

NJPB

# NEW JERSEY Outdoors

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Fall 1992



Meet New Jersey's Skillful Anglers • High Breeze Farm a Step Back in Time  
Make Energy Savings Add Up in Your Home • Get Ready to Go Birding  
Explore the Hot Debate Over Endangered Species

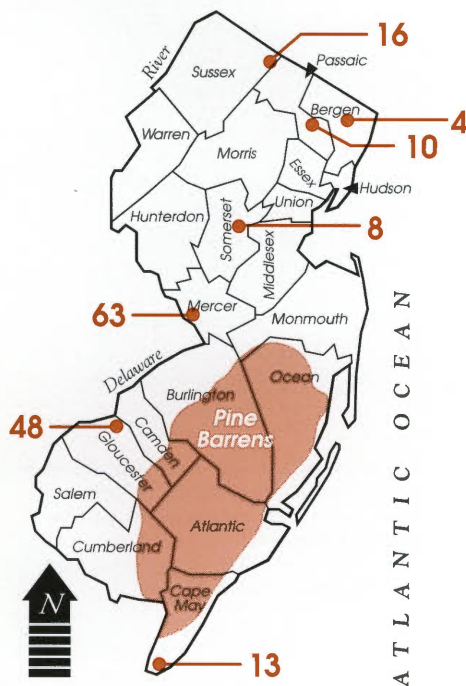


A curious grey squirrel looks out from a perch on a dune at Island Beach State Park, Ocean County.

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by Mark Schreiber

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by Robert Fletcher

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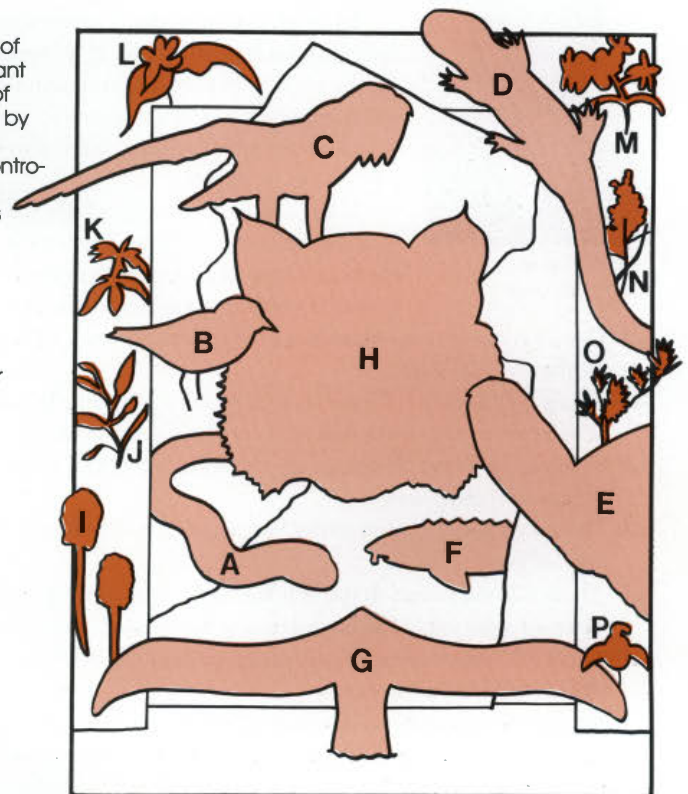
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by Robert Brunisholz

Efforts are under way to help rebuild dwindling numbers of the ruffed grouse, a wild bird that resists human supervision.

The front cover depicts some of New Jersey's endangered plant and animal species. Several of these are federally protected by the Endangered Species Act, which is sparking renewed controversy as it comes up for reauthorization. For both sides of the debate, see page 36.

- A. Corn snake
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- C. Peregrine falcon
- D. Eastern tiger salamander
- E. Bog turtle
- F. Shortnose sturgeon
- G. Blue whale
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- L. Canada violet
- M. Wild blue phlox
- N. Oceanorus
- O. Rhodora
- P. Three birds orchid





# Editorials



Jim Florio  
Governor

## Farmlands, Open Space Are Wise Investments

Fall offers dramatic beauty and tranquil scenes all across the Garden State. It is the season when New Jerseyans hit the back roads, historic villages and hiking trails, all to get a glimpse of the rich farmlands and open spaces that are essential to our economy and our quality of life.

Agriculture is a vital part of New Jersey's heritage and it's a tradition we intend to keep. Our woodlands, wetlands and farms provide an environmental balance that is critical to the health and well-being of the nation's most densely populated state.

Our Farmland Preservation Program is a significant effort to keep agriculture thriving. It enables our state and counties to purchase development rights from farm owners. That means farmers can continue to work the land. And our people will enjoy the bounty of the Garden State — forever. As a result of bond acts in 1981 and 1989, New Jerseyans have protected more than 17,000 acres of farmlands.

These and other bond acts also have helped our Green Acres Program preserve more than 300,000 acres of open space. Green Acres projects range from a local neighborhood park with tot lots, swings and tennis courts, to a thousand-acre protected forest for hiking, fishing, camping and hunting.

The program's job, however, is far from over. Current state plans indicate that we still need to add another 270,000 acres to reach our projected goal of one million acres of recreational open space.

But we are in a race against time. The next few years offer a real opportunity to preserve the bounty of the land and its beauty. And I am firmly committed to working with the Legislature to find new funds for open space, farmland and historic preservation.

Our farms and open spaces are an investment in the spirit and vision of New Jersey. As you pass each brilliant scene this autumn, remember that together, we can preserve the rich variety and beauty of the Garden State.



Scott Weiner  
Commissioner

## Volunteers Deserve Thanks

In 1833, Ralph Waldo Emerson wrote, "No man can have society upon his own terms. If he seeks it, he must serve it, too." At the Department of Environmental Protection and Energy today, Emerson's words resonate in the enthusiasm of thousands of volunteers who dedicate their spare time to help improve New Jersey's environment.

I, and all the residents of New Jersey, owe a debt of gratitude to these volunteers whose contributions include helping to keep our air and water clean and teaching our young people the value of lifelong environmental awareness. Here are a few examples of their efforts.

- ☐ Deputy conservation officers have helped enforce state wildlife management laws for the past 100 years.
- ☐ About 300 "friends" of the state's parks and forests help by publishing brochures and newsletters, maintaining trails and conducting nature walks and tours of historic sites.
- ☐ Community Water Watch groups throughout the state help protect local lakes, rivers, streams and other areas.
- ☐ The state's Clean Communities Program depends on local volunteers to help rid areas of litter.
- ☐ About 600 volunteers in the Wildlife Conservation Corps help with stocking trout and in monitoring the yearly deer hunt, as well as with clerical duties related to wildlife management.
- ☐ About 500 experts provide instruction on hunting safety and ethics as part of DEPE's Hunter Education Program.

For more information on how to volunteer for programs and activities coordinated by the DEPE, call (609) 777-DEPE and ask to be directed to the appropriate division or office for the program in which you are interested.

State of New Jersey  
Jim Florio  
Governor



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Fall 1992, Vol. 19, No.3

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

## More Places to Shoot

Russ Wilson's article on trap, skeet and sporting clays in the Spring 1992 issue did a commendable job of familiarizing "new-comers" with the basic concepts of each of these shooting sports. The longevity of these sports relies heavily on the infusion of new blood. The resurgent interest in trap and skeet, coupled with the skyrocketing appeal of sporting clays, continues to provide the non-hunting public with a more positive image of shotgun sports. Few other sports offer the opportunity to be measured by one's own independent performance in the way that trap, skeet and sporting clays do.

At the end of the article, a sidebar listed places where the public could shoot. Missing from your list were Quinton Sportsmen's Club, Buckshorn, Belleplain and Cedar Creek. All of these clubs are within a 30-minute drive from Bridgeton. This is the only area in New Jersey that offers this variety of courses within such a short drive.

More articles like Mr. Wilson's are desperately needed to correct any misconceptions that the non-shooting public has of our sports. I think that once they experience the challenges of these sports and the camaraderie of fellow shooters, they will truly understand why we are so adamant in supporting our sports and our rights to participate in them.

Ed Grassia, vice president  
Quinton Sportsmen's Club

*Editor's Note: Thank you for pointing out these additional shooting sites: Their locations and phone numbers are:*

❑ Belleplain Farms Shooting Preserve, 346 Hands Mill Road, Belleplain 08270; (609) 861-2345

❑ Buckshorn Sportsmen's Club, Jericho Road, Salem 08079; (609) 935-9805;

❑ Cedar Creek Sportsmen's Club, 2101 East Broad Street, Millville 08332; (609) 825-5051

❑ Quinton Sportsmen's Club, Jericho Road, Quinton 08072; (609) 935-9843

## Missing an Issue?

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.



## Wrong Garden

I just received the Summer 1992 issue and noted the article, "Water Conservation a Statewide Goal." I agree with the views, but have a problem with a picture illustrating the article. The caption says that the demonstration garden is being planted in Cape May Courthouse. I believe this is a photograph of the water conservation demonstration garden outside the Avalon Chamber of Commerce information center.

Ernie J. Jones Jr.  
Avalon

*Editor's Note: You're right. It's the demonstration garden at the intersection of Ocean Drive and 31st Street in Avalon. Thanks for setting the record straight.*

**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.

## A Fix for Broken Dish

I have an old-fashioned stem berry dish that is broken, and I'm looking for someplace I can take it to be mended. I thought that since your magazine writes all about New Jersey, you might be able to help me.

Our family enjoys the new **New Jersey Outdoors** immensely. It really helps when we travel and want to know where to go sightseeing and enjoy our state.

*Editor's Note: Experts at the museums we contacted recommended that you contact an object conservator, a trained expert who specializes in the repair and restoration of specific types of objects, such as glass, ceramics, furniture, metal and paintings.*

Gay Taylor, curator at Wheaton Village's Museum of American Glass in Millville, and Susan Finkel, assistant curator at the New Jersey State Museum's Cultural History Bureau in Trenton, gave us names of two glass conservators to get you started:

❑ Baer Specialty Shop, 259 East Browning Road, Belmar 08031; (609) 931-0696

❑ Kory Berrett, 3053 Reisler Road, Oxford, Pa. 19363; (215) 932-2425

## Another View on Hunting

I don't think that hunting is right or acceptable in our society. Animals deserve the right to live in peace and not have their homes destroyed by gunfire. Hunters are insensitive to the feelings of these animals and only care about their own enjoyment. I don't know why people like to hunt. It is a very cruel practice that has no good qualities.

Rachel Bussell  
Teaneck

## Toll-Free Number

**New Jersey Outdoors** has a toll-free number for subscription information. The number to call is:  
1 (800) 645-0038.



# Gardens

## Horticulture: Nature's Therapy

Molly, a patient in her early 90s at the Daughters of Miriam Nursing Home in Clifton, suffered from a form of mental illness as well as physical disabilities. Severely regressive and disoriented, she hadn't spoken for months.

Although she was unresponsive, Molly was included in a small group of patients who gathered around a table filled with plants that were selected to stimulate the senses. Members of the group took turns touching aloe and purple passion leaves, and sniffing narcissus and gardenia flowers. But it was a bromeliad that triggered a memory for Molly.

Suddenly, she said, "My husband and I grew them 20 years ago." After breaking her long silence, she began to talk more frequently, much to her doctor's surprise.

What accounts for the healing power of plants? "They are alive and familiar," says Joel Flagler, Rutgers University agricultural and resource management agent for Bergen County. "We have this innate, ancient bond with plants and still depend on them for food, shelter, fuel and medicine."

Flagler in 1987 initiated what has become one of the most successful horticultural therapy programs in the state. As the first registered horticultural therapist to work in Bergen County, Flagler began training volunteer gardeners to work with special populations and introduced his first program at the state's largest hospital, Bergen Pines Hospital in Paramus. Today, nine programs throughout the county have made an extraordinary difference in the lives of people in nursing homes, mental health facilities, a prison and Bergen Pines.

Many of these men, women and youths had experienced despair, boredom and failure before being introduced to the joys of gardening.

Esther, in her late 80s, was a former

judge who resided at the Daughters of Israel in West Orange, where she refused to participate in any activities. It seemed that nothing could stimulate her once active mind. She complained incessantly and told whoever would listen that she was tired and should be dead. Sitting listlessly in her room, she didn't bother to dress. But when she was introduced to gardening, she quickly became hooked.

"We couldn't get her out of the planting room," says Flagler. "She would tell the aide who helped her, 'We've got to go. It's time for horticulture.'"

Because people have an inborn nurtur-

The result is an increased feeling of self-worth and a more positive outlook on life.

Flagler points to the findings of a recent poll showing that gardening is the second most popular leisure activity for senior citizens. The first is socializing. That the two go hand-in-hand is evident in the increased sociability of horticultural therapy participants like Esther, who became more outgoing and involved with the patients gardening alongside her.

Adaptations that include raised beds for the wheelchair-bound make gardening accessible for physically disabled patients. Special tools such as handle extenders;

Velcro straps that affix tools to hands; and trigger and cushion grips enable post-stroke and hand-injured patients to work the tools.

Gardening provides patients with physical as well as emotional benefits. Patients who stretch to water a plant, for example, experience increased range of motion. Moderate exercise through stretching and light lifting results in increased muscle tone, flexibility and endurance. Breathing the fresh air in outdoor gardens and oxygen in the greenhouse are added benefits.



Working with plants can help a person develop an increased feeling of self worth and a more positive outlook on life.

ing instinct, their roles as caretakers emerge when they are given plants to grow. Role reversals occur when patients who require constant care can themselves become the caregivers for a living plant.

Physically disabled and geriatric patients at Bergen Pines Hospital plant flowers, vegetables and materials for dried crafts. They pot houseplants, make new cuttings and create dish gardens and ter-



rariums. A store in the hospital's lobby sells the finished products.

"The patients are able to channel their creativity and self-expression with these dried crafts," says Flagler. "It gives them self-confidence and the satisfaction of having completed a meaningful task."

What started on a trial basis at Bergen Pines Hospital has become a permanent program, supported by physical therapists, occupational therapists and other staff members. Recently, \$150,000 of private funds was raised to build a state-of-the-art greenhouse that will be attached to the main hospital.

Elderly residents at the Van Dyk Nursing Home in Ridgewood garden indoors and outdoors, as do young adults with psychiatric problems or mental retardation at the Christian Health Care Center in Wyckoff. These youths grow vegetables and bedding plants from seeds. Indoors, they nurture tropical plants and create nature crafts such as wreaths, dish gardens and potpourri.

At the Dumont Mental Health Center in Dumont and the West Bergen Mental Health Center in Ridgewood, young adults with emotional problems seed flats, grow plants under lights and garden on rooftops and balconies.

Like their aged counterparts, these youngsters realize control over their environment, increased self-esteem and a sense of achievement. Many of these youths, who had previously exhibited anti-social and aggressive behavior, begin to interact with others, sharing and engaging in basic communication and acceptable behavior.

Nowhere are the positive aspects of gardening more apparent than in the Hackensack Jail Annex where inmates often enjoy success and praise for the first time. In the year-round greenhouse, they grow poinsettias, which they donate to orphanages. Their vegetable garden saved \$10,000 in food costs. A \$90,000 grant from the Department of Corrections will train youths at the jail in all aspects of the green industry: horticulture, lawn maintenance, pruning, gardening and landscap-



Joel Flagler admires a resident's work at the Daughters of Israel in West Orange.

ing. When they are released, the youths will have employable skills that translate into independence.

People have used plants for healing since the days of ancient Egypt. Centuries later in 1812, Dr. Benjamin Rush, a Philadelphia physician and signer of the Declaration of Independence, recorded the psychological benefits in mental patients working with plants. Although a number of therapeutic gardening programs were created over the next 125 years, the major impetus for horticultural therapy's development didn't occur until the 1940s when veterans hospitals used horticultural activities as a form of occupational therapy. At that time, garden clubs became more involved in bringing structured activities to shut-ins and patients. In 1973, the American Horticultural Therapy Association was founded, and training and employment programs have grown since then.

Flagler is developing an undergraduate horticultural therapy course at Rutgers University, where he is an assistant professor in agricultural extension. He also has designed the horticultural therapy program at the New York Botanical Garden, where he finds that many people in related professions — teaching, nursing, physical therapy, occupational therapy and other areas of medicine — are attempting to combine talents or begin second careers.

A career in horticultural therapy requires that one be both a "plant person" and a "people person," with knowledge not only of horticulture, but of sociology, gerontology and the psychology of personality and disability, says Flagler. Although it is based on a very old practice, horticultural therapy is a new profession with only 230 registered horticultural therapists in the entire country and less than a dozen in the state of New Jersey.

But in the past 10 years, as gardening has been woven into overall treatment programs and awareness of its excellent success rate has grown, interest in horticultural therapy has escalated. Because our elderly population is expanding, there has been more demand for horticultural therapy in nursing homes and hospitals, where gardening is often the only contact that patients have with the green world.

But gardening's soothing, relaxing effect isn't limited solely to special populations. "Everyone is exposed to stress," says Flagler. "People are finding that gardening is a wonderful way to counteract that stress, to become refreshed, restored and more productive."

*By Eleanor Gilman, a freelance writer who lives in Ridgewood*



### Tires Become Haven for Fish

Between 600,000 and 700,000 used tires have been dropped into the ocean in the past eight years, but the state Department of Environmental Protection and Energy isn't alarmed about it.

That's because the placement of these tires has been overseen by the department's Division of Fish, Game and Wildlife as part of its Artificial Reef Program.

Artificial reefs are imitations of natural reefs, such as coral or rock outcroppings, made by intentionally placing tire units, construction debris, old ships and other heavy objects on the sea floor. Tires have several qualities that make them desirable for artificial reef construction, including durability, longevity (they probably will last 50 to 100 years on the sea floor), easy availability and acceptability as a surface for encrusting marine organisms.

Within two years after placement on the sea floor, tire units are colo-

nized by a variety of encrusting organisms, including mussels, barnacles, tube worms, hydroids, anemones and sponges, which attach firmly to the rubber surface. This 2-inch-thick "living carpet" amounts to 175 pounds of organisms per tire unit. These animals filter and help purify sea water and provide food for sea bass, tautog, cunner, porgy, ling, rock crab, lobster and other fish and shellfish that find refuge among the tire units.

Underwater surveys have found an average of 29 fish living on each unit. In addition to providing new homes for fish, tire units also create new fishing grounds for anglers. Sport fishermen caught 1.8 million fish on New Jersey's eight artificial reef sites during 1991. This catch amounts to an annual harvest of about 13 fish per tire unit.

The only concern with tires is their low density in seawater, which makes them very unstable on the sea floor and susceptible to movement during storms. Materials that move off reef sites potentially could clog commercial trawling and dredging grounds and threaten beaches. To overcome the problem of instability, the division's Marine Fisheries Administration spent four years testing a variety of different tire unit designs on the ocean bottom. The results of these experiments demonstrated that tires must be heavily ballasted. Forty-five pounds of concrete is needed to stabilize each car tire when subjected to 15-foot high storm waves at a depth of 60 feet.

Concrete is used not only to ballast tires, but also to bind them together into 16- to 32-tire units. Other binders, such as steel cables or nylon belts, either quickly corrode or abrade, thus allowing the tire bundles to break apart.

#### New Jersey's Artificial Reef Sites:

- 1 Sandy Hook
- 2 Sea Girt
- 3 Shark River
- 4 Garden State North
- 5 Garden State South
- 6 Atlantic City
- 7 Ocean City
- 8 Cape May



Cape May Reef yielded these triggerfish.

The units are carried to their reef site on barges or transport vessels. At the site, a temporary buoy is dropped to mark the deployment area. Units then are dropped overboard with either a crane or forklift. As unloading proceeds, the barge is moved around the marker buoy so that the units are scattered over one to two acres of the sea floor. One artificial reef is made up of between 20 and 700 tire units.

Construction and placement of the tire units is overseen by the Marine Fisheries Administration, but currently carried out by three county and two commercial facilities. The goals of the counties are to recycle old tires and improve fishing opportunities off their shores. In the county programs, prison inmates, supervised by county or state personnel, supply the labor to assemble the tire units. The commercial facilities are geared toward making a profit by charging a nominal tipping fee and offering a legitimate way for garages and trucking companies to dispose of their used tires.

For further information on the Artificial Reef Program, call (609) 748-2020.

*By Bill Figley, principal fisheries biologist for the Division of Fish, Game and Wildlife's Marine Fisheries Administration*



# Volunteers

## Helping Students Make a Difference



Members of the Eastern High School's ESCAPE Club (Eastern Students Committed Against Polluting the Earth) plant a tree on the school grounds in Voorhees, Camden County. Students have planted 3,000 trees at the school and in the community over the past two years.

Students in dozens of environmental clubs throughout New Jersey have launched recycling programs, organized litter cleanups and taken part in educational programs on issues ranging from solid waste reduction and endangered species to water and energy conservation.

Tackling such often complex environmental issues can be a formidable and exhausting challenge, but one that's made easier with the encouragement and support of the Youth Environmental Society (YES), a private, nonprofit organization that promotes club activities at high schools and colleges.

Begun in 1976 by a group of college environmental activists, YES's goal is to develop student leadership ability through environmental action. It accomplishes this by providing environmental clubs with training, resources and networking opportunities through seminars, meetings, classes for teachers, newsletters and other publications, and its annual environmental leadership awards program.

"YES brings everyone together to work as a team and share ideas," says Katie Martin, a member of OCEAN (Our Campus Environmental Action Network), a club at Central Regional High School in Ocean

County. OCEAN, whose members launched a recycling program at their school, received one of six environmental merit certificates awarded this year by YES.

YES also awarded environmental leadership awards to the following four groups:

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YES strives to  
develop leadership  
ability through  
environmental action.

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□ Columbia's Leaders for Environmental Action Networking (CLEAN), Columbia High School, Maplewood, Union County. This group conducted an environmental education program for local elementary school students. Members wrote lesson plans and gave nearly 80 presentations on environmental topics to classes at five elementary schools.

□ Environmental Education Network (EEN), Ocean County. Ocean County

students and activists formed an environmental network of students and adults that includes environmental clubs from 12 of the county's 15 high schools as well as Ocean County College. Member clubs have been extensively involved in environmental events, recycling programs, beach cleanups and elementary school education.

□ Montgomery Students for Environmental Action (MSEA), Montgomery High School, Somerset County. Members of this group started an exchange center in cooperation with the township for usable, but unwanted household items. Students also took part in beach and roadside litter cleanups, and organized letter-writing campaigns on topics such as wetlands protection and the United Nations Earth Summit.

□ Student Environmental Action Coalition of New Jersey (SEAC-NJ). This network of students earned a special award from the YES Board of Directors for bringing together student organizations, disseminating information on environmental issues and organizing and participating in several high school and college networking meetings around the state. Part of a national SEAC network, the group has placed special emphasis on reaching minority and urban populations.

YES offers many opportunities for volunteer participation. The organization is overseen by a board of directors whose members include a variety of professionals. Volunteer skills and expertise are put to use in areas of program development, promotions, writing, photography, teaching, leadership training, fundraising and office management.

For more information, write to the Youth Environmental Society, P.O. Box 441, Cranbury 08512, or call (609) 655-8030.

*By Tanya Oznowich, supervisor of the Department of Environmental Protection and Energy's environmental education program and current president of YES.*



## Walking Along Water

The duckweed that covered much of the canal in summer is nearly gone now, and there are some deer tracks off to the right. It's late November, Thanksgiving morning to be exact, and I'm walking along one of my favorite stretches of the Delaware and Raritan Canal towpath near Somerville.

