that survive may find living is easier after a fire. Species such as wild turkeys — which use openings for nesting and rearing their young — deer, and quail that use a forest's open areas, benefit from fire.

Sometimes one species replaces another as the habitat changes in a stand of woods. "Birds that may use the forest will be hurt, like woodthrush, redstarts, and tanagers," says Larry Niles, acting chief of the endangered nongame species program in DEPE's Division of Fish, Game and Wildlife. "But after a fire moves through, the habitat will be useful for a whole new group of species, like the sparrows, field and grassland type birds."

Endangered species have to rough it through fires, too. Individual pine snakes and corn snakes can be killed in fires, but corn snakes can go into the ground and escape.

"After a fire's over, it creates an environment that eventually becomes prey-rich," Niles says. "Depending on how large the fire is, it may actually help them. They are primarily forest species, and use openings to hunt in. When it's cool, they go into openings to warm up, so an opening to them would be good."

For example, Schweitzer says that there's a moth, the Bucholz's dart (*agrotis buchholzi*), which is under consideration for federal protection, that feeds on the pixie, a Pine Barrens flower that thrives after fires. Without the fires required by their food sources, he says, some animals, like the Bucholz's dart, would be closer to extinction.

Niles says controlled forest fires, which foresters purposely set to burn off the needles, leaves, twigs, and other fuel on the forest floor, benefit a great number of species without harming any. "It creates more browse for deer, more nesting and feeding opportunities for turkeys, and makes more productive habitat for prey, so predators do better."

Deer can find a particularly rich feast. "There are a lot of nutrients in trees and vegetation, and when they burn, it has a fertilizing effect," Hughes says. "A fire opens the forest floor to light, and you often get lush herbaceous activity after a fire. It makes good deer food. In fact, one of the largest deer kills we ever had during a hunting season was in 1963, after one of the biggest fires we had."

by Tina Kelley

A month or so after a forest fire, the blackened trunks of trees make the woods look dark even at midday. But the green ferns shine just a few feet above the ground, new growth rising up like sunlight after storm clouds. Soon the trunks will sprout whiskery branches from the center stem and before too long, the deer will come back to graze in areas they had fled in terror.

Some say the world will end in fire, but in New Jersey, there's a rare and precious ecosystem that couldn't live without regular infernos — the Pine Barrens, where most significant forest fires in the state occur. Fire, in fact, is one of the reasons we have Pine Barrens to begin with, biologists say.

"Fires are necessary to maintain the ecosystem, fairly frequent fires, on the order of several a century," says Dale Schweitzer, an invertebrate zoologist for The Nature Conservancy. "Most fires, once they really get going, are pretty intense. They burn large areas and are usually crown fires. They create habitat for rare species."

In looking through lists of threatened and endangered species, he has found half or more are Pine Barrens species. "It's one of the most imperiled areas you have in the northeast," Schweitzer says.

Last year was the worst in 15 years for forest fires in New Jersey. From January through November, there were 1,382 fires, burning 23,000 acres. As forest fire season approaches again, those who study the forest say it's important for people to understand the cycle of destruction and regrowth, and the role they may plan in it.

Joseph Hughes is Assistant State Forest Fire Warden for the Department of Environmental Protection and Energy's (DEPE's) Division of Parks and Forestry. He knows fire's impact on the woods, especially on the pitch pine, a dominant pinelands species.

"The pitch pine has developed a number of characteristics which allow it to survive a severe forest fire," he says. "Pitch pine has a thick fire-resistant bark for one thing, and resinous cones. If the cones are heated to a certain temperature, the resin melts, and the cone opens up and spews forth seeds on to mineral soil." After a fire, the seeds find nutrient-rich ground and plenty of light from an opened-up forest canopy.

Pitch pines can also regenerate by sending out sprouts from dormant buds, from root collars found at ground level.

"After one year you'll see all the trunks sprouting out from the roots, a foot long, and see all the ground cover species sprouting back — blueberry and the shrubby oaks, scrub oak and blackjack oak," says Andy Windisch, associate ecologist with The Nature Conservancy, based at the Natural Heritage Program of the DEPE. "Pitch pine is pretty well insulated by its thick bark. The tree can often survive even a crown fire, which goes from the ground to the very tops of the tree, where all the foliage of the tree is consumed."

Natural enemies of the pine forest can be destroyed in fires, as happened last year with the pine looper moth. Sections of the pines had already become dangerously moth-eaten, and the thinning foliage let more light and heat into the forest floor,

making fires more likely. But those same fires appear to have killed many of the moths.

"The pine looper is conspicuously not defoliating trees in areas that burned," Schweitzer says. "Those pines are significantly healthier than in unburned areas, except where the fire was really hot. The moths are above ground, and mostly do get fried."

Eugene Vivian, 77, has studied Pine Barrens ecology for decades, and taught it at Glassboro State College (now Rowan College) for 25 years until 1979. He's seen fires come and go, last year's included.

"There's a great area along the Garden State Parkway I pass frequently, close to the 71 mile mark, near last spring's fires," he says. "I would say most of the shrubs have come up five or six feet."

He's noted an abundance of one plant that comes up after fires called fireweed, which is feathery white like a dandelion, with white flower heads and seeds. "It's not a showy flower," he says. "There are some other plants called fireweed that have more showy flowers."

Fire in the pines, Ocean County.



LESIE DICOLA

Death and Rebirth:

The Forest's Fiery Cycle

A charred pine shows signs of regrowth only three months after a spring 1992 Pine Barrens fire.



New Jersey's Park Rangers Saddle Up

FRED LOUQUET



With the advent of off-road "high tech" bikes — very unlike anything most of us learned on 40 years ago — many back areas of our state's parks and forests have become more readily accessible.

The result? Park rangers have taken to mountain bikes themselves to monitor these and other trails more regularly and better serve park users.

After a season of evaluation in a few areas, rangers in many New Jersey parks and forests will be patrolling trails on mountain bikes this year. Bike patrols will be in effect in Washington Crossing State Park, Lebanon State Forest,

and Bull's Island Recreation Area, joining Allaire State Park, High Point State Park, and Liberty State Park, which have all had successful bike patrol pilot programs.

Bike patrol rangers are equipped with radio communications, first aid supplies, reports, summonses and minor repair tools. Park rangers on mountain bikes can reach secluded or hard-to-reach areas and can respond more quickly when emergencies arise. In the past, when standard patrol vehicles could not get to a hard-to-reach area, rangers had to respond on foot. Obviously, mountain bikes will not re-



FRED LOUQUET

Ranger Trish Riker (far left) watches over the highest trails in the state at High Point State Park.

Ranger Terri Genardi (above) patrols the Liberty State Park waterfront against the backdrop of Manhattan.

Author Fred Louquet (left) on a back side trail at Allaire State Park before his retirement.



place motorized patrol vehicles. But mountain bikes will add another dimension for rangers, just as canoes, boats and snowmobiles have done.

Already, the rangers have found mountain bikes to be quite useful. This is even true in a park with an urban setting.

"Visitors aren't as intimidated by bikes as they are with our standard patrol cars," says Terri Genardi, state ranger at the sprawling Liberty State Park in Jersey City. "As a law enforcement tool, they blend right in. We can better protect the people and the property when potential lawbreakers don't even know we're there."

Last December, Liberty State Park bought two mountain bikes for patrol purposes, and Genardi said she hopes they will become a staple for all state parks and forests.

"I love the bikes," she said. "They're helpful to us, which means they're helpful to our visitors."

by Fred Louquet, retired chief ranger, Allaire State Park