The canal is the focus of a long, 60-mile greenway, a linear state park, through central New Jersey. At Bull's Island, a state recreation area on the Delaware River offering picnicking, boat launching, camping and a wonderful walking bridge over to Pennsylvania, the feeder canal begins, bringing river water to the main canal 22 miles ahead. Gradually, it rides higher and higher over the descending Delaware, passing Washington Crossing State Park on its way to Trenton. The feeder eventually meets the main canal, which then heads northeast toward Princeton.

This is the real canal, a 75-foot wide, 8-foot deep ditch built with immigrant labor. A major transportation route of its day, it moved more tonnage than the famed Erie Canal in upstate New York in the years around 1870. It runs north through Kingston, Griggstown, Blackwell's Mills, East Millstone and Bound Brook before emptying into the Raritan River near New Brunswick. This canal was a real engineering feat, a boon to business then and a popular recreation way now.

*Old mileage posts can be found along the towpath.*

I grew up in Franklin Township, near New Brunswick, and discovered the Delaware and Raritan Canal and its towpath when I was quite young. It had ceased to be a commercial enterprise many years before I was born and had become a haven for fishermen, canoeists and boys like me. Where a stream emptied into the canal, depositing sand and silt in a tiny delta, my childhood friends and I would take off our clothes and go swimming. I learned how to catch bass there, and became an expert at catching bluegills with cork poppers.

Nothing really happens Thanksgiving morning, unless you're the cook, so I decided to drive down to Weston Causeway and walk south to East Millstone and back. I haven't been here for a year or so and I see the state has built a new parking area and set up a plaque with some canal history on it. The old bridgetender's house, built around 1831, is still here, though.

It's a little overcast and cool, and it looks like it might rain, but I've brought along a waterproof parka shell just in case. I begin my four-mile round-trip hike by heading south on the towpath under tall oaks. I pass alongside some farm fields on my right while a few cars pass me by on my left — on the other side of the canal. But soon Weston Canal Road veers away from the canal and I enter one of my favorite stretches of the entire 66-mile Delaware and Raritan Canal State Park. It's quiet; nothing but deep woods line the canal and towpath here. There's really nothing else quite like this in densely populated central New Jersey. I remember a few years back walking here during the summer when a huge blue heron, its giant wings nearly motionless, glided down the canal only a few feet over the water. The scene was almost prehistoric. Did I see a pterodactyl? I don't expect to see a heron this time of year, but there are a good number of ducks and some Canada geese.

It seems that many New Jerseyans have



There's always  
something going  
on in the  
canal, or even  
in the woods  
along the towpath.

discovered the towpath as a retreat from our civilized world; it is one of the state's most popular parks. Even this morning, I pass a few couples holding hands, and several runners and a mountain bike rider pass me by. The towpath, which used to be the walkway for mules pulling heavily laden barges, is wide enough for all of us.

A unique linear park, with many access points along its length, the Delaware and Raritan Canal State Park is a gem of a natural area, but what an irony. It is really a totally unnatural construction project left over from the early Industrial Revolu-

PHOTO BY AUTHOR



tion. Yesterday's industry has preserved today's natural resources. I wonder to myself exactly how future generations might benefit from the great earthworks of today, such as the interstate highways or the many square miles of parking lots.

If one makes a distinction between the two, the towpath lends itself to both hiking and walking. Serious hikers, those interested in a long-distance workout, will have no problem finding adequate mileage along this route. With two cars parked at beginning and end points, hikers can cover large sections of the canal. It's possible, and some already have done it, to hike the entire 60 miles of towpath in a weekend. There are no hills, the footing is solid and someone in good shape starting early could easily maintain a 3 mph pace, maybe faster. There is a gap between the feeder and the main canal of 1.25 miles that would require some road walking, but the hardy hiker probably could reach the midpoint near Princeton after a long day, rest up and finish it off the next. But this is super-hiking, not the best way to take in all the towpath and canal have to offer.

Walkers, on the other hand, will find the towpath a real pleasure in any season. Good drainage means a dry and firm footpath. There are many access points and a short walk, turnaround and return are convenient and nearly always prove to be interesting. There's always something going on in the canal, or even in the woods along the towpath. You often can see deer, turtles lying on logs, frogs and fish jumping, and all sorts of birds enjoying the unique, man-altered ecosystem. The scenery actually is enhanced, in a way, when a canoe glides quietly by. The only real problem is poison ivy. Know how to identify it if you plan to hike in the summer.

I pass one of the old mileage posts that notes the distances to both New Brunswick (13 miles northeast) and Trenton (31 miles south) Many of these concrete posts remain, maybe a bit tilted and worn. Now, across the canal, the woods open up into Colonial Park. A few people sitting along the dock wave to me.

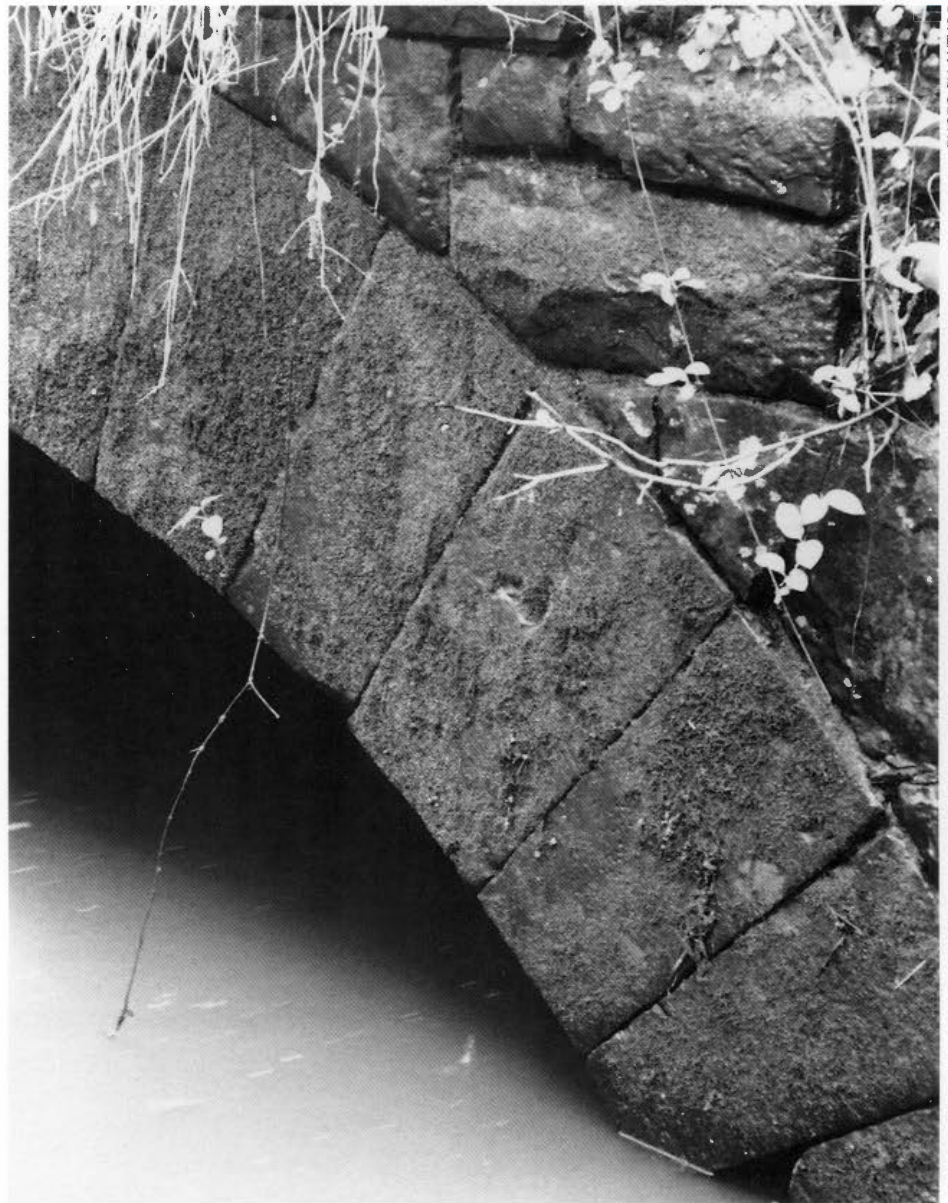


PHOTO BY AUTHOR

Spooky Brook runs underneath the canal through this culvert, which prevents the waters of the two from ever mixing.

One of the most interesting features of this section of the canal is the culvert through which Spooky Brook runs. Along this section, the canal water level is high. The brook flows underneath the canal through the culvert, its waters never mixing with those of the canal. I scoot down the slope to admire the "ancient" stonework of the canal builders.

Not far ahead I come to my turnaround point, the little town of East Millstone. I used to live in nearby Millstone, and the area still looks much the same. But this is not a day to linger or grab a bite at one of

the old stores in this town. I head back, north on the towpath, where a huge meal awaits me on this day of thanks. I give thanks to the canal, to those who died building it and to those who had the foresight to make it a state park.

*By Bruce Scofield, coauthor of "Fifty Hikes in New Jersey" and author of "Circuit Hikes in Northern New Jersey"*



## Paterson Building on Rich History

Visitors walking through Paterson, Passaic County, can't help but take note of the city's rich cultural and historical heritage. In an area of town declared a National Historic Landmark District in 1976, mills still stand that once were home to some of the most productive industries in the history of the country. The remembrance of this colorful past has been the focus of a year-long series of festivities celebrating Paterson's 200th anniversary.

Named after William Paterson, a New Jersey governor and signer of the Declaration of Independence, Paterson was founded in 1792 as the first planned industrial city in the United States. The area, located near the Great Falls of the Passaic River, was ideally situated for harnessing the tremendous amounts of water power that the falls provided. Pierre Charles L'Enfant, who later designed Washington, D.C., came up with the idea for a system of raceways, a three-tiered network that would carry water to the mills of Paterson and enable them to use this power in the development of industry.

Before widespread use of the raceways was halted in 1914 due to the installation of a hydroelectric plant, water could cruise down the channels at a maximum of 30 miles an hour, providing the mills with the energy they required. "Without water, there wouldn't have been any industrial development," says Giacomo deStefano, director of the Paterson Museum. "Of course, if you didn't get much rain, the water flow would trickle down to about nine miles an hour. Productivity would be seriously affected."

Goods ranging from linen and silk to aircraft engines and steam locomotives were produced in the city over the course of the next two centuries, and at various points in history Paterson led the country in the production of these items. In fact, the silk industry once played such a

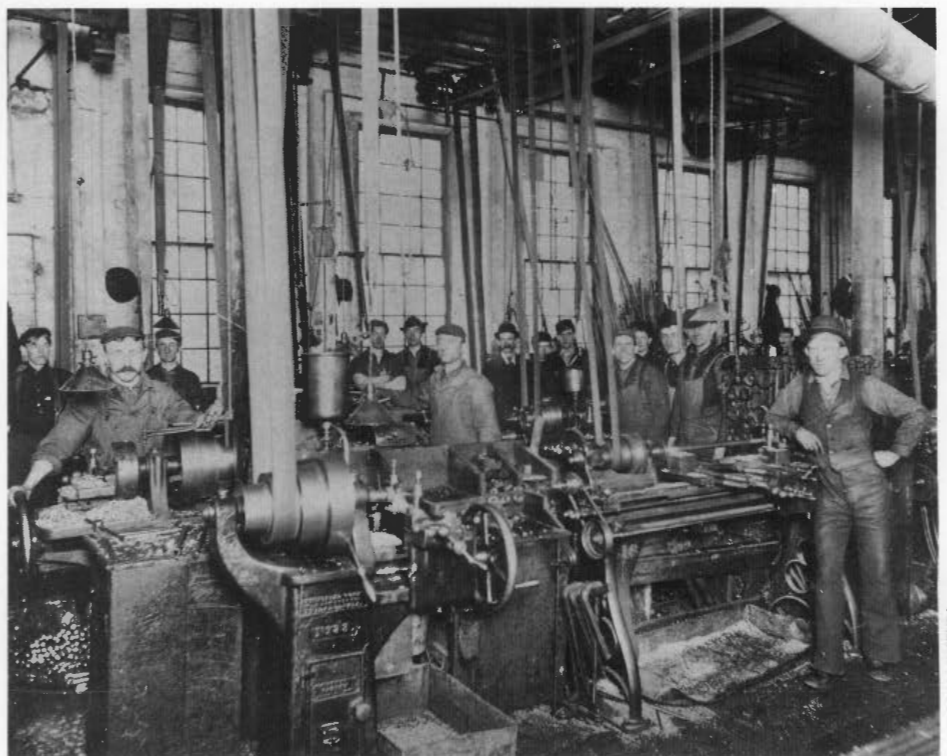
prominent role that Paterson was dubbed the "Silk City of the New World." The once-productive mills have since been converted into shops, art galleries, restaurants and housing. The Paterson Museum on Market Street, for instance, was once the home of the Rogers Locomotive Erecting Shop, owned by Thomas Rogers, the maker of the country's first steam locomotive.

As well as being the birthplace of industry, Paterson also has inspired the growth of many innovative American minds. Samuel Colt, the developer of the revolver, made many of his early firearms in the city. John Holland, a city school-teacher and inventor of the first practical submarine, and Albert Sabin, developer of the first oral polio vaccine, both called Paterson home.

With the arrival of the city's 200th anniversary, Paterson hopes to take advantage of its rich and diverse history to inspire a rebirth in the area. "There's no

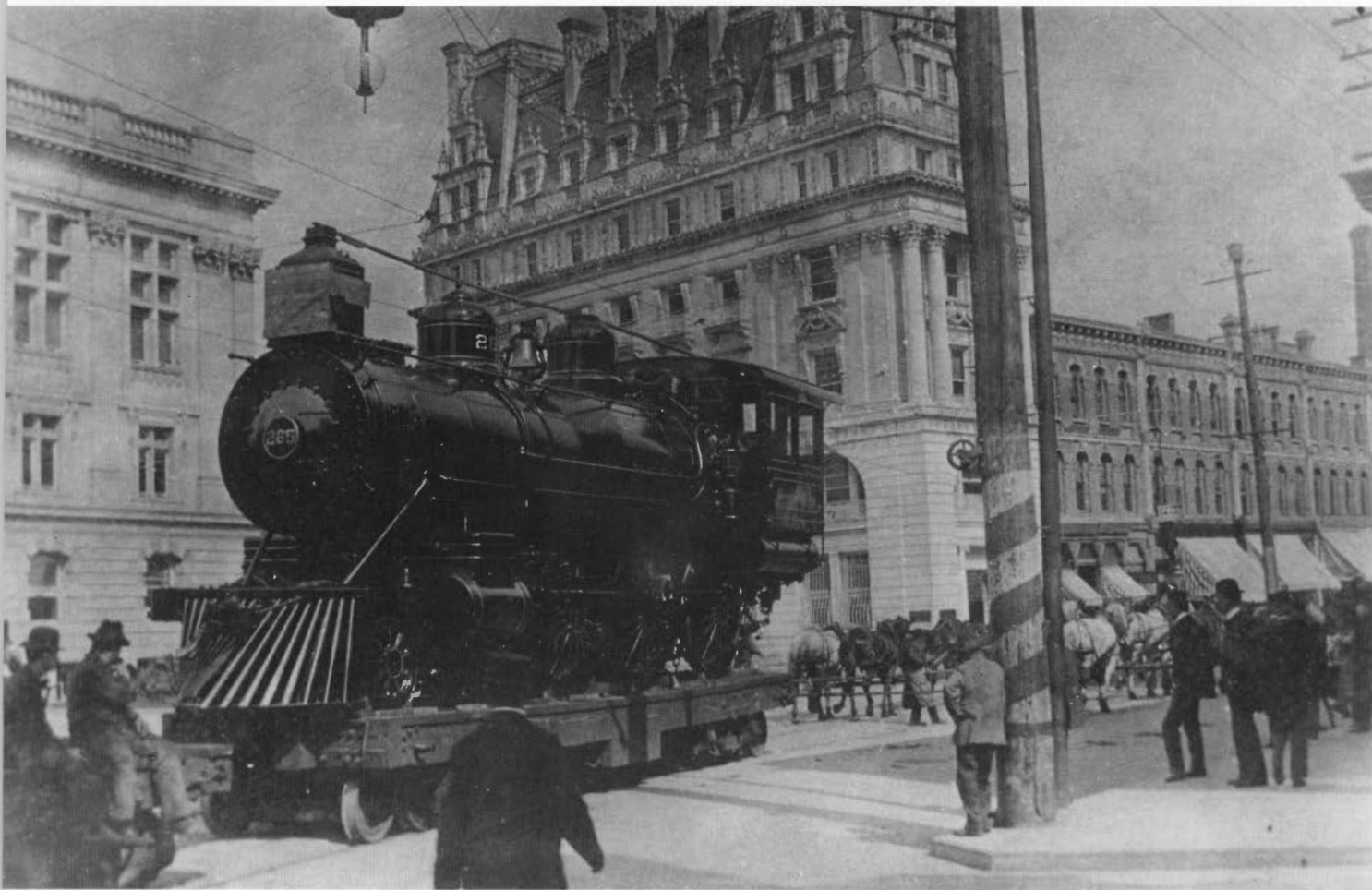
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Paterson at various times produced goods ranging from linen and silk to aircraft engines and steam locomotives.



PATERSON MUSEUM





county administrators into a new building in the downtown area and the construction of 27 specialty shops in a portion of the city that was devastated by fire in 1991.

City officials are working with the Department of Environmental Protection and Energy to obtain funding for a much-needed cleanup of the Passaic River through the department's Clean Shores Community Grant Program. In addition, several local companies have joined in the efforts to make Paterson a better place to live.

"We have numerous agencies included in an intense cleaning of the city — NJ Transit, Conrail and others are cleaning their grounds and cutting back old brush," says Jim Gallagher, director of policy, planning and management for the city of Paterson. Inmates from the state Department of Corrections also will be brought in to do cleanups of

empty lots and other areas of the city.

To celebrate Paterson's 200th anniversary, the city sponsored several festivals, including one honoring comedian and Paterson native Lou Costello. A 200th anniversary parade is scheduled for September 27 and a 10K mini-marathon is planned through the streets of Paterson on October 4.

For more information about the city of Paterson or its scheduled events, contact the Office of the Mayor at (201) 881-3380.

*By James Grubic, a Rutgers University journalism intern*

One of the last of the Rogers locomotives is drawn up Market Street in Paterson in the early 1900s (above). Engine No. 265 was made for the Texas and Pacific Railroad.

Rogers Locomotive workers (far left) are shown in the lathe shop in 1897. Electricity had only recently replaced electric power to run the belts shown in the photo.



## Concrete Uses for Tainted Soil

More than 500,000 tons of soil in New Jersey have been contaminated with petroleum in the past five years, most commonly from leaky underground storage tanks of the type found in gas stations or residential fuel oil tanks.

It's a problem that strains the limited storage capacity of solid waste disposal facilities where the soil often is dumped. But the problem could be reduced or eliminated if the contaminated soil could be reused in some beneficial way.

The Department of Environmental Protection and Energy's Division of Science and Research solicited proposals to investigate the possibility of reusing this soil and the result has been promising research into the use of petroleum-contaminated soil to manufacture asphalt and concrete.

Associate Professors Namunu Meegoda of the New Jersey Institute of Technology and Samer Ezeldin and David Vaccari of Steven's Institute of Technology conducted joint studies on using the soil in the production of hot mix asphalt for roads and as sand replacement in concrete production.

New Jersey produces an average of 15 million to 18 million tons of asphalt per year, and several materials such as ground glass and crushed asphalt already were being recycled in asphalt production. Concrete production averages about 8 million tons per year. Recycling petroleum-contaminated soil for the manufacture of curbing and roadway dividers seemed like appropriate uses of the soil in concrete.

The researchers sampled soils from six sites contaminated from leaking underground storage tanks — three contaminated with home heating oil and three with gasoline. These soils were diverse in nature, ranging from sandy soils to finer, silty clays. All soils were used without prior treatment of the petroleum contamination.



MICHAEL KELLY

Leaky underground storage tanks are the most common source of petroleum-contaminated soil.

Results to date have been very favorable. All soils sampled were able to produce concrete with a compressive strength greater than 2,500 pounds per square inch, which is the typical strength of sidewalks and curbing. With some of the sandy soils, the concrete that was produced exceeded 5,000 pounds per square inch. In some of these soils, the researchers were able to substitute as much as 40 percent of the sand with petroleum-contaminated soil.

The researchers also were able to produce asphalt that met or exceeded state Department of Transportation specifications for each of the soils tested. With sandy contaminated soil, it was possible to replace as much as 35 percent of the sand and gravel with the soil.

More importantly, experiments conducted so far have shown that these construction materials will not be a source of air or water pollution.

The research into reuse of petroleum-contaminated soil is continuing. The DEPE has approved a second proposal for full-scale testing of concrete beams and

slabs and for a test portion of highway, all constructed with the reused soil. An asphalt plant was licensed last year to accept petroleum-contaminated soil, and it is hoped that this research will encourage concrete manufacturers to modify their plants to be able to produce concrete made from the contaminated soil.

Reuse of petroleum-contaminated soil not only produces strong and durable construction materials, but keeps the contaminated soil out of landfills where it takes up valuable space.

*By Robert Mueller, a research scientist with DEPE's Division of Science and Research*





# Get Ready to Go Birding

Whether they're watching shore birds such as these off the Jersey shore, or other species, millions of people nationwide take part in birding.

by Pete McLain

Birding today is a far cry from "bird-watching," as typified by the gents in knickers and ladies in tennis shoes. Modern birding is a highly sophisticated avocation that attracts more than 61 million people who enjoy millions of recreation days a year and annually spend more than \$14.3 billion.

Dr. Paul Kerlinger, New Jersey Audubon's director of the Cape May Bird Observatory, defines a birder as anyone with a bird identification guide and a pair of binoculars. There are those active birders who spend many hours in the field and an average of \$1,850 per person per year studying birds and building a lifetime list of species they personally have observed. These lists, for a few individuals in North America, may top 700 species. Then there are the many more individuals who simply enjoy seeing and



learning about the birds in their back yards, city parks or wherever they travel on vacation.

The typical birder is middle-aged, highly educated, with an income higher than the national average, according to a recent survey conducted by Kerlinger and biologist David Wiedner. The average birder spends 93 days a year pursuing the activity and drives an average of 2,763 miles.

If you are eager to venture into the serious birding field, one of the best ways is to join the New Jersey Audubon Society or one of the chapters of the National Audubon Society here in New Jersey. Don't get the idea that you have to be an experienced birder to join birding clubs and organizations. A high percentage of the members will be in the beginner category. Experienced birders are ready and willing to help newcomers to the ranks.

What does it take to start a birding career? A good bird identification book such as Roger Tory Peterson's *Field Guide to the Eastern Birds* has few peers in its bird drawings and descriptive text. It fits nicely into a field jacket pocket and quickly will become your birding bible. The second most important item is a pair of quality field glasses or binoculars in the 7 or 8 power size to allow you to study closely the differences in the various species of birds. The beginner should expect to pay a little more than \$200 for decent binoculars. You may want to move up in quality and clarity as you advance in birding. Spotting scopes on tripods or gunstock-mounted scopes are good investments for bird identification.

## Start in Your Own Back Yard

With your birding book and binoculars, where do you start looking for birds to identify? Probably the best place is right in your own back yard, on telephone wires and in small parks, woodlands, open fields or natural areas. As you leaf through the field guide, the numbers of birds may discourage and confuse you. You will probably think, "I'll never learn all these birds" — and you probably never will. However, if you break the book down into the different bird habitats and the physical features of different species, you will find it easier to identify birds by the elimination of those that don't match the habitat you are observing.

As an example, you might divide your study plan into the long-legged wading birds, which usually are seen in shallow water areas. You then would look in the wading bird section of the book and forget about ducks, sea gulls and perching birds. If you see what looks like a duck resting comfortably on the water, study the ducks and geese section of the book and methodically eliminate the ones that bear no resemblance in size or color to what you might be studying. Certain birds are found on the beaches, others soar in the sky, some may flit among the treetops, while others may spend their time on the ground. Try to match the bird you are studying to its habitat.

Once you have located the bird in its habitat, the trick is to



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Check out the  
Fall Birding  
Weekend  
October 2-4  
in Cape May.

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Birders often are  
photographers as well.



study it, carefully noting its color pattern, body shape and how it behaves. Many birds display different color patterns at different times of the year. The spring breeding plumage is distinct, but the immature plumage is not as well-defined in many species in the summer and early fall. You now are becoming an avian detective in seeking the clues to identification.

As you progress in birding, you will make friends with other birders. By combining efforts and experiences, you will start developing a list of birds you have learned to recognize. If you are lucky enough to join an experienced birder who will point out the differences and show you how to recognize some of the more difficult birds, life becomes easier.

### Cape May the Raptor Capital

New Jersey is blessed with some of the best birding in the world in Cape May County. More than 90,000 birders from all over the world visit Cape May Point each year to enjoy the year-round birding opportunities, particularly the fall and spring migrations. It's reported that birders visiting Cape May leave more than \$10 million in their wake.

More than 200,000 hawks of 15 different species pass over Cape May during their migration in mid-September to late October, helping to earn Cape May the title of the raptor capital of the United States. Between 30,000 and 50,000 have been observed at the Cape May Point hawk watch.

One of the best ways to see and really learn about birds is to participate in New Jersey Audubon's Fall Birding Weekend in Cape May, this year scheduled for October 2-4. In addition to the hawks, you can find waterfowl on Lily Lake and on the local bays and waterways. Wading birds will be seen just about any place there are standing shallow water and mud flats.

The time to catch the fall flights of birds is right after a series of north winds the birds ride on as they funnel into Cape May to rest and feed before continuing their southern migration. On these special days, the fields, woods and sky are filled with birds, and it's a birding experience you'll never forget.

Generally speaking, the fall migration starts in mid-August when the shorebirds arrive on the beaches and the warblers, flycatchers and songbirds fill the trees. One of the best birding locations is the 400-acre Higbee Beach State Wildlife Management area adjacent to the Delaware Bay almost at the tip of the Cape May peninsula. From August to November, the birds use the diversity of woodlands, fields, freshwater ponds and bayshore in great numbers.

Another excellent birding area is Cape May Meadows on Sunset Boulevard. This property is owned by The Nature Conservancy, and nature trails and birding go hand in hand. Your chances of seeing a peregrine falcon are excellent in early October, and rails, shorebirds and wading birds utilize the shallow ponds in great numbers from late summer to November.



A red-tail hawk soars over Cape May, considered by many to be the country's raptor capital.

### Spot Hundreds of Species a Year

Million of birds are in Cape May at any given time and it's no trouble for an experienced birder to identify 300 different species of birds a year, and 200 on a fall weekend. If you are interested in beach birds such as gulls, terns, willets, scoters and sanderlings, you can stroll the miles of boardwalks along the ocean front and never get your feet wet or sand in your shoes during your search.

If you visit the Cape in May, you will witness more than a half-million shorebirds of five major species along the Delaware Bay shore from Fortescue to the Cape May Canal. This is the second-largest concentration of spring migrating shorebirds in the Western Hemisphere. The best places to observe them are at Reed's Beach and Moore's Beach off Route 47, about 25 miles north of Cape May Point. May is the prime spring birding month for shorebirds in Cape May County.

If you're interested in seeing the pelagic birds, those that spend most of their lives offshore in the Atlantic Ocean, there are charter boats that regularly run birding and whale-watching trips offshore. You probably will see species on these trips that you've never seen before.

Bed and breakfast accommodations in the restored Victorian homes facing the ocean are excellent in Cape May. There also are many comfortable hotels and fine restaurants, as well as nearby campgrounds.

If you would like additional information on birding in Cape May, write to the Cape May Bird Observatory, P.O. Box 3, Cape May Point 08212, or call (609) 884-2736. Better yet, stop in at the Cape May Bird Observatory on East Lake Road in Cape May Point and pick up a list of the various birding functions scheduled by New Jersey Audubon and the Cape May Bird Observatory. The observatory maintains a "Birding Hotline" that you can call to check on bird migrations and any special birding news. The hotline number is (609) 884-2626.

One of the best ways to really learn about birding is to attend the New Jersey Audubon's fall or spring birding weekends, which feature classroom and field workshops on bird natural history, field trips and evening programs. Call the Cape May Bird Observatory for additional information.

*Pete McLain is an outdoors writer who lives in Toms River.*



# Time Stands Still on High Breeze Farm

by Jim Wright

Illustrations by Robert Fletcher

Since the early 1960s, New Jersey's Green Acres Program has acquired more than 220,000 acres of land for conservation, ranging from vest-pocket parks in urban areas to the 11,332-acre Wawayanda State Park in the north.

Along the way, the state has secured such treasures as the Delaware and Raritan Canal State Park and Liberty State Park, with its historic brick Central Rail and Ferry Terminal. The state also has preserved two Revolutionary War battlefields, at Monmouth and Princeton.

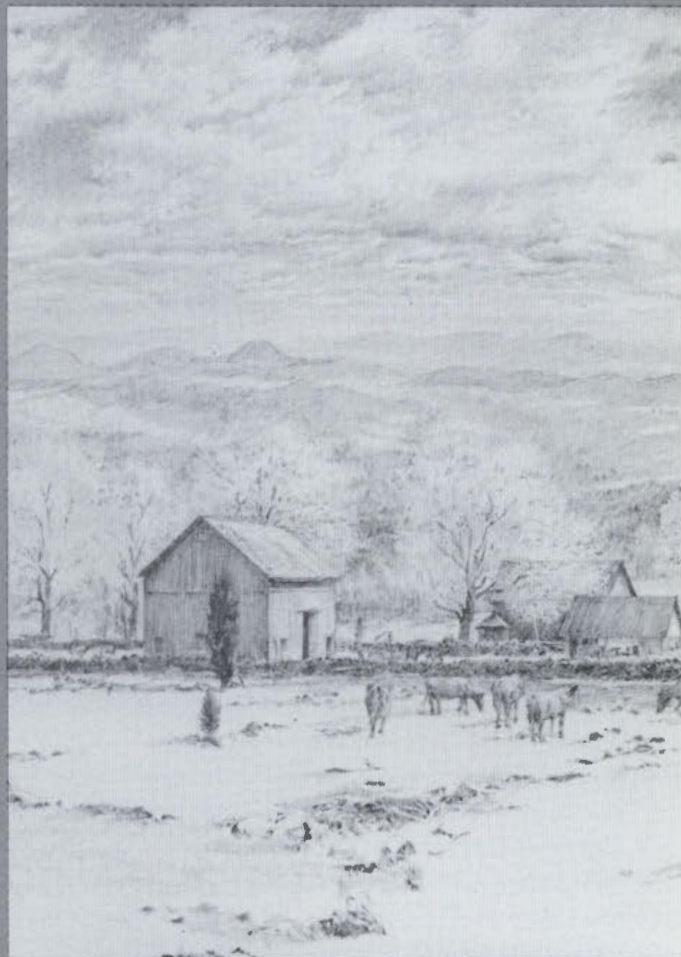
But for all its foresight, the state made one of its most significant historical purchases without fully realizing what it had bought: a 184-acre Brigadoon called High Breeze Farm.

The farm, located halfway up Wawayanda Mountain in Vernon Township, Sussex County, amounts to a time capsule of an American family farm of years gone by. Although High Breeze has fallen into disrepair, the state plans to someday restore it to its former beauty and turn it into a living-history museum, where visitors will be able to see demonstrations of old-fashioned farming techniques.

The sign on the road up the mountain to the farm sets the stage: "Road designed in the Eighteenth Century for horse and carriage travel. Please drive leisurely."

A few hundred yards up the steep and high-crowned washboard road is High Breeze, with its gently rolling pastures and its spectacular views of a valley that stretches from Vernon across the border into Warwick, N.Y.

Thanks to tenant farmer Bill Becker, High Breeze still has the feel of a working farm. You can hear pigs grunting in their stalls in the upper barn, and watch cows



High Breeze Farm in Sussex County remains suspended in time.





graze in the lower pasture. Bees swarm around the hives in one of the sheds, and come spring, Becker again will make maple syrup from the stately sugar maples that line the ancient road.

But hard by the road lies High Breeze's 165-year-old main house, as desolate as a haunted house. Indeed, a spirit lives in the once-stately two-story clapboard house, with its old slate roof and flaking dull-white paint. It is the spirit of the old-style American family farm, comprising equal measures of hard work, ingenuity and independence.

From 1860 to 1986, High Breeze was home to four generations of Barretts. Though the times changed, the Barretts' self-sufficient approach to farming did not. When times got lean for small-scale agriculture in the late 1800s, many farmers began to specialize in dairy products or fruit-growing, but the Barretts continued their broad-based approach.

Although four generations of Barretts traded home-grown eggs for coffee, sugar and flour



at the general store at the bottom of the mountain, they refused to put all of their eggs in one metaphorical basket. From David Barrett in the 1860s to Luther Barrett in the 1980s, they raised horses, cattle and poultry. They kept geese and ducks. They made maple syrup and maintained beehives for honey.

The Barretts grew hay, corn, turnips and rutabagas. They cultivated pear, peach, plum and apple trees. They hunted small game. They operated their own blacksmith shop, and shod horses far and wide. In the summer, they rented rooms and provided meals to people from New York City — a precursor of today's bed and breakfasts.

And the more that the world changed beyond the stone fences of High Breeze, the more the Barretts clung to traditional ways. Aside from buying an occasional pickup truck and getting rudimentary electrical service, the Barretts ignored the 20th century. To this day, the main house has never had indoor plumbing, central heating or even a telephone. Up until his death in 1986, Luther Barrett, the last in the family to work the farm, still cut hay with a horse-drawn mower — as his great-grandfather had done more than a century before.

While High Breeze remained suspended in time, most other mountain farms in the region disappeared altogether — consumed by state parks, watersheds and real estate developers.

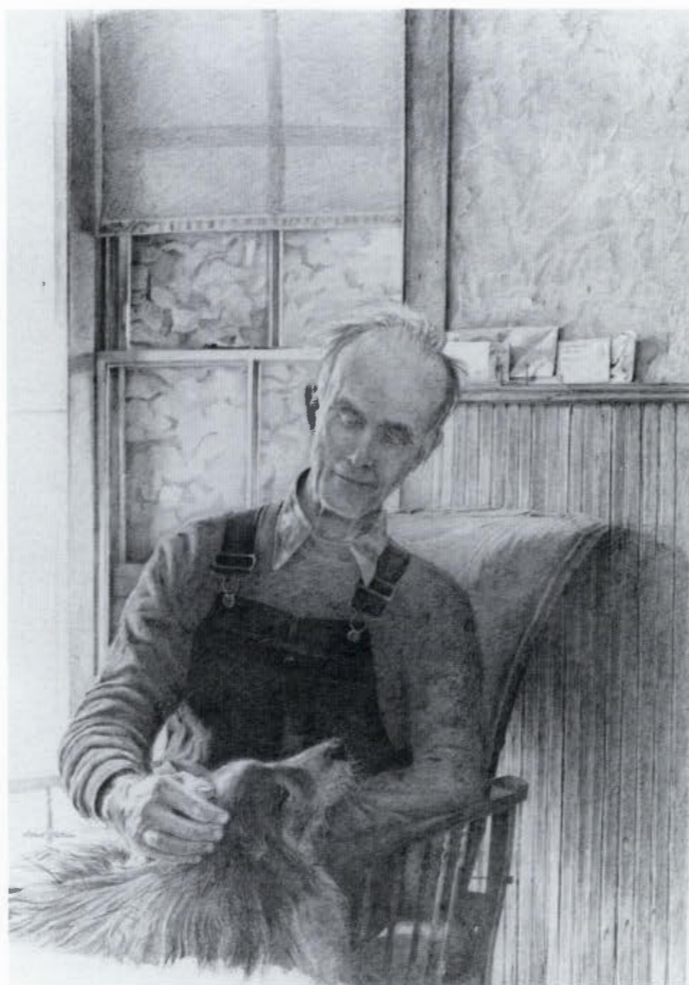
From an environmental standpoint, the state's purchase of High Breeze in 1981 was a necessity. Not only did the farm border Wawayanda State Park and the Appalachian Trail on the south, but it also was a parcel of prime real estate at a time when Sussex County was becoming one of the fastest-growing areas in the state. Indeed, three-fifths of the farmland still remaining in the county is owned by real-estate interests and earmarked for development.

The state's plan was straightforward: It would give Luther Barrett lifetime use of the farm (fiercely independent, he opposed the sale) and, after his death, it simply would incorporate the 184 acres into Wawayanda State Park, as it had done with three other farms.

But shortly after Luther Barrett died in 1986, the president of the Vernon Township Historical Society came up with a different plan. When Ronald J. Dupont Jr. looked at the farm, he didn't see the demise of a way of life — he remembered all that High Breeze stood for and sought a way to preserve it.

"What always impressed me is that when you step out of your car at High Breeze, you step into history," says Dupont. "You don't have to worry about rebuilding the farm to make it look like it used to. It never changed. High Breeze is a time capsule of farming in rural New Jersey in the late 19th century."

Five years ago, with pocket change for a budget, but a wealth of determination,



Luther Barrett, shown here with his border collie Jeff, was the last in his family to work the farm.





Dupont launched a campaign to keep the farm alive. He spent months and months researching High Breeze, the Barrett family and the region's agricultural legacy, then applied to the Office of New Jersey Heritage for state historic-site designation.

Not only did the state approve Dupont's request, but it also forwarded the application to the U.S. Department of the Interior to place High Breeze Farm on the National Register of Historic Sites. In July 1989, High Breeze received that distinguished federal status.

In the meantime, Dupont led a grassroots campaign in High Breeze Farm's behalf. Mustard-yellow posters soon started sprouting up on area bulletin boards, and their message was as clear as the huge block letters exhorting, "SAVE THE FARM."

"I was showing a group of students a picture of the horse barn, which has a little window up in the hay loft, by the peak of the roof," Dupont recalls. "A boy asked if the window was there so that the horses could look out, and it suddenly dawned on me — to the generations of kids who have grown up in the city or suburbs, this farm is as foreign as ancient Egypt. I realized that if we didn't save High Breeze, a rural lifestyle that was part of New Jersey for 250 years would vanish forever."

And the state of New Jersey heeded his plea. Dorothy Guzzo, senior planner for the Department of Environmental Protection and Energy, was quick to appreciate the potential of Dupont's vision for High Breeze.

"It's like someone dropped a blanket over the farm at the turn of the century," says Dorothy Guzzo, a planner for the state Department of Environmental Protection and Energy.



"The farm has never been modernized, and we're very sensitive to that," she says. "It's like someone dropped a blanket over the farm at the turn of the century. Now we're lifting the blanket and carefully dusting it off."

With the help of matching grants from the New Jersey Historic Trust, the DEPE has developed a plan to preserve the buildings. The first phase, to stabilize the buildings to keep them from deteriorating further, was completed this past summer. Preliminary architectural work on the restoration of the buildings has been done, as have archaeological studies. But as Guzzo concedes, much work remains — and much more money needs to be found if the farm is to become a living-history museum.

Aside from restoring the farm to its bygone beauty, long-term plans include the possibility of building a visitors center and a bypass around the farm itself, which would be only fitting. In a sense, the 20th century has been bypassing the Barretts' farm all along.

If all goes according to plans, the farm will one day be restored to the way it was in its heyday at the turn of the century. There will be tours of the main house, featuring demonstrations of quilting, candle-making, cooking, cheese-making and butter churning.

In the summer kitchen, there'll be apple pressing and maple-syrup making. The upper barn will be home to square dances and special musical events. The orchards will be recultivated and will provide the bounty for annual harvest festivals. The blacksmith shop will again echo with the clang of a smithy's hammer against hot iron.

The farmstead also will have a picnic area, nature trails and plenty of room to roam, or just set awhile and enjoy nature. Because of the farm's mountainous location and steady breezes, crop-killing frosts come later to High Breeze and the seasons seem heightened there as a result. A visitor once called the farm "heaven on a hillside."

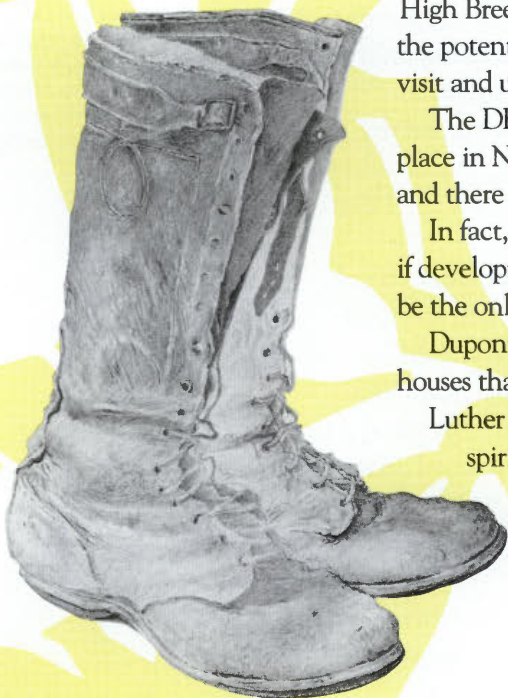
There are many reasons, of course, to let High Breeze Farm die quietly. Money is tight these days, and old-style farming is passe. But to walk the fields and wood lots of High Breeze and read the plans for what might be, one cannot help but be struck by the potential for such a living history museum, a working farm that New Jerseyans can visit and understand firsthand what the past was really like.

The DEPE's Guzzo agrees. "We're aware of the farm's significance and its special place in New Jersey history. It's been a working mountain farm for nearly two centuries, and there are very few like it left."

In fact, one of the planner's reports on the prospects for High Breeze predicted that if development in the region continues at the present rate, someday High Breeze will be the only farm left.

Dupont estimates that "even 25 years down the road, you're going to see more houses than farmland in Sussex County."

Luther Barrett, a conservationist long before the term was popularized, was a spiritual man as well. One of his favorite proverbs from the Bible describes why the state hopes to save High Breeze: "Remove not the ancient landmark thy fathers have set."



*Jim Wright, an editor for The Bergen Record, and Robert Fletcher, a former Midland Park advertising executive, are working on an illustrated book about Luther Barrett and High Breeze Farm.*



# Hooked on the Big Catch

By Dory Devlin

Acrylic paintings  
by Mark Schreiber

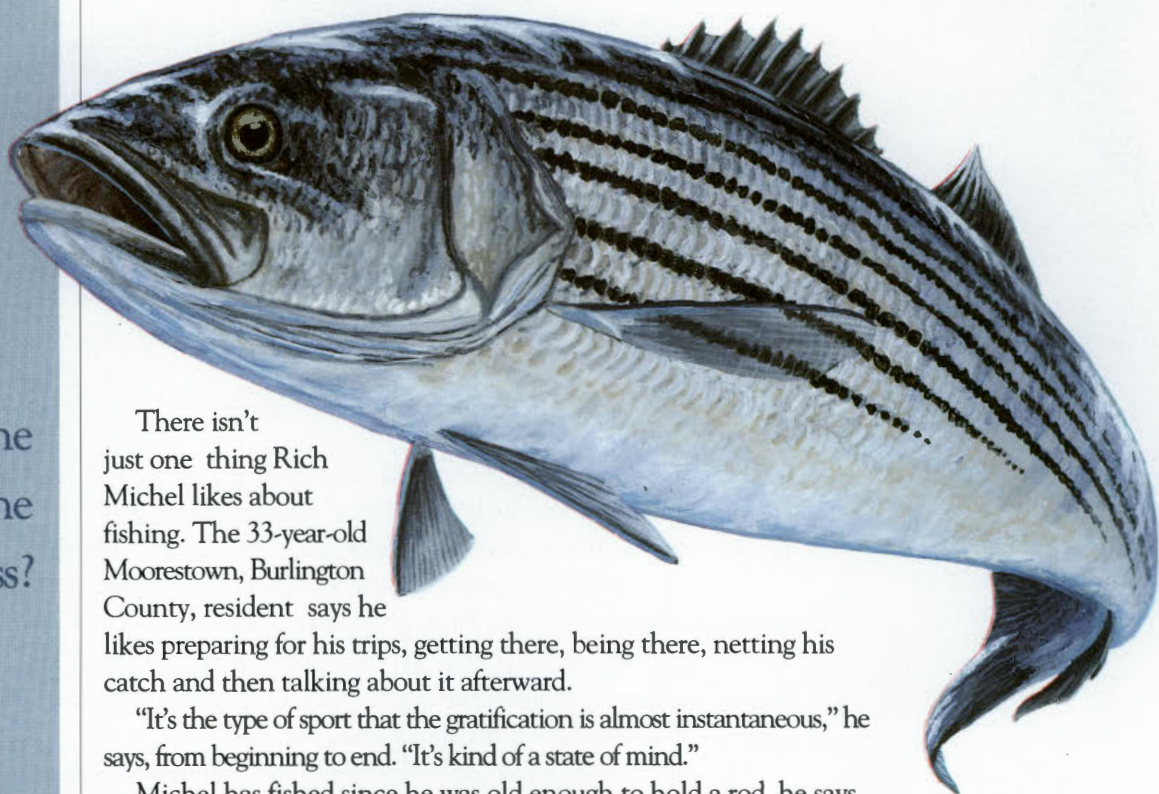
Photos by Dilip Kane  
and J.J. Raia

Did You Hear the  
One About the  
Striped Bass?



Rich Michel

Thousands of anglers, young and old, each year pursue the dream of catching "the big one." The New Jersey Skillful Angler Program, sponsored by the state Division of Fish, Game and Wildlife, annually recognizes the men and women who make their dreams come true by combining skill with luck to catch the biggest fish in each species category for the season. Following are profiles of five of the winners for the 1991 fishing season.



There isn't just one thing Rich Michel likes about fishing. The 33-year-old Moorestown, Burlington County, resident says he likes preparing for his trips, getting there, being there, netting his catch and then talking about it afterward.

"It's the type of sport that the gratification is almost instantaneous," he says, from beginning to end. "It's kind of a state of mind."

Michel has fished since he was old enough to hold a rod, he says. These days, he spends most of his weekends fishing in the Mystic Islands for flounder, blues and bass. He also likes to venture offshore for tuna and marlin.

It was a 51-pound, 8-ounce striped bass that earned Michel his personal record on October 27 from a boat in the Great Bay. He got a later start than usual that day, but it didn't matter. At about 11:30 a.m., he felt a strong bite. It was a foggy day and he was by himself.

"With a 12-pound test line, it was quite a battle," says Michel. "I couldn't see more than 100 yards, and there were so many boats around I thought one would cut me off."

He was able to back the boat up to the fish, wrestle with it and finally push half of it into his net. "That fish wasn't going into that net," he laughs. In all, it took about 20 minutes.

Michel likes to fish in small area boat tournaments because he enjoys the camaraderie with the other fishermen.

When not competing, he fishes alone much of the time, but also goes out with friends. A commercial heating and air conditioning contractor, he enjoys taking his weekend adventures to work every week, where he shares them with co-workers who also enjoy the sport.

"This is just something I've always enjoyed and something I can blend into work with the others who like to fish," he says.

Telling the story, competitively, is half the fun.

"This fish," he says about his record striped bass, "will be 100 pounds by the time I'm 50."





## Half-Hour Fight Nets Biggest Brown Trout



Laura Still

Growing up in Indiana, Laura Still spent much of her summers fishing in Michigan in a small place called Lake Shavehead. It's something she has always loved to do, but until four years ago, she didn't get out on the water as much as she did in her childhood summers.

These days, Still, a 28-year-old secretary, goes fishing every weekend with her husband Andy and her son Brian.

"It's very relaxing," says Still, who most often casts her line at the Round Valley Reservoir in Hunterdon County. "It's nice and quiet, and we like to watch for other animals that are on the shore while we're fishing."

The early morning solitude Still seeks on the water was shattered at 6:45 a.m. on May 5, when the threesome reeled in an 18-pound, 5-ounce brown trout. She knew she had a big one since the fish was pulling around their canoe even with the anchor down.

"It was a half-hour fight," recalls Still. "I was shaking. I just couldn't believe it."

A 6-pound Trilene test line with a Shakespeare Ugly stick and a Daiwa reel helped them win the battle. The 18-pound, 5-ounce fish netted Still the state's biggest brown trout of the season. She also holds the current state record for brown trout, which was 13 ounces larger.

Still, of Parsippany, Morris County, and her husband, who were married July 18, also venture out saltwater fishing off Point Pleasant on 24-hour trips. "We go for blues and we're going to try tuna fishing this year."

She has caught a variety of fish this past season, from catfish and pickerel to white and yellow perch. Five-year-old Brian, too, plays a big hand in the day's catch.

"We let him reel in all the fish that we catch," says Still, who adds that they usually don't keep the fish.

"We release most everything," says Still. "Except for that brown trout."



## Fishing 'Addict' Lands Big Largemouth Bass



Gary Lalena

For many, angling is a relaxing way to pass the time. Not for Gary Lalena.

"It's addictive," says Lalena, a 31-year-old Lindenwold, Camden County, resident.

Fishing is what he does for fun, and for work. It's just something he feels driven to do.

"I've been fishing since I was about six or seven," he says. He drops his line for about 40 hours every week when he's not working at the Sports City sporting goods store in Berlin.

Fishing from the shore in Hammonton on May 18, Lalena reeled in an 8-pound, 5-ounce largemouth bass. An 8-pound test line with a Series One rod and Daiwa reel helped do the job, along with some spinnerbait as a lure. Lalena builds and sells spinnerbaits and buzzbaits.

But snaring large bass is nothing new to Lalena. He makes a habit of it.

He catches an average of 20 to 25 fish that weigh more than 6 pounds each year. The biggest largemouth bass he has caught weighed 9.5 pounds.

"I have about 20 mounted," he says. "All bass."

The avid angler has won the Trilene fishing contest two years in a row for casting accuracy.

Lalena caught the largemouth bass at about 1 a.m. The wee hours are when he does some of his best fishing, he says. Usually, he's out from about 10 p.m. to 4 a.m.

"That's when the big ones are out," he says. "The water's usually quiet. No one's giving the fish pressure."

He fishes at lakes throughout Camden and Atlantic counties. "I've taken out of almost every possible lake," he says.





## Dad Watches Son Reel in 6-Pound Black Sea Bass



Mike Brennan



When 9-year-old Mike Brennan and his dad, Jeff, go fishing, it's Mike who doesn't want to leave.

"I usually want to go home and he wants to stay," says Jeff, who has been fishing with his son ever since Mike was old enough to hold a rod. He was about 5 years old when he learned the basics in a farm pond nearby their Blakeslee, Pa., home.

Jeff says he and his son don't get out on the water as often as he would like. They go freshwater fishing about once every two weeks and saltwater fishing a few times a year.

"We have a lot of fun," says Jeff Brennan. "I like watching him do things; I get a thrill out of it."

He remembers vividly the day Mike caught his first tuna, about 40 miles off of Point Pleasant. "He stuck right with it," he remembers. "It took him 40 minutes, and he didn't let up on it. It was fun to watch."

Mike says he likes freshwater fishing the most. "There's just a lot more types of fish and they're bigger," he says.

Mike caught one of those big fish from the charter boat "The Wright Stuff" southeast of Manasquan on December 11 at about 11:30 a.m. It was a 23-inch long, 6-pound black sea bass, caught with a 30-pound test line and a Penn rod and reel.

"It took me awhile," recalls Mike, but finally the bass surrendered.

What did he do with it?

"We ate it," he says. "It was good."

Mike says he doesn't usually like to eat all the fish he catches, but this was an exception.

"I like catching 'em better. I eat 'em if I have to," he says.

What he really likes about fishing is the test of his ability against the fish kingdom's.

"I like just challenging myself and seeing if I can catch the biggest fish in the area," he says.

His toughest challenge, and his most fun, was tuna. "It was hard. They fight a lot," says Mike. "My arms were sore when we got back."

With all his experience, it looks like Mike will have a lot to teach the family's youngest fisherman, 2-year-old Matthew.

"I'm hoping he'll show him the ropes," says Dad.



## Record Muskie Provides Chills and Thrills



Lee Pflomm

Lee Pflomm of Waldwick, Bergen County, fishes anywhere from every day in the week to once every two or three days.

"It depends on the time (of day) and the mood," says the 23-year-old.

He started fishing when he was about 7 years old with his grandfather. Since then, it's just been a part of his life.

Pflomm likes to fish in the morning mostly, for bass and trout. But it was while he was fishing for walleye with orange shiners that he netted his biggest catch, a 22-pound, 3.25-ounce muskellunge.

"I was fishing on the bottom when he hit," Pflomm says. "He came up to the surface and he looked around. My first thought was that it was a gar. Then he went down and he kept coming up and down and lunging away from the boat every time I tried to net him."

Finally, he got the head into the net and maneuvered the fish onto his raft in the Monksville Reservoir.

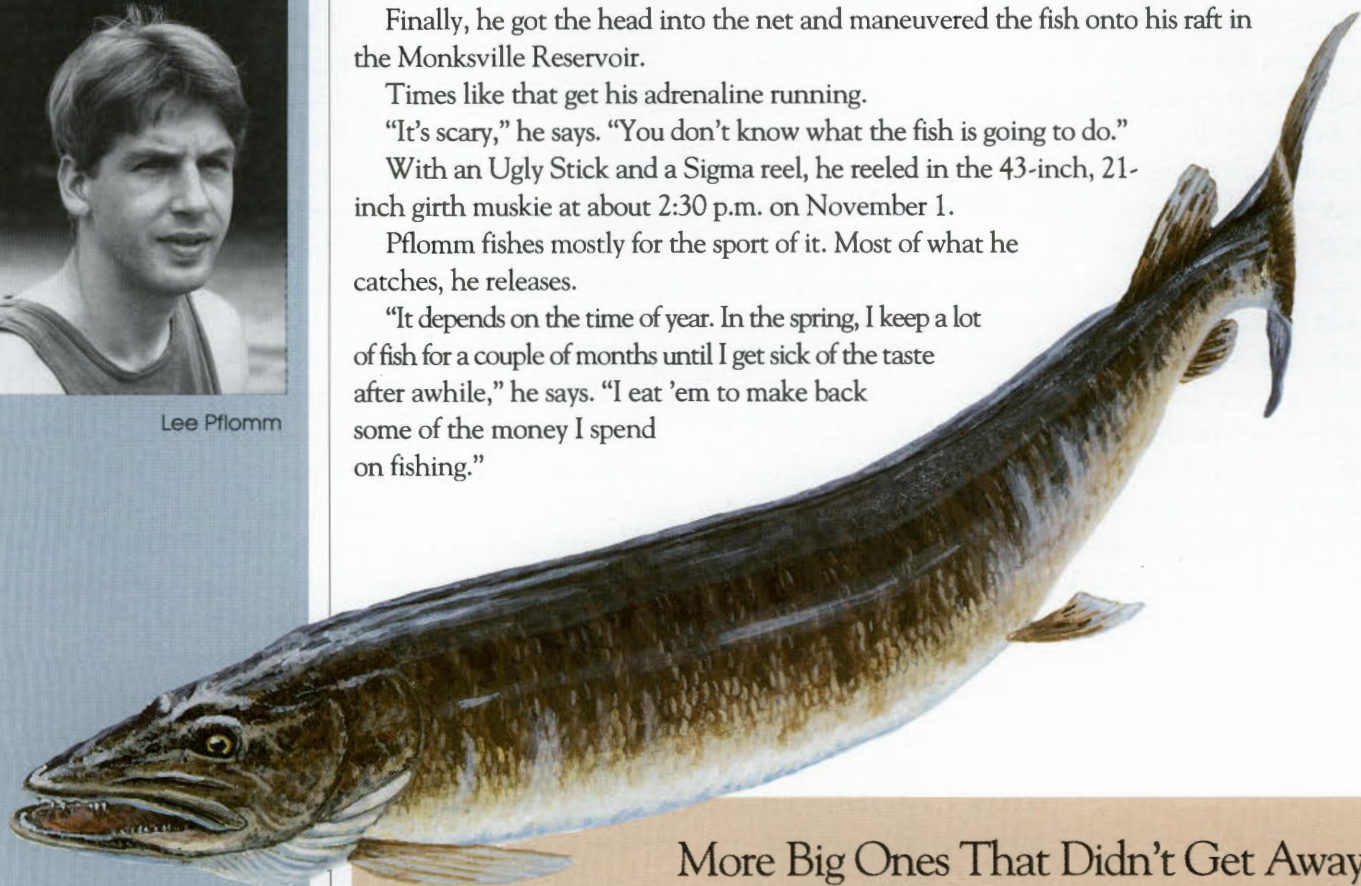
Times like that get his adrenaline running.

"It's scary," he says. "You don't know what the fish is going to do."

With an Ugly Stick and a Sigma reel, he reeled in the 43-inch, 21-inch girth muskie at about 2:30 p.m. on November 1.

Pflomm fishes mostly for the sport of it. Most of what he catches, he releases.

"It depends on the time of year. In the spring, I keep a lot of fish for a couple of months until I get sick of the taste after awhile," he says. "I eat 'em to make back some of the money I spend on fishing."



### More Big Ones That Didn't Get Away

Other fish worthy of 1991 Skillful Angler Awards and the anglers who caught them were:

**Smallmouth bass** — 6 pounds, 5 ounces, Bob White, New Providence; **channel catfish** — 17 pounds, 4 ounces, Aristides Torres, Summit; **chain pickerel** — 5 pounds, 3 ounces, John Boxler, Millville; **brook trout** — 3 pounds, 6 ounces, Paul Nardone, Colonia; **lake trout** — 15 pounds, 6 ounces, Bob Froehlich, Cranford; **rainbow trout** — 8 pounds, 2 ounces, Joseph Rosa, Wallington; **American shad** — 7 pounds, 8 ounces, Bud Schlosser, Levittown, Pa.; **black drum** — 80 pounds, D.J. Rutledge, Paulsboro; **bluefish** — 18 pounds, George Rhubart, Burlington; **winter flounder** — 2 pounds, 5 ounces, Douglas Millen, Richboro, Pa.; **kingfish** — 1 pound, 14 ounces, Anna Olszewski, Tuckerton; **blue marlin** — 535 pounds, Steve Gallagher, Riverton; **white marlin** — 87 pounds, Don Woods, Williamstown; **tautog** — 17 pounds, .49 ounces, Bill Sofield, Tuckerton; **albacore tuna** — 62 pounds, John Stankina, Willow Grove, Pa.; **weakfish** — 10 pounds, 8 ounces, James Codner, Oakhurst;

For a brochure on how to apply for a Skillful Angler Award, write to: the Division of Fish, Game and Wildlife, CN 400, Trenton 08625-0400, ATTN: Skillful Angler Program.

Dory Devlin of Basking Ridge is a reporter for the Star-Ledger of Newark.



# Invest in Home Energy Conservation

by Priscilla E. Hayes

Frank Migneco takes his work home with him, but his family doesn't mind. In his marketing job at Jersey Central Power and Light, he helps get the word out about JCP&L's varied energy conservation programs.

And then Migneco goes home and makes sure the dust is brushed off the coils at the back of his refrigerator to keep it running efficiently. Or he replaces conventional light bulbs with compact fluorescent bulbs, which produce at least the same amount of illumination using a fraction of the electricity.

You, too, can be bitten by the energy conservation bug and start realizing savings in your utility bills. One of the best places to start is the Home Energy Savings Program (HESP), currently sponsored by the New Jersey Board of Regulatory Commissioners and the electric and gas utilities. The cornerstone of HESP is the energy audit, which the utilities provide free of charge to their consumers. Just by calling your power company, you can arrange for a trained and state-certified energy auditor to look your house over from top to bottom, searching for energy-wasting problems and for the most cost-effective ways of dealing with them.

The auditor will give you advice on whether you can perform conservation work yourself, and the probable costs, with or without a contract.

Besides the on-the-spot tips during the audit, you will receive a computer analysis of your audit and publications that offer other ways to save energy.

Alice Borsody, an energy auditor employed by the consulting firm DMC Services, has been performing such audits for

homes "since before it was fashionable to save energy." She finds that many times the primary reason for seeking an audit is for increased comfort in the home, rather than for cash savings.

"People are amazed when I can walk into a home and immediately single out which room is the coldest," she says.

Some problems, such as a family room placed away from the rest of the house, are design problems. But Borsody finds there is always something the auditor can suggest to increase comfort and conservation in the home.

Some of the tips cost nothing, since they require simply a change in your practices. Others require some investment of money and often are looked at in terms of payback period — how long it takes to recoup that money in energy savings.

The auditors recommend brushing or vacuuming dust and pet hair off refrigerator coils at least every two months, since such buildup tends to insulate the coils, forcing the refrigerator to work harder to perform its job of dispersing heat from its interior. The frozen food in a full freezer helps insulate the interior so the freezer doesn't have to work as hard.

Likewise, flushing the accumulated sediments out of the bottom of your hot water heater can make its work easier and make it last longer. Wrapping the hot water heater as your utility recommends, and insulating the cold and hot water pipes where they leave the hot water heater, reduce heat losses in general and make the hot water stay hotter and the cold stay colder. Hot water temperature also can be adjusted if it is too high, or a timing device can be installed that will allow the heater to produce hot water only when actually needed. Similar timers to control heating levels in the home are readily available and take the thought out of turning down the heat at night or during other periods when it is not needed.

Caulking and weather-stripping are cheap and relatively easy measures and help reduce energy needs in both heating and cooling seasons. Such sealing may be necessary not only around doors and windows, but around recessed lights, skylights and the holes drilled





Labels on major appliances, such as this one for a refrigerator-freezer, provide consumers with helpful information on energy efficiency.

to allow wires and plumbing to enter the home. It is important to make sure you do not close off any vents of the "weep holes" at the bottom of windows, which allow rain water falling through an exterior screen to flow out and prevent buildup of vapor on windows when the storm window is pulled down.

Similar precautions must be observed when placing insulation in walls or ceilings, generally a recommended efficiency measure. Placing insulation with a vapor barrier over previously installed insulation with a vapor barrier will trap moisture in the first layer of insulation, where it can promote rotting of walls or ceilings. Moreover, insulation should not be in the roof, but against the ceiling.

Choose the least sunny window — optimally one facing north — for a room air conditioner, or make sure that a tree will shade it and reduce its work. All air conditioning units must be kept clear of grass clippings and similar objects that can clog an outdoor unit. Evergreen shrubs to hide a unit also adversely affect its operation, especially if planted too close.

If you happen to be about to build or renovate a home, you can take the sun into account by putting large windows and a summer shading overhang on the south side, and planning as few windows as possible on the north side.

Compact fluorescent light bulbs, which can be used with minor adjustments in regular sockets or lamps, initially cost more than standard light bulbs, says Roseanne Huhn, an energy conservation specialist at Public Service Electric & Gas. But they use only about 25 percent of the energy to produce the same amount of light and last 10 times as long, she notes. PSE&G and other utilities are working on programs that will help educate consumers about these bulbs, and hope eventually to offset some of the purchase costs.

Other opportunities for savings may come from replacing appliances with more energy-efficient ones when the need for new ones arises. Your best source of advice for choosing energy-efficient appliances or heating systems to replace or supple-

Refrigerator-Freezer  
Capacity: 23 Cubic Feet

(Name of Corporation)  
Model(s) AH503, AH504, AH507  
Type of Defrost: Full Automatic

## ENERGYGUIDE

Estimates on the scale are based on a national average electric rate of 4.97¢ per kilowatt hour. Only models with 22.5 to 24.4 cubic feet are compared in the scale.

Model with lowest energy cost

**\$68**

**\$91**

THIS MODEL

Estimated yearly energy cost

Model with highest energy cost

**\$132**

Your cost will vary depending on your local energy rate and how you use the product. This energy cost is based on U.S. Government standard tests.

**How much will this model cost you to run yearly?**

		Yearly cost
		Estimated yearly \$ cost shown below
Cost per kilowatt hour	2¢	\$44
	4¢	\$88
	6¢	\$132
	8¢	\$176
	10¢	\$220
	12¢	\$264

Ask your salesperson or local utility for the energy rate (cost per kilowatt hour) in your area.

Important Removal of this label before consumer purchase is a violation of federal law (42 U.S.C. 6302)

**A.** Estimated annual operating cost for this model only.

**B.** Scale showing lowest and highest estimated operating costs for models within this size range. These models represent different brands, not just those of the company listed in the upper right-hand corner.

**C.** Where the estimated annual cost of this particular model falls in comparison to all other models in this size range.

**D.** A grid to help determine more closely the customer's operating cost based on local utility rates and use habits.

ment your existing ones is your local utility company. Some utilities offer rebates on the purchase of certain items, such as air conditioners or heat pumps with a specific efficiency rating.

Your power company may offer other opportunities for economies — both in energy and in cash incentives. JCP&L and PSE&G both have an appliance cycling program for customers with central air conditioners. The air conditioners are automatically turned down for short intervals on certain hot days, helping to prevent brownouts. All those who choose to participate receive money back during the summer



months; customers of JCP&L may elect to have that money automatically sent to one of four environmental groups. Some utilities offer customers the option of participating in a time-of-day reduced rate program. Loans or other help with conservation measures are available, especially for low-income families and seniors.

*Priscilla Hayes is a freelance writer who lives in Robbinsville.*

## Take Advantage of These Energy-Saving Tips

- 1** Open drapes and shades during winter days to get the heat of the sun and close them at night or when it's cloudy to retain heat. Close drapes and shades on the sunny side of the house in the summer to avoid extra heat from the sun.
- 2** Turn your thermostat down to 68 degrees Fahrenheit on winter days, 60 degrees at night. Use an automatic clock thermostat to turn down the heat when no one will be home. During the summer, set the thermostat at the minimum level for comfort, preferably 78 degrees Fahrenheit or higher.
- 3** Don't block heat registers or radiators. Keep them clean for better heating efficiency.
- 4** Keep air conditioner and furnace filters clean, or replace them.
- 5** Turn lights off — not only to save electricity, but to avoid extra heat from the lights during the summer.
- 6** Use window fans instead of your air conditioner to create a cross-breeze when the heat is not too oppressive.
- 7** Take showers instead of baths. They generally use less hot water and less heating energy. Install a water flow restricter on the shower head to save hot water.
- 8** Make sure your hot water heater is not bigger than your family needs.
- 9** Clean dust and dirt off lights and fixtures for more efficient operation and more light.
- 10** Install dimmer controls and three-way switches that save electricity by allowing you to match light to lighting needs.
- 11** Allow no more than one-quarter inch of frost on your freezer before defrosting.
- 12** Wash full loads of laundry, but separate drying items into heavy and lighter items. Don't overload the dryer.
- 13** Turn off televisions, stereos, radios and lights if no one is using them.





## Dreaming in the Sun

Lyle Rawlings had dreamed of building a solar house for 10 years. On cold, sunny days, he would look around his traditional house in Montville and bemoan all the solar energy he could be using.

But he wanted more than a break on his heating bill from southern-facing passive solar windows, or from a few solar panels to collect heat for his hot-water needs. Rawlings also wanted to educate people about the possibilities solar-powered houses held out for energy independence and a cleaner environment.

So he created FIRST — Fully Independent Residential Solar Technology, Inc., a nonprofit organization. His organization was awarded a \$171,000 grant from the New Jersey Department of Environmental Protection and Energy's Office of Energy to fund construction of a 2,300 square-foot solar house in East Amwell Township, Hunterdon County.

And in November, Rawlings realized his dream as he and his family moved into the demonstration house.

Sunlight streams through the south-facing wall of low-iron, extra-clear windows at the front during the cool months. The sun's heat is collected and stored by nine movable walls. The special black surface on each transmits heat to paraffin inside, which melts and slowly gives off heat to the interior of the house. Addi-



Sunlight streams through the south-facing wall of windows of Lyle Rawlings' solar home in Hunterdon County.

tional heat is captured by the black slate or black tile floors in all the rooms on the southern side. This heat is stored in the 8-inch concrete slab underneath, insulated by 2 inches of foam beneath it.

Rawlings found that he needed the propane backup heaters somewhat more than he had anticipated last winter. This winter he expects to reduce heat losses from the house with new thermal shades for the windows and fewer air leaks in the walls.

As the summer months approach, the overhang above the front wall of windows reduces the amount of sunlight that reaches either the paraffin-containing walls or the floor of the house, so that in the hot months no direct sunlight enters to produce heat.

All the electricity for the house is produced by 36 silicon photovoltaic panels on the roof, which convert sunlight directly to electricity. Twelve golf cart batteries store the electricity and deliver it to the house, either in DC form or, after conversion by an inverter, as AC current. The collection

system automatically stops producing electricity when the batteries are at capacity. Rawlings finds that the panels are so efficient that the system shuts off at about 11:30 a.m. on a sunny day. He and his wife try to find ways to use up the "excess energy" that the sun can produce for them during the rest of the day. That may mean vacuuming the whole house or cooking up food for later use.

The system technically is designed to store about four extra days of electricity, to be drawn on during cloudy periods. But during an especially cloudy period lasting about three weeks, Rawlings and his family did not run out of power, although they did become more careful about how they used it. Indeed, the only "backup" to the electric system is a propane stove, which replaces the electric cook-top and frying pan when it has been overcast.

A composting toilet reduces the electrical needs of the house, since it decreases the need for water to be pumped out of the well.

Likewise, the refrigerator, television, lap-top computer and lights were chosen or designed to be especially energy efficient. A curved mirror atop the house collects heat for hot water needs.

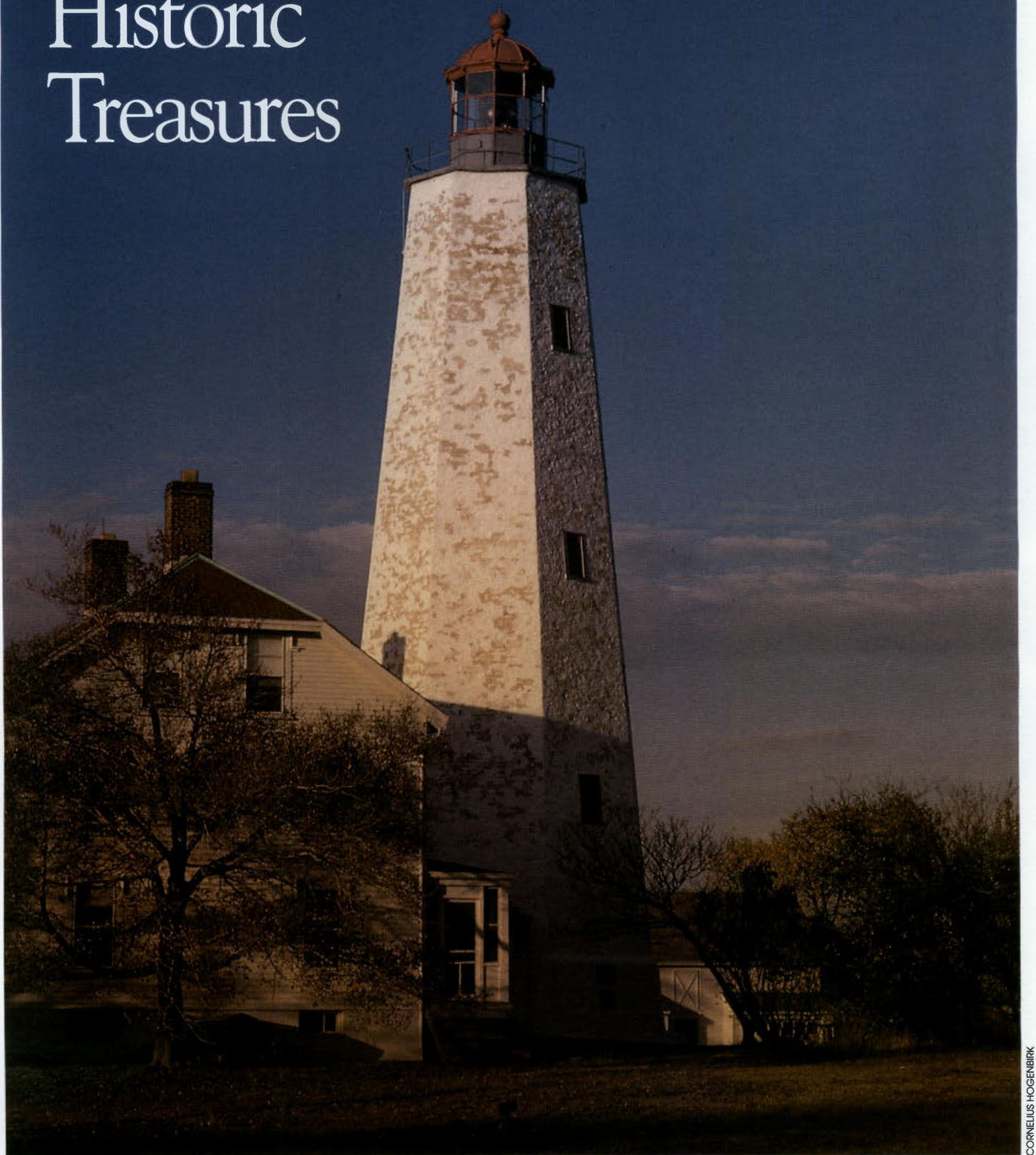
Rawlings is quick to admit there still are some bugs in the functioning of the house. Some of the windows in a separate top level of south-facing windows may need to be replaced with windows that open to allow summer heat to escape. The composting toilets are not working as well as they should. But Rawlings is philosophical about these problems, since he feels he now is actively working to help develop a fully commercial technology that anyone can apply.

Rawlings calculates that the extra cost of the solar aspects of the FIRST demonstration home, about \$27,000 in all, will be paid back in energy savings in 10 years. In fact, he calculates that the monthly cost of the extra mortgage amount that normally would be needed to finance these additional features is roughly equal to the energy savings each month.

His hope, he says, is that his house will help demonstrate the feasibility of solar energy so that "somewhere in the next few years," people will be able to go to the marketers of homes and buy a complete solar option at a price comparable to what they might pay for one of today's traditional homes.



# New Jersey's Historic Treasures



CORNELIUS HOGENBIRK





The Force Home is an 18th-century farmhouse in Livingston, Essex County, which was built around 1749 and significantly expanded in the early 19th century. Samuel Force, an early settler in the area and one of the original township officials, bought the house as a gift for his two sons, Thomas and Jonathon. Today, the home, which serves as a museum and headquarters for the Livingston Historical Society, and its surrounding park still maintain much of the early rural charm and craftsmanship of the era.

The 45,000-candlepower beacon housed in Sandy Hook Lighthouse (far left) has illuminated New Jersey's dangerous shallows for more than 200 years. In 1761, the merchants of New York City financed a lottery to raise the funds to build the lighthouse at Sandy Hook, Monmouth County, to guide ships past the New Jersey Shoal into New York Harbor. The 103-foot brick and masonry lighthouse is the oldest operating light tower in the United States today.

A visit to one of New Jersey's many historical landmarks can offer the perfect opportunity to develop a deeper appreciation of the state's rich heritage. These treasures of the past allow visitors to step back in time and explore firsthand the foundations of our early industry and culture.

*Text by Amy Cradic, a Trenton State College journalism intern*





The thick climbing ivy on the classic stone exterior of Nassau Hall (at left) lends a look of distinguished antiquity to the building that dates back to 1756 and once was the entirety of Princeton University in Mercer County. For more than 50 years, Nassau Hall was both bedroom and classroom to the university's original undergraduates. The building has hosted many historical figures, including Woodrow Wilson, whose graduating class of 1879 donated the bronze tigers guarding the main entrance of the building. An atrium, located in the center of Nassau Hall, later was built as a memorial to Princetonians who lost their lives at war.

WALTER CHOROSZEWSKI





WALTER CHOISEWSKI

The Colonial Revival-style mansion at the Frelinghuysen Arboretum in Morris Township, Morris County, features supporting ionic columns and an elegant semicircular piazza. The view of this impressive mansion is enhanced by the surrounding cut-leaf silver maples, American beeches and Australian pines, as well as a variety of floral gardens located throughout the arboretum. Today, the Frelinghuysen Arboretum is the headquarters of the Morris County Park Commission and serves as a center for horticultural activities in the region.





MICHAEL S. MILLER

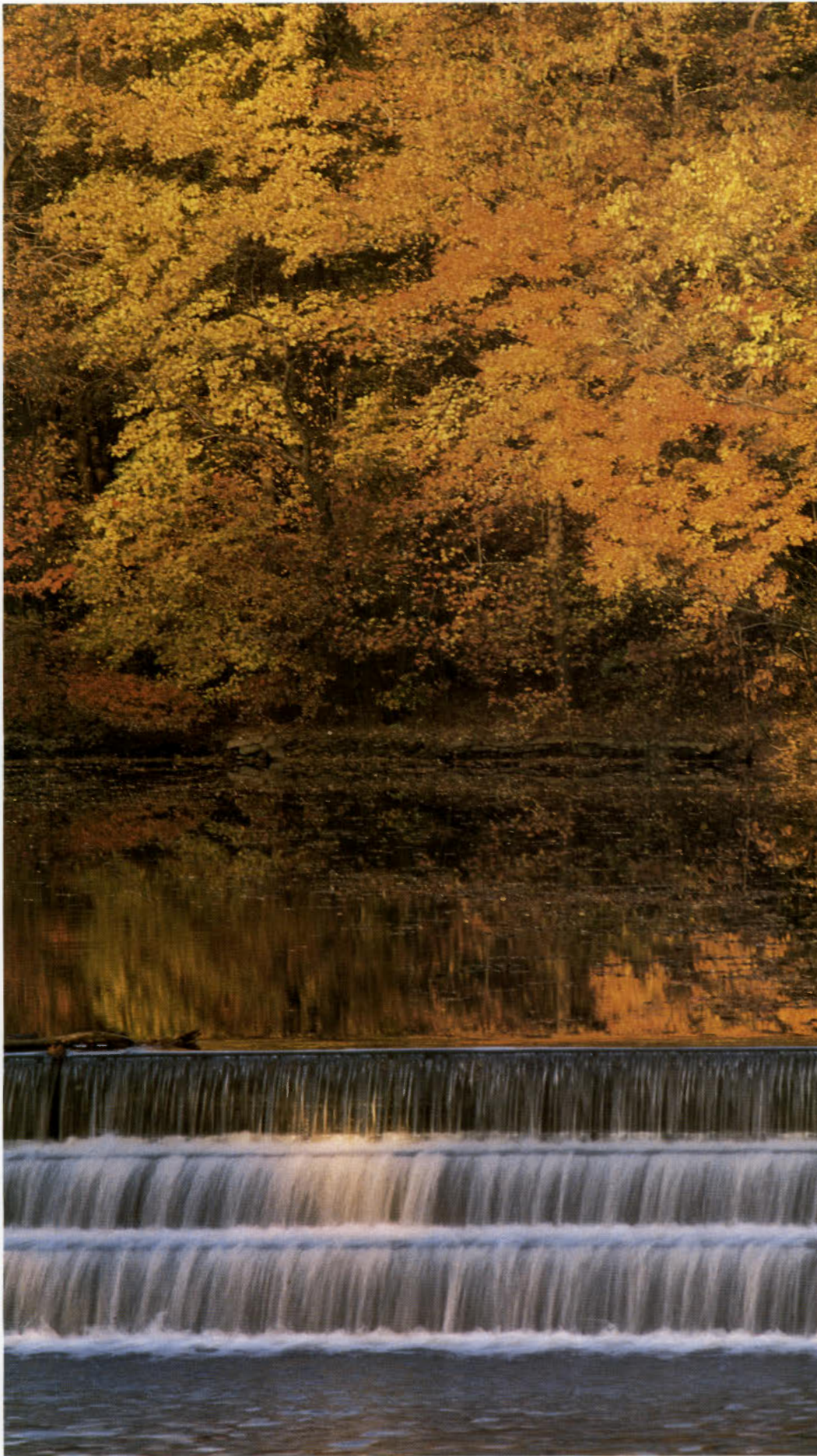
The Clinton Gristmill (pictured at left with a close-up of its water wheel) is located in Hunterdon County on the banks of the Raritan River and the Spruce Run. The four-story wood frame mill was built in 1812 and used to ground flaxseed into linseed oil for making printing inks. Progress throughout the 19th century forced changes at the original oil mill, which was converted over the years into various other types of operations, including a gristmill and a sawmill. Today, the mill is home to the Clinton Museum.

Batsto Village in Burlington County is the site of a former bog iron and glassmaking industrial center (1766 to 1867) that now reflects the agricultural and commercial enterprises of Joseph Wharton. Wharton, a Philadelphia industrialist and financier who purchased the property in 1876, constructed new buildings and made vast improvements to other existing ones. The 19th-century Pine Barrens village consists of 33 historic buildings and structures, including a mule barn (shown below), a gristmill, sawmill, general store and mansion.



WALTER CHOPCZEWSKI





This spillway once provided the water for the adjacent Droecker's Mill in Cranford, Union County. The 18th-century mill, one of 11 that at one time lined the Rahway River, is the only one of the structures that remains today. During the Revolutionary War, the mill was used to manufacture grain and woolen blankets for General George Washington's army.

WALTER CHOROSZEWSKI



# Battle Lines Drawn Over Endangered Species

By Bob McHugh



Peregrine falcons, which historically nested on cliffs in the Delaware Water Gap and the Palisades, were among the many raptors decimated by pesticides in the 1960s. The New Jersey population now numbers 13 pairs, nesting on man-made towers and bridges along the waters of the Atlantic Ocean and the Delaware River.

For a bird's-eye view of the hot debate over the expiring federal Endangered Species Act, try a perch above the state Department of Labor building in downtown Trenton. That's where two elegant and endangered peregrine falcons have been spotted — 14 stories above the Delaware River — in a soaring testimonial to government's ability to rescue creatures of Mother Nature from the brink of man-made extinction.

As Congress debates another five-year reauthorization of the tough endangered species law, a pitched battle is being fought between economic interests, who say the law is anti-development, and environmentalists, who argue that what's good for endangered species is good for the entire planet.

When the Endangered Species Act became law in 1973, its philosophical aim was simple: to keep the spread of American civilization from causing any plant or animal species to go the way of the dinosaurs. But critics still argue that the act has been misused by blocking economic growth in the name of obscure birds and flowers. Supporters of the law claim that builders and developers are trying to take control over life and death by threatening to destroy creatures put here by a higher power.

The panel empowered to make final decisions on when and how the law is enforced is the federal Cabinet-level Endangered Species Committee, also known as the "God squad," headed by Interior Secretary Manuel Lujan.

In May, the committee handed down a hotly contested decision to allow limited logging in the Northwest, despite the threat to the northern spotted owl. The owl is protected under the act.



Supporting a position held by President Bush, Lujan's committee took what the secretary called a "common sense, middle-ground approach." Some scientists said the ruling guarantees the owl's eventual extinction. But Lujan said his decision would buy the birds more time and added, "Owls die every day. That's just like people."

It was only the second time in 20 years that the panel has overridden the Endangered Species Act.

### Federal Dollars Help Protect Birds in New Jersey

New Jersey is home to three major vertebrate species officially listed by the federal government as endangered: the peregrine falcon, the bald eagle and the piping plover, a small shore bird.

State officials say there have been no outright instances of progress being barred by an endangered species. Rather, enforcement of wildlife laws has resulted in the redesign of many building proposals in order to protect natural neighbors.

"In the real world, that's what's happening," says Joanne Frier-Murza, who heads the state's Endangered and Nongame Species Program. Part of the Department of Environmental Protection and Energy, the program also oversees wildlife protected under the New Jersey Endangered and Nongame Species Act.

Frier-Murza acknowledges that New Jersey's relatively small number of federally protected species results in the federal law being less of a factor than, say, in Oregon where protection of the spotted owl had the potential to eliminate what the timber industry said would be as many as 32,000 jobs.

But a key benefit of the Endangered Species Act has been the federal money and assistance made available to New Jersey. Dollars from Washington have played a big part in protecting the eagle, peregrine falcon and piping plover.

"It was really good to have that available to us — in fact, essential," says Frier-Murza, who points to her program's achievements.

### Hope Renewed for Peregrines

The word peregrine describes an ability to travel quickly and effortlessly. It is an appropriate appellation for a bird that is said to soar at up to 100 mph. The falcon, about the size of a crow, is able to swoop down on its prey, often killing it on impact.

Between 1975 and 1980, the state released 56 peregrine chicks raised in captivity to restore the falcon's presence in New Jersey. With patience and care, it worked. By 1987, 14 pairs of falcons had taken up residence in specially built nesting towers in the salt marshes of South Jersey.

Last year, a count hinted that the falcons were again on the decline. Pesticides were suspected, especially from DDT, which is still in use in South America and can find its way into the migratory birds upon which the falcons feed.

But hope is renewed by the falcon's appearance in Trenton and other cities, where perches atop tall buildings mimic the rocky cliffs that are the bird's natural home. Hoping to nurture the falcons, the Endangered and Nongame Species Program has placed a wooden nest atop



Piping plovers nest on the sands of New Jersey's barrier island beaches. Once abundant, piping plovers now compete with recreation-seekers and development, and require protection to nest successfully. The population in New Jersey numbers about 125 pairs, an important part of the East Coast population of 800 pairs.



The small whorled pogonia (top), federally listed as endangered, is considered by many to be the rarest orchid in the Northeast. Its habitat is open mixed hardwood forests. In New Jersey, this species is known to exist in only two small populations in Sussex County that collectively support only about two-dozen plants. The federal government only recently listed the sensitive joint-vech (bottom) as threatened. Its habitat in New Jersey is restricted to the muddy banks of fresh or slightly brackish intertidal streams. New Jersey supports what is considered the world's largest viable population of this species, which is found along a tributary of the Maurice River in Cumberland County.

the Labor building and invited the birds to move in. A similar effort on the roof of a nearby building failed last year.

Protection of the bald eagle, our national symbol, also has gone well in New Jersey. More than 60 eagles have been spotted in surveys the past two winters, although that number is also dwindling slightly. But Frier-Murza believes the all-important discovery of five nesting sites around the southern reaches of the state means "a turning point" in the fight to save the eagle.

Piping plovers also are finding a happier home on the state's beaches. A federal count found three more pairs in the Northeast than in 1990 — not a huge increase, but moving in the right direction.

The New Jersey Endangered and Nongame Species Program gets no money from the state treasury for its annual budget. Funds come from private contributions and from the check-off available to state taxpayers each year. The Wildlife Tax Check-off Conservation Fund, which pays more than 90 percent of the program's budget, raises about \$400,000 a year.

## Grants Critical to Plant Research

The DEPE's Office of Natural Lands Management depends almost entirely on federal matching grants for its research on endangered plant species, says Robert Cartica, who supervises the office's Natural Areas Program. The Office of Natural Lands Management was responsible for creating New Jersey's official Endangered Plant Species list, which contains 308 native species.

Citing the need for continued funding and help with research, Cartica calls the federal act "very critical" to protection of those endangered plant species included on the federal and state lists.

"The whole research program depends on the existence of the Endangered Species Act," Cartica says.

Some globally endangered or threatened plant species that have benefited from matching grants made available under the Endangered Species Act include the small whorled pogonia, American chaffseed, Knieskern's beaked rush and swamp pink.

The small whorled pogonia is thought to be the rarest orchid in the Northeast, and is known in New Jersey in only two small populations in Sussex County that collectively contain about two dozen plants.

American chaffseed, once recorded in 18 locations in New Jersey, now has been reduced to a single roadside population in Burlington County that is threatened by collectors and vehicles.

Four counties in the Pinelands region of New Jersey are known to support the only populations of Knieskern's beaked rush in the world.

Most of the matching grants obtained from the federal government, which may cover up to 90 percent of the total





project cost, are used to search available habitat for remaining populations of these and other species throughout the state. However, in the past three years research has been directed toward determining the impact of disturbance and development on populations of the swamp pink. Most of the world's populations of this plant are found in the freshwater wetland habitats of New Jersey's coastal plain. Results of the research will aid in designing management for this species to ensure its survival.

The justification for preserving these and other endangered plants goes beyond their ecological and cultural value as part of New Jersey's natural heritage. Some species also have beneficial medicinal, industrial and agricultural uses. For instance, pawpaw, endangered in New Jersey, has been found to contain a family of biologically active compounds — acetogenins — that have very promising anti-cancer characteristics and also are good at killing insects.

The active ingredient in half of U.S. prescription drugs is derived from plant species, and many of these compounds are obtained more cheaply and easily from the plants themselves than from chemical synthesis. Alkaloids, found in one-fifth of all plant species, currently are used to treat a variety of ailments from simple pain to cancer. Yet only 2 percent of the earth's flora have been screened for alkaloids.

## Reauthorization Sparks National Debate

National debate over reauthorization of the Endangered Species Act is marked by hotly held feelings. Senator Mark Hatfield, R-Oregon, called the law "a monster." Hatfield's colleague, Senator Bob Packwood, R-Oregon, says the spotted owl debate has split his state right down the middle. "It comes down to this," Packwood said after the controversial Interior Department ruling. "Are you for people or for the bird?"

In Washington, the dispute centers on the act's reputation as a development-killer — a bad rap, supporters say, that's not borne out by the facts.

According to reports compiled by wildlife groups, only 34 projects out of 120,000 reviewed under the act between 1979 and 1991 were blocked. Defenders of the act also note that private landowners can win hardship exemptions to tamper with endangered species so long as they attempt to mitigate any loss. And supporters note the ultimate power of the "God squad," as demonstrated in the spotted owl dispute.

But critics claim the law is an environmental juggernaut, marching as unstoppable as Sherman. Currently, critics note, about 600 species are listed by the federal government and as many as 3,600 more are candidates.

And the law has been less than a resounding success, argue those who believe the act should be rolled back. So far, they point out, only five species have been "delisted," or returned to healthy population levels. That's at a price tag of \$30 million a year in federal dollars alone. An Interior Department audit puts the cost of restoring all listed species at a whopping \$4.6 billion.

On Capitol Hill, battle ranks form behind legislation offered either to strengthen or enfeeble the act.

Representative Gerry Studds, D-Massachusetts, has proposed a bill (H.R. 4045) that would double Endangered Species Act funding and expand the act's jurisdiction. Studds' bill is widely supported by the environmental community.

Contrasting Studds' proposal are bills offered by two Western lawmakers. Representative Jim Hansen, a Republican of Utah, has offered what he calls The Human Protection Act of 1991 (H.R. 3092), which would make additions to the list more difficult. The Balanced Eco-



Most of the world's populations of the swamp pink can be found in the freshwater wetlands of New Jersey's coastal plain. The swamp pink is federally listed as threatened throughout its range in the United States. A member of the lily family, it is easily identifiable by its spring flower structure, which consists of a dense cluster of spectacular pink flowers.



conomic and Environmental Priorities Act of 1991 (H.R. 4058), sponsored by Representative William Dannemeyer, R-California, would give final authority on all protection efforts to both the Interior and Commerce departments and require the government to compensate businesses for economic losses suffered under the Endangered Species Act.

### N.J. Interests Take Sides

Opinions about the act and its future are no less firmly held in New Jersey than in Oregon or the District of Columbia.

Bill Neil, assistant director of conservation for the New Jersey Audubon Society, believes the endangered species debate aims right at the “heart of the conflict” between environmental and economic interests.

Neil argues that those who would weaken the act have sensationalized their case with dramatic stories of economic woe. Such dire tales are particularly effective in a time of national recession — when most people are more concerned about their mortgage payments than about the piping plover.

But, Neil says, the act’s allegedly onerous impact is rarely realized. “The developers would have you believe the sky is falling. That’s simply not the case in New Jersey,” Neil says.

Rather, landowners or developers with endangered species problems generally have been able to work things out with environmental regulators — agreeing to mitigate damage to sensitive habitats, Neil says. “If you look at the factual record, the hue and cry is exaggerated,” he says.

Neil believes that critics of the act have one valid concern: that the federal endangered species list is a “moving target” that changes as species are added or deleted. As new plants and animals are listed, a valuable parcel of land could become commercially worthless overnight.

The solution might be to protect habitats rather than species, Neil proposes. It’s an idea embraced in the Studds legislation now pending in Washington.

The concept would impose stricter environmental controls on regions where a large number of pressing environmental questions converge: issues like spreading development, preservation of open space, wetlands protection and protection of endangered species. It’s a concept that has worked in New Jersey — albeit with decades of argument — in the Pinelands.

“Nobody has been able to prove that the Pinelands has wrecked the South Jersey economy,” says Neil.



“The developers  
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— Bill Neil,  
assistant director of  
conservation for the  
N.J. Audubon Society



"If everyone  
benefits, then  
everyone should  
bear more of  
the cost."

— Michael McGinness,  
director of environmental  
affairs for the  
N.J. Builders Association



PHOTOS BY DILIP KANE

A spokesman for the New Jersey Builders Association doesn't argue against reauthorization of the Endangered Species Act. But the question from Michael McGinness, the builders' director of environmental affairs, is what form the reauthorized act should take.

"It's time to take another look at it," McGinness believes.

He does not dispute the act's laudable goal of protecting vulnerable animals and plants. But McGinness says New Jersey builders find fault with how that goal has been pursued by federal and state officials.

McGinness takes exception to what he calls the regulators' "incomplete" approach. He believes the standards and procedures for listing and removing species from protection are arbitrary. And he believes enforcement is short-sighted, interfering with particular projects, yet not looking toward regional or statewide habitats and recovery plans.

In short, McGinness says the builders' message to federal and state wildlife officials is: "Get your act together."

Perhaps most controversially, McGinness argues that the reauthorized act should make provisions for compensating landholders who lose their property rights to endangered species. If protecting a single species is ultimately for the good of the entire planet, as conservationists argue, then no single person or company should have to pick up the tab, according to McGinness.

"If everyone benefits, then everyone should bear more of the cost," he says.

Even conservationists like the Audubon Society's Neil admit they've got a tough fight on their hands as Congress turns its attention toward reauthorization of the Endangered Species Act.

A host of conflicting concerns — among them the economy and presidential politics — will make it an uphill battle to win new muscle and money for the act.

In addition, local groups like the New Jersey Builders Association will be watching to ensure that whatever Congress does, it will not create additional bureaucratic or economic burdens. These groups also believe any changes in the federal act could set the tone for revisions in state endangered species laws such as those in force in New Jersey.

Ultimately, the real fight simply may be to preserve the status quo, keeping the federal Endangered Species Act and its goals intact. "The best we may do is keep the bill the way it is," Neil allows.

Few observers expect much real progress on reauthorizing the act before next year, when a newly elected Congress arrives relatively insulated from the pressures of election-year politics.

"It's going to be a very bloody battle down in Washington," Neil predicts.

Bob McHugh is a former public  
information officer for the  
Department of Environmental  
Protection and Energy.



# *Managing* the Stubborn Grouse

*The ruffed  
grouse is truly  
wild and  
rigidly resists  
human  
supervision and  
artificial  
environments.*



A male ruffed grouse drums his wings to attract a mate and discourage other males from his territory.



By Robert Brunisholz

**T**he ruffed grouse is a native of New Jersey that has earned the admiration and respect of hunter and non-hunter alike, but during the past two decades this regal bird has been declining in number. Some modern and innovative steps, however, now are being taken to rebuild dwindling numbers of a species hunters call the finest game bird in North America.

Under the best of circumstances, grouse are difficult, if not nearly impossible, to manage. The reason grouse pose such perplexing problems to biologists is the same that gives the bird such prestige among hunters. The ruffed grouse is truly wild and rigidly resists human supervision and artificial environments. The grouse is, according to its admirers, a true aristocrat of the woodlands.

Modern game management has made great advances in propagating and replenishing both game and non-game species, but the grouse has remained aloof and shunned those efforts. Replenishing wildlife with artificially reared species generally has met with great success, but not so with the grouse. This bird is born to the wild, scorning chicken wire and coops. Quite simply, ruffed grouse will not lay eggs in an artificial environment. Undoubtedly, there has been the occasional, odd clutch of grouse that has matured under human supervision, but the bird never has been raised in any appreciable quantities that could be called successful game-farm propagation.

Although management is a difficult task, the Garden State has some of the best grouse habitat in the country. Notwithstanding a home range that includes most of the United States, it was here in New Jersey that grouse thrived. Seeds, berries, buds, even pine needles and the leaves of certain trees and shrubs, offered the ruffed grouse prime food supplies and ample cover.

But during the 1800s to as late as the 1930s, cutting destroyed much of the environment in which grouse had so generously reproduced. Unlike the gaudy ringneck pheasant, with its penchant for open fields, grouse prefer fringe coverts in which to feed and nest, and hardwoods and conifers for roosting. Long before "ecology" and "environment" became trendy buzzwords, forests were retreating before the blades of bulldozers and the resulting wave of humanity.

Unlike the adaptable whitetail deer or the raccoon, which seem willing to live side-by-side with their human counterparts, the grouse sneered at development, refused any truce with civilization and made a strategic retreat into what remained of the state's wild areas.

### Grouse Numbers Failed to Rebound

Officials of the state's Division of Fish, Game and Wildlife admit that until recently, little could be done to manage grouse. Efforts to stock or replenish broods, quite simply, ended in frustration. Adding to the dilemma, pioneering game management techniques accepted declining grouse populations under a dogma that centered on the cyclic theory.

Modern game managers know that almost all populations of wildlife species progress through a cycle of highs and lows, as dictated by nature. When the numbers of a particular species proliferate to a "high," nature, in the form of disease, weather or predation, decreases the overabundance. Once nature has completed its course and the species has been reduced to a "low," the population again begins to rebuild.

The theory is sound, and more than 20 years ago cyclical biologists attributed declining grouse populations to natural fluctuations when grouse hunters began to report fewer flushes. During the 1960s and as late as the 1970s, it was not uncommon for a hunter to experience as many as 20 or more flushes per day. In recent years, however, grouse hunters found themselves settling for one or two, and often considered it a "great day" afield when four or five birds flushed.

The so-called cycle had been in a downward spiral, but as

*The Garden State  
has some of the best grouse  
habitat in the country.*

the years progressed, once abundant numbers of grouse failed to fully rebound to original levels.

Although aware of decreasing populations, officials of the Division of Fish, Game and Wildlife found themselves in the unenviable position of deciding which species would receive the lion's share of management attention. With the exception of some edge-cutting on selective wildlife management areas, active grouse management was minimal.

Two factors are essentially responsible for the grouse taking a back seat to other species. The first concerns popularity.

Certainly the ruffed grouse is championed by many





Ruffed grouse have survived predation by other animals, soggy springtimes and the destruction of their feeding and nesting covers.

upland hunters, most of whom speak in guarded whispers as though they have unearthed the Holy Grail should they discover a productive grouse covert. When compared to the number of pheasant and quail hunters, however, grouse gunners are but a tiny minority.

Joseph Penkala, northern regional supervisor for the Division of Fish, Game and Wildlife, says hundreds of upland hunters delight in seeking the elusive grouse, but thousands choose to chase the ringneck pheasant, quail and chukar partridge, all of which can be pen-raised.

"We are obligated to direct our resources at those areas in which there is the largest demand, and from which we get the best return," Penkala says. "I'm a grouse hunter myself, and whenever I hunt public land there are always other hunters afield. Nevertheless, dyed-in-the-wool grouse gunners comprise a tiny fraction of upland shooters when compared to the legions of pheasant hunters."

The second reason grouse management may not have been a top priority is simple logistics. Unlike the raising of pen-reared game birds such as pheasant or quail, proper grouse management is a monumental and massive undertaking.

Pheasants, for instance, are reared at the Rockport Game Farm in Warren County and subsequently released at various wildlife management areas, where they are harvested on a put-and-take basis. While raising pheasants from eggs is not an easy chore, grouse management problems are compounded because the bird simply refuses to be "raised."

As a result, proper grouse management requires manipulation of thousands of acres of habitat. One of the most important steps toward protecting grouse and subsequent reproduction was taken by the Department of Environmental Protection and Energy some three decades ago, with the implementation of the Green Acres Program. The ongoing project has protected thousands of acres of rough, rugged terrain, the stamping grounds of the ruffed grouse.

### Selective Cutting Boosts Habitat

While the traditional timbering practices of bygone years would inevitably spell further disaster for the thunderbird, wildlife biologists have found that clear-cutting certain parcels or "blocks" of old-growth forests may be the key to reestablishing the Garden State's once prolific numbers of ruffed grouse.

Wildlife researchers nationwide have found that grouse thrive in fringe cover and new-growth areas in which natural brush, berry bushes and greens eagerly sprout after the covering canopy of mature trees has been removed. The preservation of old-growth, large trees that prevent sunlight from penetrating naturally brushy areas is a prime suspect in the recent declines in grouse populations.

Division personnel now are taking imaginative and innovative steps with the selection and subsequent timbering of old-growth trees in specific sections, then introducing plantings of food and ground cover within the clear cut.

An intensive grouse management program began last spring when the division hired a forestry consultant whose sole duty will be to enhance grouse habitat, according to Penkala. The consultant will direct the timbering effort, which was made possible by a grant to the division from the Ruffed Grouse Society.

The program began in mid-summer in Sussex County at the Flatbrook-Roy Wildlife Management Area. The division's goal is to establish stable populations of grouse in that area and, if successful, in subsequent years continue the program in additional areas, including southern sections of the state.

### Grouse No Stranger to Adversity

Undoubtedly, much remains to be done. Dedicated groups such as the Ruffed Grouse Society have joined with



division biologists whose game management techniques have created a brighter future for the noble ruffed grouse. But there is another positive indication of the future of the thunderbird, which is often overlooked — the bird's tenacity.

The ruffed grouse was here well before the Indians and the early settlers. It is a tough, resilient bird that has taken pressure from predators, disease, forest fires and yes, even hunting, without flinching. Compared to the thousands of pen-raised pheasants released yearly, the wild populations of grouse far outnumber, and outlast, survival rates of ringnecks, as well as any other exotic import.

While it is logical to assume wildlife biologists may aid the grouse and its habitat by innovative game management techniques, this monarch of the hardwoods continues to give a metaphorical raspberry to our feeble, human attempts to

civilize it. The ruffed grouse has survived predation by red fox, owls, hawks, man, soggy springtimes and the destruction of its nesting and feeding cover, and in the face of such adversities, still declines handouts at feeder stations.

Bones of grouse found at the campsites of ancient man prove the bird was beating its springtime staccato rhythms on a drumming log more than 25,000 years ago. The ruffed grouse undoubtedly marches to a different drummer, and is certainly above being classified on a level with pen-raised, barnyard dullards. If we continue to be careful with our natural resources, there's little doubt the ruffed grouse will be here when you and I have long since gone.

*Bob Brunisholz is a freelance writer who lives in Long Valley.*

## Best Bets for Finding Grouse

Despite dwindling numbers, New Jersey retains some areas that could be called "strongholds" for populations of ruffed grouse. Here are a few in which hunters can usually rely on putting up, or flushing, more than four or five grouse each day.

❑ **Stokes State Forest:** Located in Sussex County, "Stokes," as hunters refer to this 15,480-acre tract of wooded hillsides and mountainous terrain, still retains respectable numbers of ruffed grouse.

❑ **Flatbrook-Roy Wildlife Management Area:** Also in Sussex County, this wildlife management area lies adjacent to Stokes State Forest and consists of much the same environment as found in Stokes. Rolling hillsides covered with tangled wild grape thickets, barberry and cedar offer the best cover and food.

❑ **Black River Wildlife Management Area:** Located primarily in Chester Township in northwestern Morris County, Black River consists of 3,057 acres of prime grouse habitat.

❑ **Colliers Mills Wildlife Management Area:** Grouse are comparatively common at this Ocean County wildlife management area in which hunters can choose from 12,250 acres of either pine or scrub oak, with nearly 210 acres of fields, offering edge areas to which grouse commonly gravitate.

❑ **Delaware Water Gap National Recreation Area:** We've saved the best for last. This area consists of more than 35,000 acres of hardwoods, edge areas, pine and cedar. A word of caution is due: Most of the "Gap" that is open to hunting consists of steep hillsides. There are high densities of grouse to be found here, but you'll earn every shot.

The Ruffed Grouse Society is dedicated to the propagation of

both the ruffed grouse and the woodcock. The society provides direct grants to colleges and universities studying long-term grouse and woodcock management techniques, conducts education workshops and offers landowner assistance. Support of projects such as the

one now under way in New Jersey exceeded \$1 million by the late 1980s.

For information, write to the Ruffed Grouse Society, 451 McCormick Road, Coraopolis, Pa. 15108.

A pointing dog holds a grouse in an alder thicket.



PETE McLAIN



# Birthday Well-Wishers Are Winners

The New Jersey Division of Fish, Game and Wildlife received some creative birthday wishes from more than 1,250 Jackson Township, Ocean County, students who designed birthday cards for a contest in honor of the division's centennial celebration.

The 32 winning artists, representing grades one through eight, received their awards at a special ceremony in July at Six Flags Great Adventure where their work was on view for the occasion.

But for those who missed that opportunity, here's a look at three of the winning entries.



Christina Parsons  
Second Place, Third Grade





Kris Lewis (far left)  
First Place, Seventh Grade

Mike Daly  
Second Place, Seventh Grade





Paul Stankard's delicate glass reproductions of plants often feature an element of myth in their human-like root systems.

## Nature Reflected in Glass

Artist Paul Stankard still vividly recalls the strange beauty he discovered the day his family moved to Gloucester County almost 35 years ago. A prickly pear cactus caught his eye that day, and Stankard's fascination with plants has flourished in South Jersey ever since.

Today, Stankard, 49, is known internationally for delicate glass art that immortalizes the beauty his eye captures in nature. With intricate detail and accuracy, he crafts colored glass to recreate each plant part — from flower petals to root hairs — and entomb them forever in a case of glass.

His artwork is so fine and detailed that it creates the illusion of a real flower on display. In fact, one unsuspecting newspaper reviewer marveled in print at

Stankard's ability to preserve the plant with no apparent damage. The mistake is understandable.

"The magic of what I do consists of taking inorganic material, melting it at 2,000 degrees Fahrenheit and transforming it into an organic illusion. That's creative satisfaction — taking glass ... and giving it life," Stankard wrote recently to Japanese appreciators.

Stankard's glass art falls into two main categories — paperweights and botanicals. By focusing on flowers in his paperweights, he builds on a 19th-century French tradition that has long enjoyed a following among antique collectors. In fact, antique paperweight dealers became his first customers in 1970, when he was elated to sell them for \$10.

Today, Stankard's work commands up to \$17,500 in New York galleries. His work is displayed in museums around the world, including the Metropolitan Museum of Art in New York, the Victoria and Albert Museum in London, the Musee du Louvre in Paris and the Hokkaido Museum of Modern Art in Japan.

"The appeal of Paul Stankard's work derives not only from his detailed recording of each blemished petal or insect-bitten leaf, but also from his sensitive and wonder-filled interpretation of nature," wrote Robert Charleston in "Masterpieces of Glass," a world history of glass commissioned by the Corning Museum of Glass.

After working exclusively on paperweights for more than 10 years, Stankard began experimenting with a new format — the botanical — in the late 1970s. Botanicals, a term Stankard coined, are rectangular glass blocks about 6 inches high, 4 inches wide and 3 inches deep.

In clear glass, the botanical provides an endless variety of visual angles and illusions that illuminate the flower at its center. Looking straight in the front panel provides a crystal-clear view that reveals narrow striations on a plant's leaves. A side panel, however, creates the illusion of a rain-soaked window — with the plant moving in and out of focus.

"The magic of my work is to invent illusions to make the flower more dimensional — more lifelike," Stankard says.

In colored glass, the botanical provides a strikingly different effect. The plant appears suspended in both time and space — completely isolated from its environment. Stankard calls these "cloistered botanicals."

About the same time he began experimenting with the botanical format, Stankard also expanded his artistic interpretation of nature. He began to capture the world that thrives below the ground. He included the soil and root systems that support life above, and his work gave form to a "life force" that binds the visual and unseen worlds.

"The essence of art is to take this material



and give it life, give it spirit," Stankard says. "Beauty has an energy. If you're responding to the energy it's emitting, I've connected."

In some cases, his work demands a response from the viewer. To embody this life force, Stankard has created pale, unearthly spirits whose appearance, meaning and purpose are open to interpretation.

In a green cloistered botanical, these spirits are human-like forms climbing among a raspberry plant's roots, reaching toward the earth's surface. In one paper-weight, these "root people" huddle around a lifeless white body below the soil — completely separated visually from the thriving wild strawberry plant above.

Adding this element of myth helps develop a dialogue between the art and its viewer, Stankard says, and it expresses the dichotomy the artist senses between the real world and the spiritual world. Spirituality surfaces frequently when Stankard discusses art and nature. Walking through six acres of woodlands he owns near his home-based studio in Mantua Township, he talks excitedly about nature's life force. The bookcases in his studio are lined with books about plants, art and theology, and he has begun to research God's relationship to the plant kingdom.

Stankard's environmental ethic also is firmly planted in the real world. A member of the Mantua Township environmental commission, he is helping to draft a shade tree ordinance for the municipality, and his editorial in the *Gloucester County Times* exhorted residents to actively plan and work for open space preservation.

"Our response to nature is going to become a moral and ethical issue," Stankard says. "I feel I'm hypersensitive about these issues because I do spend time walking in the woods. I do spend time enjoying wildlife."

And he sees a natural connection between his art and his environmental advocacy.

"I'm able to take this love of nature and interpret it. ... I feel like I'm recording it in glass," he says. "If I can heighten people's appreciation of wildflowers and of nature, I think that's a noble cause."

It took Stankard 10 years to fully realize

his calling. After high school, he enrolled in the scientific glass blowing program at Salem County Vocational and Technical Institute — now Salem County College. "I was a daydreamer in high school, but Salem opened a door and it was a beautiful connection," he recalls.

For the next decade, he worked at several positions in the glass industry, making specialized scientific and industrial glassware. This industrial experience helped him master his craft, but he felt a closer bond with prickly pear cactus than glass lab instruments. During evenings and lunch hours, he found himself experimenting with flower motifs.

"When I made the transition to glass and flowers, I knew it was right," he says.

Stankard's craft is called lamp working. Its name traces back to the oil lamps originally used to soften glass tubes for shaping. Today, Stankard uses gas-oxygen torches to soften and shape the hundreds of colored glass rods that line his studio walls. The artist likens his craft more to jewelry making than traditional glass blowing because it requires such precise handiwork.

He sculpts parts of the plant separately and then joins them into a complete specimen, which will be encased in molten glass. The final product must be ground and pol-

ished before it is ready for presentation.

Despite 30 years of craft work, Stankard still finds lamp working an exacting process. It took him six weeks to capture the flower of the mountain laurel in glass, and three days of painstaking experimentation often ends in failure, he says. As the artist has become more ambitious, the lamp working process has expanded to a "six-hand operation" with two assistants — his daughter, Christine Kressley, and student David Graeber, who both have studied art history in college.

"I feel I'm still growing. I respect technique, but I'm constantly battling process," he says. "If you have a feeling for the craft, you want to push it."

Three years ago, Stankard pushed his artistic expression beyond the glass walls of lamp working. He began writing poetry to capture the wonder that inspires him as he walks through the woods or watches bees swarming around a tree.

"Poetry is challenging me and leading me to new interpretations," he says. It has given me a perfect complement to my work."

*By Jim Morris, assistant director of the Office of Continuing Education at Cook College*

"The magic of what I do consists of taking inorganic material, melting it at 2,000 degrees Fahrenheit and transforming it into an organic illusion," says Paul Stankard, shown here in his Mantua Township studio.



MICHAEL A. HOGAN



### Woodbridge River Watch Earns National 'Take Pride' Award

The Woodbridge River Watch, a group dedicated to cleaning up the river and adjoining wetlands in its Middlesex County community, has won New Jersey's first-ever national Take Pride in America Award.

The group of citizens, alarmed by the deteriorating state of the Woodbridge River, formed the river watch in 1988 (NJO Summer 1992). They improved the stream flow by removing debris, cleaned up the riverbank and adjoining wetlands, helped secure the dedication of a 40-acre sanctuary, planted trees, monitored water

quality, built a volunteer base, stimulated public awareness and helped launch similar river watch programs in Rahway and Winfield Park.

Their efforts earned them one of the 100 national awards bestowed this year as part of Take Pride in America's national campaign to focus attention on the importance of public resource stewardship and responsibility.

Eight groups and individuals from New Jersey also were selected as finalists for the 1991 Take Pride in America Awards, giving the state its best showing ever in the awards program. A total of 30 groups and individuals were nominated from around the state, and 820 from the rest of the nation.

New Jersey placed finalists in the following categories:

#### Business/Corporations

The Merrill Creek Owners Group was recognized for promoting environmental education at the Merrill Creek Reservoir in Warren County. Two naturalists use the visitors center and the 2,100 acres of forest and field surrounding the reservoir to conduct programs on birds, animals, insects, forestry and aquatics.

#### Youth Groups

Cub Scout Pack No. 28, Den No. 4, has taken on the task of encouraging the entire town of Jackson, Ocean County, to recycle batteries. The Scouts first educated the residents on the hazards of throwing away batteries and then set up collection areas with plastic containers that the Scouts decorated.

The Irvington Junior Environmental Club in Essex County worked with the Irvington Environmental Protection Commission to sponsor an Earth Day celebration in 1991, two clean-up days and the publication of a booklet, "Irvington Environment," featuring poems and drawings by the students.

#### Education/Institutions

Rowena McNulty, a special education teacher at the Hopatcong Middle School in Sussex County, established a "Green Team" of two teachers and 50 students in the sixth, seventh and eighth grades. The team has organized school-wide assemblies, participated in several community cleanups and planted more than 100 trees. It also has promoted environmental awareness by organizing debates, plays and puppet shows, and by creating a Garbage Museum.

Oakland's YES (Youth-Environment-Seniors) has joined generations to help the environment. YES is a middle-school environmental club that has opened its membership to senior citizens and adults in the Oakland community of Bergen County. YES developed a brochure about litter that was mailed to all residents and businesses. The group's efforts led to Operation Clean Sweep I and II, in which participants were asked to pick up three pieces of litter a day.



ASBURY PARK PRESS

**CLOSE CALL FOR "CASPER"** — This baby harp seal, which washed ashore on the beach in Belmar, Monmouth County, in May, was adopted by students at the Belmar and St. Rose Elementary Schools who helped raised more than \$475 to help feed, treat and release it.

The seal, which the students named Casper, was weak and emaciated when it was rescued and taken to the Marine Mammal Stranding Center in Brigantine, says Robert C. Schoelkopf, director of the center. The six-week-old harp seal, which probably would have starved or been eaten by sharks if left alone, still had its white baby coat when it was found.

After recuperating at the center for about two months, Casper — along with another baby harp seal and a young hooded seal that also washed up on New Jersey beaches — was flown to Bar Harbor, Maine, and taken by boat to an isolated island owned by the Audubon Society. The flight was paid for by the International Fund for Animal Welfare.

Schoelkopf says the wayward seals, usually found thousands of miles away in the Arctic Ocean, probably were abandoned by their mothers a couple of weeks before southern currents brought them to New Jersey. Mother seals typically wean their young when they grow teeth, leaving them to survive on their own or starve.



### Individuals

Dr. Ishwarbhai C. Patel, through the Rutgers Urban Gardening Program (NJO, Spring 1992), has helped motivate low-income families and individuals to grow their own vegetables on vacant city lots. The gardens promote community pride, feed the homeless and provide therapy for the mentally handicapped. Throughout Newark and neighboring communities, Dr. Patel has been instrumental in establishing more than 1,100 community and approximately 500 family gardens. In the 1991 season, more than 6,000 city residents cultivated 25 acres to grow 60 varieties of vegetables, herbs, small fruits and other food crops worth more than \$765,000.

### Constituent Organizations

The Alliance for a Living Ocean brought the problem of non-point source pollution into sharp focus through the use of the Crab Connection, a stenciled painting of the blue crab. The crab was painted on storm drains to dramatize the effects of pollutants that are poured and washed down the drains and how they jeopardize water quality. Both residents and vacationers pitched in to paint thousands of blue crabs throughout Ocean County. The organization followed up with newspaper advertisements, fliers, posters and letters explaining the consequences of non-point source pollution.

Applications for next year's awards are due by November 1 and can be obtained by contacting Dawn Blauth at the New Jersey Department of Environmental Protection, Office of Communications, 401 East State Street, CN 402, Trenton 08625-0402; (609) 984-3643.



The Frelinghuysen-Elmendorf Residence in Hillsborough is an excellent example of a Federal/Greek Revival-style dwelling.

## Eight Sites Added to Historic Register

Seven stone houses and their associated outbuildings in Washington Township, Morris County, as well as an 1828 estate in Hillsborough Township, Somerset County, have been added to the New Jersey Register of Historic Places.

The Washington Township area features a significant number of stone structures due, in part, to the availability of good building stones and the heavy concentration of Germanic settlers who constructed stone buildings during the late 18th and 19th centuries. The seven nominated residences were built between 1770 and 1870 and have been traced directly to prominent local German families.

The Frelinghuysen-Elmendorf Residence in Hillsborough is an excellent example of a Federal/Greek Revival-style dwelling. The 1828 structure prominently overlooks the village of Millstone and reflects both the quiet elegance of a country estate and the architectural sophistication of a more urban dwelling. This atmosphere was generated by the original owners, James Elmendorf, a physician, trustee at Rutgers and member of the state Assembly, and Elizabeth Yard Frelinghuysen, a member of a prominent family.

These nominations will be sent to the National Park Service, U.S. Department of the Interior, to be considered for listing on the National Register of Historic Places.

## Millville Moves to Save Oldest House

Once slated for demolition, the house at 204-206 East Main Street in Millville, Cumberland County, now survives as the oldest house in town.

The town originally had targeted the site for a parking lot, but a listing of sale dated August 2, 1797, placed the house's construction date as 10 to 15 years earlier than that of the structure once thought to be Millville's oldest house.

The modest dwelling belonged to a typical working family and represents the type of house built in the early stages of the town, which became so important to the glass industry that by 1860, 11 glass factories were in operation there.

**TAKE  
PRIDE IN  
AMERICA**



### Reduce Hazardous Waste in Your Home

Each year, U.S. industries produce more than a ton of hazardous waste for every man, woman and child living in this country. Many common household and automotive products eventually become hazardous waste either through direct use or improper disposal. These wastes can pose a threat to both the quality of the environment and our health. Following are some of the measures that you can take to reduce the overall volume of hazardous waste generated and to ensure its safe disposal.

#### Become More Selective Consumers

We can reduce the demand for products that create hazardous waste by being environmentally conscious shoppers. For instance, vegetable oil soap, which can be purchased at supermarkets, is an excellent substitute for some of the more hazardous furniture and wood floor polishes. The use of rechargeable batteries helps to curtail the influx of toxic heavy metals into our waste stream. There also are a number of environmentally friendly cleaning agents now commercially available as substitutes for other more hazardous products. Many of these items easily can be found with other alterna-

tive products in some supermarkets, natural food stores and environmental catalogs.

You also can make many alternative cleaners at home. For example, one-half cup of borax mixed with a gallon of hot water makes a disinfectant proven effective for hospital use. A substitute for ammonia glass cleaner can be made by combining one-part white vinegar with one-part water.

For more information on alternatives to other products, such as lawn and garden pesticides, drain cleaners and paints, contact the Department of Environmental Protection and Energy's Hazardous Waste Advisement Program at (609) 292-8341, or the Bureau of Community Relations at (609) 984-3081.

#### Participate in Collection Programs

It has become increasingly apparent that we cannot continue to dispose of hazardous household products by simply placing them in the trash or pouring them down the drain. Studies have shown that batteries are the major source of mercury, cadmium and lead present in municipal solid waste landfills. These toxic metals can eventually escape from landfills and contaminate ground water. Pouring cleaning agents, paints, paint thinners and other hazardous materials into the drains of houses with septic sewage systems can result in ground water contamination. Even a pub-

licly owned waste water treatment plant is not always capable of managing all of the chemical wastes flushed into it by numerous homeowners and businesses.

Just as recycling has become a fact of life for New Jersey residents, responsible management of our household hazardous waste must become part of our lifestyle as well. Nineteen of the 21 counties in New Jersey sponsor programs where household hazardous waste can be collected independently of non-toxic household refuse so that it may be sent to specially designed landfills or incinerators, or recycled. Call your municipal office or county solid waste management office for information about household hazardous waste collection programs in your area.

The DEPE has set up a hotline to enable New Jerseyans to report environmental abuses. The hotline, which is staffed 24 hours a day, can be used to report questionable releases of chemicals into the air, water or soil by either industrial or non-industrial sources. Past as well as current abuses may be reported. The hotline number is 1 (800) 292-7172. Callers may choose to remain anonymous.

*By Heather Swartz, a community relations coordinator for the DEPE's Site Remediation Program*

## Follow-Up

### Rabies Vaccine Tested on Raccoons

New Jersey has begun a field trial to test the effectiveness of an oral rabies vaccine in wild populations of raccoons in parts of Cape May, Atlantic and Cumberland counties.

The field trial will attempt to create a rabies-free barrier to the advancing rabies disease in raccoons (NJO Spring 1992).

The project is a joint effort between the state Departments of Environmental Protection and Energy, Health and

Agriculture, as well as the three county health departments, the U.S. Department of Agriculture and Thomas Jefferson University. The field trial began in late April when fish-meal bait containing the vaccine was hand-dropped or placed on roadways and in storm drains and dropped by helicopter into unpopulated areas, such as wildlife management areas and state forests.

The project is the first natural field experiment in the United States that tests the effectiveness of the vaccine. Two previous field tests, one in Pennsylvania and the other in Virginia, tested the safety of the oral rabies vaccine for

wildlife. In Europe, a similar vaccine has been widely used in fox populations, producing positive results.

After raccoons eat the vaccine-laden bait, they produce antibodies against the rabies virus, in much the same way humans respond after being inoculated against diseases such as polio, measles and the mumps.

A follow-up test is scheduled for the fall in the same area.





## Habitat Preserved for Endangered Birds

A nesting area for least terns, black skimmers and piping plovers will be protected under an agreement reached by the Borough of Barnegat Light and the state Division of Fish, Game and Wildlife.

The habitat of these endangered species lies adjacent to Barnegat Light State Park in Ocean County and a new jetty that guards the inlet. The area will be fenced off on a seasonal basis, from early April to after Labor Day, to protect nesting colonies. The fencing prevents people and natural predators such as foxes, cats and dogs from disturbing the area.

The nesting site was created in 1987 when the Army Corps of Engineers began to replace the old jetty at Barnegat Light. The thousands of cubic yards of sand that were deposited on the southern side of the new jetty combined with the naturally deposited sand to form an area ideally suited for beach-nesting birds. During the period that the area was fenced for safety reasons, it became one of the most productive beach-nesting habitats in the state.

The state relinquished control of the area to the borough in exchange for the municipality's agreement to manage the site as permanent open space. The division's Endangered and Nongame Species Program provided the borough with a recreation management plan to protect the beach-nesting birds. The Jersey Shore Audubon Society has contributed \$2,500 to help protect and monitor the nesting area, and Island Beach State Park has provided a naturalist to give weekly interpretive programs throughout the nesting season. Long-range plans call for the construction of an observation platform that will provide viewing opportunities without disturbing the birds.

The Barnegat Light nesting area is one of more than two dozen areas that the Endangered and Nongame Species Program protects and manages along the New Jersey coast.



## Science Center to Open at Liberty Park

Ever wonder what it would feel like to be caught in the middle of a tornado? You can find out safely and explore other wonders of science at the Liberty Science Center, a 60,000-square foot facility scheduled to open on October 24 at Liberty State Park in Hudson County. A public/private partnership raised most of the \$65 million cost of the center.

Among the attractions will be:

- ☐ A giant 80-foot tornado, through which visitors can pass
- ☐ The Kodak Omni Theater, featuring the world's largest projection dome with an 88-foot screen and seating for 400
- ☐ A living saltmarsh, with "touch tanks" where horseshoe crabs or sea stars can be held
- ☐ A laser light show that will fill the atrium with constantly changing imagery
- ☐ A 100-foot touch tunnel where total darkness forces visitors to rely on the sense of touch
- ☐ An illusion labyrinth, a companion experience to the touch tunnel, that will fool the eye as well as the mind

The center is looking for volunteers to conduct demonstrations and experiments, act as guides, care for the animals and plants, help design new exhibits and plan and run special events. In return, volunteers will receive a variety of benefits. For more information, write to the Office of Volunteer Services, Liberty Science Center, 251 Phillip Street, Liberty State Park, Jersey City 07304, or call (201) 451-0006.

Liberty State Park is easily accessible by taking Exit 14B off the New Jersey Turnpike.

### Environary

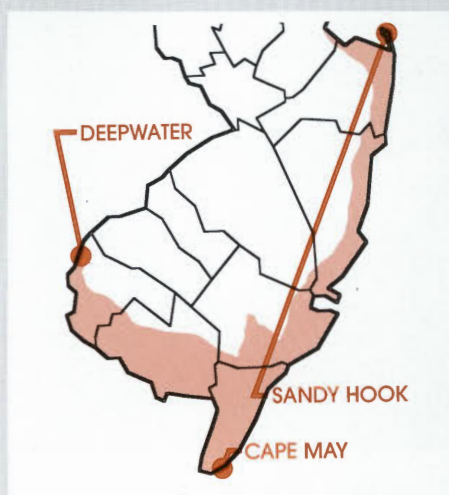
Confused by the many environmental terms that come your way? Here are definitions of a few of them.

**Leachate** — A liquid formed when water passes through wastes, agricultural pesticides or fertilizers and collects contaminants. Leaching may result in hazardous substances entering surface water, ground water or soil.

**Methane** — A colorless, odorless, non-poisonous, flammable gas created by the anaerobic, or oxygen-free, decomposition of organic materials.

**Non-point source pollution** — The contamination of waterways and the ocean when pollutants, such as fertilizer, motor oil and pet waste, are carried off the land by stormwater. These pollutants do not have a single point of origin, such as a tailpipe or a smokestack, and therefore are considered non-point sources.





### Coastal Trail's Maritime Tour Nears Completion

The first of five theme tours along the 275-mile New Jersey Coastal Heritage Trail is scheduled to be ready for the public by late fall.

The trail, designed as a vehicular route along existing public roads, was conceived as a way to promote public appreciation, education, understanding and enjoyment of significant natural

and cultural sites associated with the coastal area.

Signs and a trail map will act as guides for each tour. The five themes for the route are:

**Maritime**, which is scheduled to be the first completed and will highlight New Jersey's strategic setting on the mid-Atlantic coast and the development of navigational aids and coastal defenses.

**Coastal Habitats**, which will focus on the barrier islands, coastal wetlands, estuaries, bays and rivers that give the coastal area an abundant diversity of plant and animal life.

**Wildlife Migration**, which was inspired by the state's critical position on the Atlantic flyway and will provide opportunities to view species such as snow geese and aquatic mammals.

**Relaxation and Inspiration**, which recognizes the Jersey Shore's historic role as a playground for millions of vacationers. Historic hotels, amusement parks and religious retreats will be among the sites highlighted.

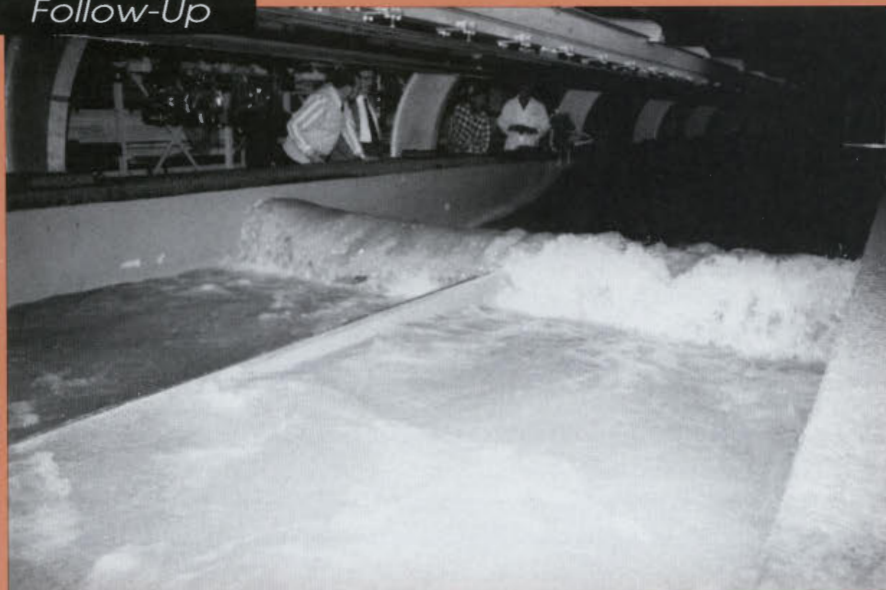
**Coastal Communities**, which will explore the prehistoric and historic activities of the coastal area, including glassmaking, cranberry cultivation and boat building.

The trail was authorized by Congress in 1988 under a bill sponsored by Senator Bill Bradley. The plan was developed by the National Park Service, in cooperation with the state Department of Environmental Protection and Energy, the Division of Travel and Tourism and the Pinelands Commission. The state will play a key role in trail management, marketing and sign installation.

For free maps or more information, write to the New Jersey Coastal Heritage Trail, P.O. Box 118, Mauricetown 08329-9901, or call (609) 785-0676. Maps and other literature will not be available until after October 30.

*Roundup by Greg Johnson of DEPE's Office of Publications.*

### Follow-Up



Researchers at the Stevens Institute of Technology study the effects of wave action on a simulated shoreline.

### Scientists Build Their Own Beach

Scientists at the Stevens Institute of Technology in Hoboken, Hudson County, have constructed an indoor beach to study the effects of wave action and test various methods for protecting the New Jersey shoreline against erosion (NJO Summer 1992). The study was funded by Breakwaters International, a Flemington company that manufactures artificial reefs for erosion control.

Thirty tons of sand were trucked into the institute's Davidson Laboratory to create "Stevens Beach," a composite of dozens of beaches found along the Jersey Shore. The largest of the laboratory's two wave tanks measures 320 feet and contains a 150-foot artificial beach. A computer generates a variety of wave patterns, sizes and speeds, sending half the water over a miniature concrete reef. The other half of the wave action crashes against the sand, providing a control of unimpeded erosion.

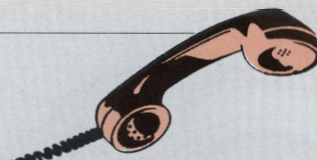
The concrete reefs, which last 50 years, could extend the life span of a beach from an average of four to six years to at least 10 years, according to Breakwaters.



## Test Your Environmental IQ

How would you score on a quiz on the environment? When the following questions, based on data compiled by S.C. Johnson & Son, Inc., were given to 2,000 adults, the average score was only 33 percent, or an F in most classrooms. Can you do better?

1. True or false: The U.S. government allows most aerosol products to be made with chlorofluorocarbons (CFCs), known ozone depleters.
2. In 1989, the Exxon Valdez tanker spilled 10- to 11-million gallons of oil. The amount of used motor oil dumped by car owners into drains and sewers each year is: a) one-tenth as much b) half as much c) twice as much d) 10 times as much.
3. Which one of the following was the most widely recycled in the U.S. last year? a) steel b) plastic c) paper d) glass.
4. The populations of American ducks and geese have declined over the last decade. This is primarily because of: a) parasites and diseases b) loss of wilderness habitat c) hunters d) air pollution.
5. In terms of volume or tonnage, the top source of solid waste disposed of in landfills in this country is: a) paper and paperboard b) metals c) food scraps d) plastics.
6. True or False: Most of the biodegradable packaging we throw away in this country decomposes in 10 years.
7. True or False: The installation of modern sewer systems has eliminated the pollution of drinking water by human wastes.



### DEPE ACTION LINE

To Report Abuses of  
the Environment,

**Call:**

**609-292-7172**

24 hours a day

### Answers:

1. False — Of those questioned, 55 percent answered this one incorrectly. CFCs have been banned from almost all aerosols produced in this country since 1978. Most CFCs produced in the United States are used in vehicle air conditioning, refrigeration and as filler material in foam products.
2. d — Wrong again? This time only 10 percent answered correctly. Thirty percent simply didn't know.
3. a — This time only 15 percent answered correctly.
4. b — Fifty-one percent correctly chose habitat loss.
5. a — Thirty-six percent correctly picked paper and paperboard.
6. False — A lot of people, 32 percent, mistakenly believe that throwing away means going away.
7. False — Forty-three percent realize that modern sewer systems haven't eliminated the pollution of drinking water by human wastes.

## Pinelands Fire Loss Worst in 15 Years

Forty-two fires that broke out in the Pinelands area of Burlington, Camden and Ocean counties on May 3 consumed more than 13,000 acres, the worst one-day loss in 15 years.

Conditions then were "perfect" for wide-spread burning. High winds, low humidity, three years of drought and a below-average rainfall in April had set the stage. Conditions were aided by the infestation of the pine looper, a species of caterpillar that devastated 200,000 acres of the Pinelands last year, leaving millions of dry needles on the forest floor. The damage was the worst one-day loss since March 31, 1977, when 15,000 acres were charred, according to Joseph Hughes, assistant state fire warden.

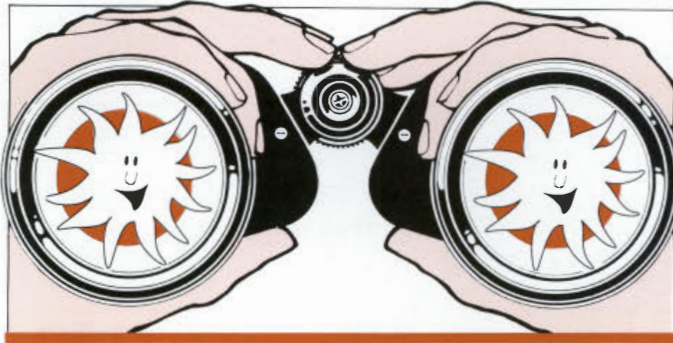
Forest fires, to a degree, are part of the Pinelands life cycle. The state forest service annually burns about 10,000 acres a year under controlled conditions. Nature has a way of adapting to this kind of adversity. One example is the pitch pine, the predominant species in the Pinelands. Its cones are sealed with a resin that is broken only by the type of high temperatures generated by forest fires. When the seal breaks, the seeds are dispersed and new growth follows.

Many of last spring's blazes in the Pinelands were considered suspicious. Approximately half the fires set each year are attributed to arson or carelessness. To report a forest fire, dial "0" for the operator and say, "I want to report a forest fire." You will be connected to the nearest firewarden.

A firefighter on a state forest fire truck sprays water on a blaze in South Jersey.







# Explorer

## Getting Energized

Hey, Explorers! How often have you been asked to do something active and your tired response has been — “Ah no, not me. I don’t have the energy today.” The word **energy** simply means “**the ability to do work or to perform.**” You use energy to walk, eat, work, play and even to sleep. If your body is healthy, not having enough energy to do something means that your body needs more rest or food so that it can produce more energy to use.

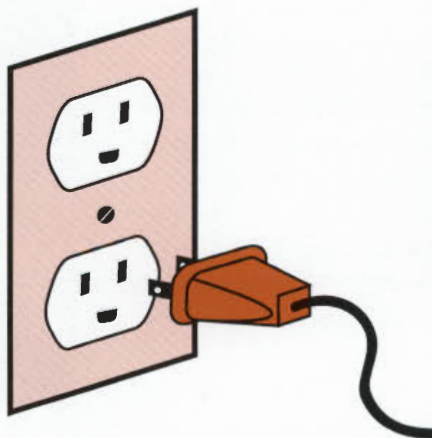
All around you, both indoors and outside, different kinds of energy are used to get work done. The breeze moves leaves in a tree, burning wood creates light and heat, and electricity is used to make a television work. So where does all this energy come from?

Almost all kinds of energy begin with the sun, which has been shining its light onto the earth for the past four billion years. Anything that light shines on absorbs part of the light’s energy and begins to get warm, thus creating heat. Another energy source created is wind. As the land and water are heated, the air above grows warm and rises, eventually to be replaced by cooler, heavier air. This movement creates wind. A third energy source is power from moving water. As water is heated by sunlight, some turns into water vapor, which eventually turns into clouds and rain, and refills the lakes, rivers and oceans.

Some of this energy has been stored for years in the form of **fossil fuels, such as coal, oil and gas.** Coal began to be formed millions of years ago, when the earth was warmer and

wetter. Many plants grew in swampy areas and left a thick layer of plant remains on the bottom when they died. Over time, this was covered by sand and clay. The weight from the sand and clay squeezed the water out of the plant layer, and it eventually turned into coal. Most geologists agree that natural gas and oil were formed in an ocean because oil is located near the fossils of ocean animals. They believe that dead plants and animals sank and mixed with sand and clay. Eventually, the heavy layers of sand that collected on top of the plants and animals helped to change their remains into gas and oil. These fossil fuels (along with nuclear power) are used by New Jersey utility companies to produce electricity for heat, light and to power appliances. They also are used by industry for production of food, clothing and other items that you buy and use daily.

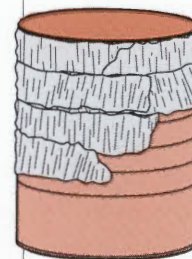
**And that, Explorers, takes a lot of energy!**



## Experiment With Insulation

A house, apartment or office loses or gains heat in two ways. This experiment will focus on **conduction**, which is **the movement of heat through walls, windows and other building materials that separate the inside of your home from the weather outside.** Heat moves from the warm side of a surface to the cool side. In winter, it is “energy-wise” to keep the heat in, while in the summer we try to keep the heat out. Using the proper building materials and insulation can make this happen. For this experiment you will need two coffee cans with plastic lids (any size, as long as they’re both the same size), newspaper, scissors, a paper bag, a knife, masking tape, water, ice and a thermometer.

1) Cut the bag and newspaper into strips. Wind the strips around the sides of *one* of the cans and tape them in place until the insulation is about 1-inch thick.



2) Have an adult use the knife to put a hole into the center of both plastic tops. The thermometer should fit through the holes.

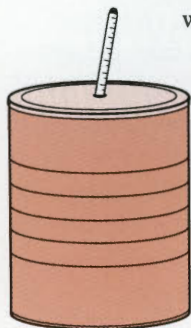
3) Fill both cans with tap water, add equal amounts of ice and put the plastic tops on.

4) Put thermometers into the holes in each of the plastic tops. Finish winding paper and newspaper strips around the



insulated can and over the top, using tape to seal it.

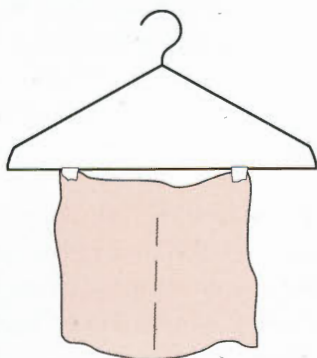
5) Place both cans in a similar sunny area outside. Measure and record the water temperatures of both cans every 15 minutes. What do you think will happen to the water temperature in each can? What actually happened? Why do you think it happened?



6) Do the same experiment again, this time using boiling water and placing the cans in a cool and dark area. (Caution: Ask an adult for help and be careful. The can will be hot.) Discuss with your family ways in which your home is, or could be, properly insulated.

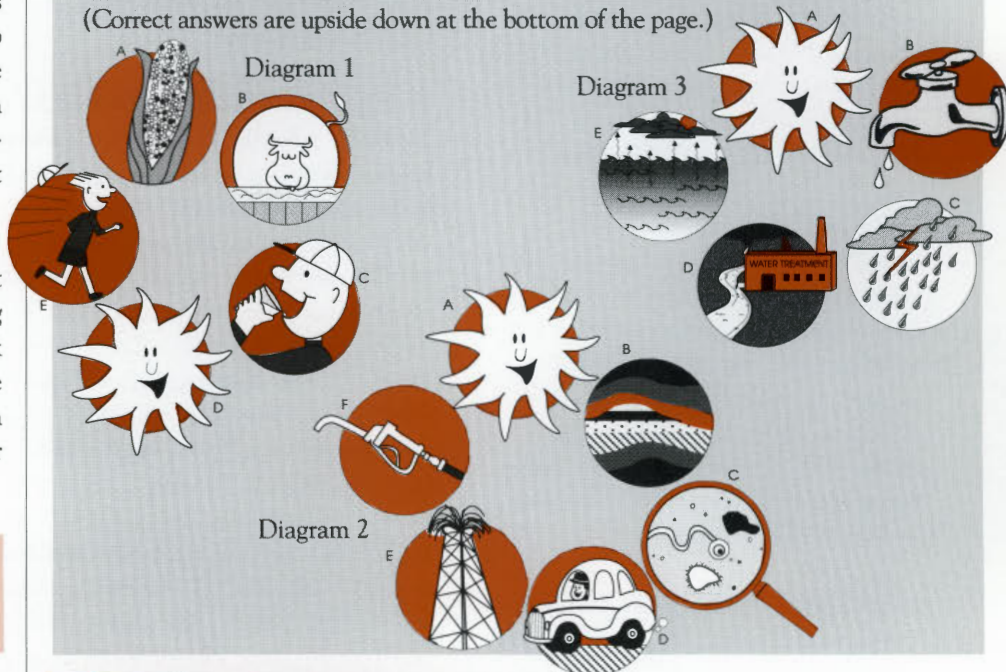
## Be a Draft Detector

A building also loses or gains heat through infiltration, which occurs when hot or cold air moves in and out of cracks in walls or spaces around doors and windows or between walls and floors. You can make a "draft detector" with a clothes hanger, tape and a tissue (see diagram). Use it to check anywhere there is a gap or opening in the walls, roof, or floor of your home. Show your parents any place there seems to be a draft and make sure that they read the article, "Invest in Home Energy Conservation," on pages 26-29.



## Energy Cycles

Below are three "energy cycles" that represent how energy flows from one "stage" to the next before an item in your home is used by you or someone in your family. Beginning with the sun in each cycle, draw small arrows to show the energy flow. (Correct answers are upside down at the bottom of the page.)

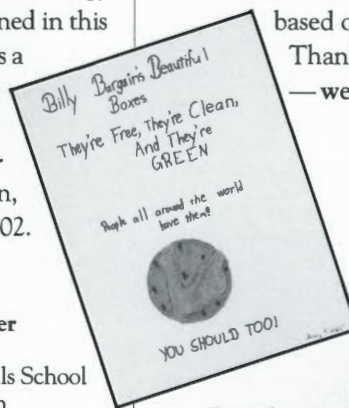


## Think About It

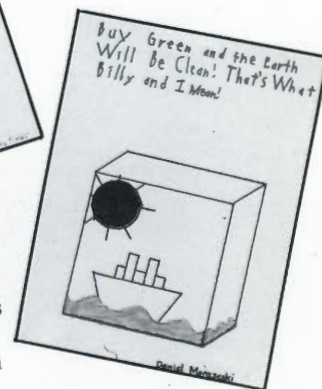
If you have practiced a way to save energy in your home that is not mentioned in this issue of "Explorer," please send us a letter and we just might print your suggestion in a future issue. Address suggestions to **New Jersey Outdoors**, Explorer Section, CN 402, Trenton, N.J. 08625-0402.

**Amy Fisher**  
Grade 3  
Clarks Mills School  
Manalapan

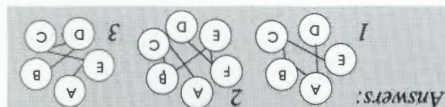
**In the spring** "Explorer" issue, we asked our readers to design an advertisement for "Billy Bargain's Boxes." We selected the two advertisements below based on content and design. Thanks to all who submitted — we love to hear from you!



**Daniel Moraseski**  
Grade 3  
Clark Mills School  
Manalapan



Explorer by Tanya Oznowich, supervisor of the Department of Environmental Protection and Energy's Environmental Education Unit.





# Events

## September

### 16 BIRD WALK FOR FIRST-TIMERS

Sponsored by the Cape May Bird Observatory. **Hours:** 7:30 a.m. to 9 a.m. **Admission:** \$5 for members, \$7 for nonmembers **Phone:** (609) 884-2736 **Location:** Meet at The Nature Conservancy's Cape May Migratory Bird Refuge parking lot on Sunset Blvd., one-half mile west of Cape May City

### 19 2ND ANNUAL ORGANIC COUNTRY FAIR

This day will be devoted to organic farming, featuring seminars, a market, craft demonstrations and entertainment. Farming and gardening supplies also will be available. **Hours:** 10 a.m. to 7:30 p.m. **Admission:** \$4 **Phone:** (609) 737-6848 **Location:** Stony Brook-Millstone Watershed Association, 31 Titus Mill Rd., Pennington

### 19 EVENING LANTERN TOURS

Take a walk through Historic Allaire Village and examine its candle-lit buildings. **Hours:** 7 p.m. to 9 p.m. **Admission:** \$2 per person **Phone:** (908) 938-2253 **Location:** Allaire State Park, Rte. 524, Farmingdale

### 19 FESTIVAL OF THE SEA

Food, arts and crafts, and activities for children will be featured. A five-mile run also takes place at 9 a.m. **Hours:** 10 a.m. to 5 p.m. **Admission:** Free **Phone:** (908) 899-2424 **Location:** Arnold, Bay and River Aves., downtown Point Pleasant Beach

### 19 HAWK ID MINI-WORKSHOP

Slide show and hawk watch. **Hours:** 1 p.m. to 3 p.m. **Admission:** \$5 for members, \$7 for nonmembers **Phone:** (609) 884-2736 **Location:** Meet at Cape May Point State Park's Environmental Education Building

### 19 HIKE ON THE PAULINSKILL VALLEY TRAIL

These hikes of various lengths take place on the abandoned bed of the New York, Susquehanna & Western Railroad. Bring lunch and something to drink, and wear comfortable shoes and adequate outdoor clothing. Sponsored by the Paulinskill Valley Trail Committee. **Hours:** 10 a.m. **Admission:** Free **Phone:** (908) 356-3289 or (908) 852-0597 **Location:** Meet at Halsey intersection, Rtes. 519 and 626, Newton

### 19 JERSEY SHORE SEA KAYAKING & BAY CANOEING SHOW

Activities featured will include clinics, guest speakers and a nature cruise. **Hours:** 9 a.m. to 5 p.m. **Admission:** Free **Phone:** (609) 971-3085 **Location:** Berkeley Island County Park, Bayville

### 19, 20 BIRD-WATCHING COURSE FOR BEGINNERS

Indoor class time will be followed by a bird outing at North America's premier bird-watching spot. Preregistration required. **Hours:** Saturday, 7 p.m. to 10 p.m.; Sunday, 8 a.m. to 10 a.m. **Admission:** \$10 for members, \$15 for nonmembers **Phone:** (609) 884-2736 **Location:** Cape May Bird Observatory, Cape May

### 19, 20 MS-150 BIKE TOUR

Proceeds of this 150-mile bike tour to the Jersey Shore will benefit the Delaware Valley National Multiple Sclerosis Society. Call for details. **Hours:** 6:30 a.m. to 5 p.m. **Admission:** \$25 to register **Phone:**

1 (800) 445-2453 **Location:** Garden State Park, Rte. 70, Cherry Hill

### 19, 20 GREATER POINT PLEASANT 15TH ANNUAL SEAFOOD FESTIVAL

On Saturday, visitors can indulge in seafood, crafts, rides and games. A parade will take place Sunday, followed by an inner tube race in the ocean surf. **Hours:** Saturday, 10 a.m. to 5 p.m.; Sunday, 12:30 p.m. to end of race **Admission:** Free **Phone:** (908) 899-2424 **Location:** on Saturday, Arnold Ave., Point Pleasant Beach; on Sunday, Ocean Ave.

### 19, 20 HAWK BANDING DEMONSTRATIONS

Observe live hawks and learn about their migration. **Hours:** 10 a.m. to 10:30 a.m. **Admission:** Free **Phone:** (609) 884-2736 **Location:** Meet next to Hawk Watch Platform at Cape May Point State Park

### 19, 20 SOUTH JERSEY SPORTSMEN'S JAMBOREE

A number of outdoor displays and activities will be featured, including a fishing derby, decoy carving, rifle demonstrations and more. Sponsored by the Cumberland County Federation of Sportsmen's Clubs. **Hours:** 9 a.m. to 5 p.m. **Admission:** Free **Phone:** (609) 785-0455 **Location:** Rte. 49 at Union Rd., Millville

### 20 BIRD WALK AT HIGBEE BEACH

Sponsored by the Cape May Bird Observatory. **Hours:** 7:30 a.m. to 9 a.m. **Admission:** \$5 for members, \$7 for nonmembers **Phone:** (609) 884-2736 **Location:** Meet at the Higbee Beach Wildlife Management Area's parking lot at the west end of New England Rd., just outside of Cape May

### 20 FALL FESTIVAL

This celebration of life in the 1800s will feature pioneer craft demonstrations, music, games, food and children's activities. **Hours:** Noon to 5 p.m. **Admission:** \$3 for adults, \$2 for children **Phone:** (201) 835-2160 **Location:** Weis Ecology Center, 150 Snake Den Rd., Ringwood



## Wetlands Institute to Host Wings 'n Water Fest

**20 "HEY RUBE, GET A TUBE"** An inner tube race will be held through the ocean surf, accompanied by a zany parade. Sponsored by the Point Pleasant Lion's Club. **Hours:** Noon to 4 p.m. **Admission:** Free **Phone:** (908) 899-2424 **Location:** Ocean Ave., Point Pleasant Beach

**23 BIRD WALK FOR FIRST-TIMERS** Same as September 16.

**26 THE FALL FESTIVAL** Join the Bergen County Militia, the North Jersey Antique Engine Club and others for this colonial celebration. Sponsored by the James A. McFaul Environmental Center. **Hours:** 9 a.m. to 6 p.m. **Admission:** Free **Phone:** (201) 891-5571 **Location:** Darlington County Park, Darlington Ave., Mahwah

**26 HARVEST FESTIVAL** This celebration of early America will include demonstrations of colonial crafts and Indian dances, live entertainment and more. **Hours:** 1 p.m. to 5 p.m. **Admission:** \$1 donation requested **Phone:** (908) 789-3670 **Location:** Trailside Nature and Science Center, Coles Ave. and New Providence Rd., Mountainside

**26 HAWK ID MINI-WORKSHOP**  
Same as September 19.

**26, 27 HAWK BANDING DEMONSTRATIONS** Same as September 19 and 20.

**26, 27 OLD-TIME BARNEGAT BAY DECOY & GUNNING SHOW** The largest decoy show in the state will feature new and old decoys, traditional boats, music of the Pinelands and the New Jersey State Duck Calling Championship. **Hours:** 9 a.m. to 5 p.m. **Admission:** Free **Phone:** (609) 971-3085 **Location:** Tip Seaman County Park and Pinelands High School, Tuckerton

**27 BIRD WALK AT HIGBEE BEACH** Same as September 20.



Kids make friends with a trio of black Labrador retrievers during a field demonstration at a recent Wings 'n Water Festival.

The Wetlands Institute will host its 10th Annual Wings 'n Water Festival on September 19 and 20, featuring dozens of family events along a 15-mile stretch of South Jersey coastline.

The highlights of this year's festival will include a bird carving and decoy show and sale, model boat exhibits, salt marsh safaris, wildlife photography, environmental exhibits and workshops, and a nature art show, as well as children's games and a variety of entertainment.

Seafood, Jersey vegetables, snacks and other foods will be served at various areas throughout the festival. Shuttles departing every few minutes will carry visitors to all of the event locations.

A special opening night reception on September 18 will include an auc-

tion of the carvings, paintings and other items donated to the institute by various organizations.

Admission to all weekend events is \$8 for adults, \$6 for senior citizens and \$4 for children under 12. Children under 4 will be admitted free. Hours are 10 a.m. to 5 p.m. on Saturday and 10 a.m. to 4 p.m. on Sunday.

The Wetlands Institute is a private, nonprofit environmental education and research center dedicated to the wise use of the Atlantic coastal region's natural resources. Located just off Exit 10 of the Garden State Parkway in Stone Harbor, it overlooks 6,000 acres of pristine salt marsh. For more information about the Wetlands Institute or its schedule of programs, call (609) 368-1211.

### 27 CRANBERRY HARVEST TOUR

A slide show on the history of cranberry farming will feature refreshments and a walk through the cranberry bogs.

**Hours:** 9 a.m. to noon **Admission:**

\$3 per person, \$9 per family

**Phone:** (609) 893-4646


**Location:** Whitesbog

Village, Rte. 530,

Browns Mills







## Events

**30 BIRD WALK FOR FIRST-TIMERS** Same as September 16.

## October

**2-4 46TH ANNUAL CAPE MAY AUTUMN WEEKEND** A weekend of programs will feature bird, botany and butterfly field trips, ID workshops and evening programs. Sponsored by the New Jersey Audubon Society. **Hours:** All weekend **Admission:** Call for fees and preregistration information **Phone:** (609) 884-2736 **Location:** Held at the Grand Hotel in Cape May

**3 4TH ANNUAL LONG BEACH ISLAND CHOWDERFEST** Local restaurants will provide samples of their finest chowder. **Hours:** 10 a.m. to 4 p.m. **Admission:** \$6 for adults, \$2 for children **Phone:** 1 (800) 292-6372 or (609) 494-7211 **Location:** Off Parkway Exit 63, take Rte. 72E to Long Beach Island.

**3 Through November 15 38TH ANNUAL LONG BEACH ISLAND SURF-FISHING TOURNAMENT** This six-week tournament will offer \$20,000 in prizes for bluefish, weakfish and striped bass. Sponsored by the Southern Ocean County Chamber of Commerce. **Hours:** All day/all night **Admission:** Registration fee is \$25 for adults, \$15 for children under 14 **Phone:** 1 (800) 292-6372 or (609) 494-7211 **Location:** Off Parkway exit 63, take Rte. 72E to Long Beach Island

**3, 4 HAWK BANDING DEMONSTRATIONS** Same as September 19 and 20.

**4 APPLE CIDER-MAKING DEMONSTRATION** This interactive program conducted by staff naturalists will teach participants the history of apples, apple tree identification and how to make apple cider. Free samples will be available. **Hours:** 2 p.m. **Admission:** Free **Phone:** (201) 891-5571 **Location:** James A. McFaul Environmental Center, Crescent Ave., Wyckoff

**4 BIG CATTUS DAY** Participants will be able to take part in a large offering of natural history activities, including boat and van tours, nature walks, slide shows and an environmental fair. **Hours:** 7 a.m. to 5 p.m. **Admission:** Free **Phone:** (908) 270-6960 **Location:** Cattus Island Ocean County Park, Fischer Blvd., Toms River

**7 BIRD WALK FOR FIRST-TIMERS** Same as September 16.

**10 CRANBERRY HARVEST CROSS-COUNTRY RUN** The course on this five-mile run will follow sand roads, run along blueberry fields and cranberry bogs, and wind through the unique wilds of the Pine Barrens. **Hours:** 8 a.m. to noon **Admission:** \$10 preregistration, \$12 day of race **Phone:** (609) 893-4646 **Location:** Whitesbog Village, Rte. 530, Browns Mills

**10 HAWK ID MINI-WORKSHOP** Same as September 19.

**10, 11 HARVEST FESTIVAL** The festival will feature educational hayrides to the pick-your-own pumpkin patch, pumpkin decorating, face painting, winery tours, wine tasting, entertainment and barefoot grape stomping. **Hours:** 10 a.m. to 5 p.m. **Admission:** Free **Phone:** (908) 475-3872 **Location:** Matarazzo Farms, Rte. 519, Belvidere

**10, 11 HAWK BANDING DEMONSTRATIONS** Same as September 19 and 20.

**10, 11 WILDLIFE ART AND CARVINGERS SHOW** Artwork and carvings of

wildlife will be on display. Sponsored by the Department of Environmental Protection and Energy's Division of Fish, Game and Wildlife. **Hours:** 10 a.m. to 4 p.m. **Admission:** Free **Phone:** (908) 637-4125 **Location:** Pequest Trout Hatchery, Rte. 46, Oxford

**11 HIKE ON THE PAULINSKILL VALLEY TRAIL** Same as September 19. **Location:** Footbridge Park, Rte. 94, Blairstown


**14 BIRD WALK FOR FIRST-TIMERS** Same as September 16.

**17 HAWK ID MINI-WORKSHOP** Same as September 19.

**17 NEW JERSEY'S SECRET PLACES TOUR** You may not know where you're going, but you will know where you've been as you see some of the state's most spectacular scenic and natural resources. Sponsored by the New Jersey Conservation Foundation. **Hours:** 10 a.m. to 4 p.m. **Admission:** Call **Phone:** (201) 539-7540 **Location:** Meet at the foundation's headquarters, 300 Mendham Rd., Morristown

**17, 18 CHATSWORTH CRANBERRY FESTIVAL** This two-day festival will celebrate New Jersey's cranberry harvest with contests, Pine Barrens entertainment, harvest tours and food made with cranberries. **Hours:** 10 a.m. to 5 p.m. **Admission:** \$4 parking fee, plus a separate fee for tours **Phone:** (609) 859-9701 **Location:** White Horse Inn, Main Street, Chatsworth





## 17, 18 CHRYSANTHEMUM SHOW

This is an annual competition of the Chrysanthemum Society. **Hours:** Saturday, 1 p.m. to 6 p.m.; Sunday, 9 a.m. to 5 p.m. **Admission:** Free **Phone:** (201) 891-5571 **Location:** James A. McFaul Environmental Center, Crescent Ave., Wyckoff

## 17, 18 HAWK BANDING DEMONSTRATIONS

Same as September 19 and 20.

**17, 18 WILD BIRD FEEDING** Displays and information on the feeding and care of wild birds will be featured. **Hours:** 9 a.m. to 4 p.m. **Admission:** Free **Phone:** (201) 635-6629 **Location:** Great Swamp Outdoor Education Center, 247 Southern Blvd., Chatham

**18 LORD STIRLING 1770s FESTIVAL** The outdoor event will feature a variety of colonial courtyard activities, including broom-making, spinning and storytelling. The 3rd New Jersey Regiment will be on hand to reenact a small encampment. **Hours:** 10 a.m. to 6 p.m. **Admission:** Free, but donation appreciated **Phone:** (908) 766-2489 **Location:** Environmental Education Center, 190 Lord Stirling Rd., Basking Ridge

**18 TURKEY SWAMP PARK DAY** This family festival will feature pony rides, demonstrations, entertainment, an arts and crafts sale, and more. Sponsored by the Monmouth County Park System. **Hours:** 11 a.m. to 5 p.m. **Admission:** Free **Phone:** (908) 842-4000, Ext. 242 **Location:** Turkey Swamp Park, Georgia Rd., Freehold

**21 BIRD WALK FOR FIRST-TIMERS**  
Same as September 16.

**24, 25 BIRD-WATCHING COURSE FOR BEGINNERS** Same as September 19 and 20.

**24, 25 HALLOWEEN PARTY** Pick and decorate your own pumpkins, go on

wagon and pony rides and eat delicious foods made from apples. **Hours:** 10 a.m. to 5 p.m. **Admission:** \$3; children under 3 admitted free **Phone:** (609) 924-2310 **Location:** Terhune Orchards, 330 Cold Soil Rd., Princeton

**24, 25 HAWK BANDING DEMONSTRATIONS** Same as September 19, 20.

**25 GHOST WALK HISTORICAL HIKE** Same as Paulinskill hike on September 19. **Location:** Footbridge Park, Rte. 94, Blairstown

**25 TALES OF THE SWAMP** Jack Rushing will tell stories and legends of the Great Swamp, such as those of the Swamp Devil and the Headless Hessian. **Hours:** 2 p.m. **Admission:** Free **Phone:** (201) 635-6629 **Location:** Great Swamp Outdoor Education Center, 247 Southern Blvd., Chatham

**28 BIRD WALK FOR FIRST-TIMERS**  
Same as September 16.

**30-1 HALLOWEEN WEEKEND PARTY** Featured will be professional storytelling around a bonfire, hayrides through the bogs and pines surrounding Whitesbog Village, a night hike and hot cider and donuts. **Hours:** 7:30 p.m. to midnight **Admission:** \$10 per person **Phone:** (609) 893-4646 **Location:** Whitesbog Village, Rte. 530, Browns Mills

**31 HAWK ID MINI-WORKSHOP**  
Same as September 19.

**31, 1 HAWK BANDING DEMONSTRATIONS** Same as September 19 and 20.



## November

**7 MOONLIGHT WALK** This five-mile moonlight walk will take you through the flooded bogs, ponds, reservoirs, cedar swamps and pine forests surrounding Historic Whitesbog Village. **Hours:** 7 p.m. to 9 p.m. **Admission:** \$3 per person, \$9 per family **Phone:** (609) 893-4646 **Location:** Whitesbog Village, Rte. 530, Browns Mills

**14 HIKE ON THE PAULINSKILL VALLEY TRAIL** Same as September 19. **Location:** Meet at Halsey intersection, Rte. 519 and Rte. 626, Newton

**15 FALL HIKE - ANIMALS OF THE PINE BARRENS** Walk sand roads along blueberry fields, cranberry bogs and the wilds of the Pine Barrens. Discuss animal habits and tracking, and seek out dens. **Hours:** 9 a.m. to noon **Admission:** \$3 per person, \$9 per family **Phone:** (609) 893-4646 **Location:** Whitesbog Village, Rte. 530, Browns Mills

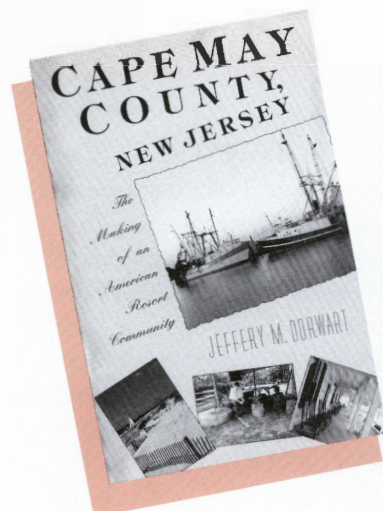
**21, 22 BIRD-WATCHING COURSE FOR BEGINNERS** Same as September 19, 20.

**22 MacNAMARA WILDLIFE MANAGEMENT AREA HIKE** This easy 6.5-mile hike should present opportunities to view snow geese, tundra swans and other migrating waterfowl. Sponsored by the West Jersey Sierra Group. **Hours:** 10 a.m. **Admission:** Free **Phone:** (609) 267-7052 **Location:** MacNamara Wildlife Management Area, Rte. 50, south of Tuckahoe

**29, 30 ADULT HOLIDAY CRAFT FESTIVAL** Make a grape vine or pine bough wreath or ornament. Please bring your own decorations. Preregistration required. **Hours:** 2 p.m. **Admission:** \$3 per person (checks only) **Phone:** (201) 891-5571 **Location:** James A. McFaul Environmental Center, Crescent Ave., Wyckoff



# Bookshelf



**Cape May County, New Jersey: The Making of an American Resort Community**, by Jeffery M. Dorwart, published by Rutgers University Press, traces the development of one of America's most popular seashore resorts, from its earliest settlement and role as a fishing and shipbuilding community to the present. Cost is \$40 (hardcover) or \$12.95 (paperback). Available at bookstores. For more information, call toll-free: 1 (800) 446-9323.

**Field and Forest, A Guide to Native Landscapes for Gardeners and Naturalists**, written and illustrated by Jane Scott, published by Walker and Company, is both a reference and a handbook featuring a variety of North American habitats. Topics discussed include the American landscape, human impact on the land and why plants thrive in certain areas. Cost is \$24.95 (hardcover) or \$16.95 (paperback). Available at bookstores. To order by phone, call Walker and Company's customer service department at 1 (800) AT WALKER.

**A Fish on Every Storm Drain**, produced by Clean Ocean Action, a group dedicated to keeping New York and New Jersey's coastal waters clean, is a packet that provides instructions on how to stencil fish on storm drains in your community to alert people to the problem of non-point source pollution. Available free by contacting Clean Ocean Action at (908) 872-0111.

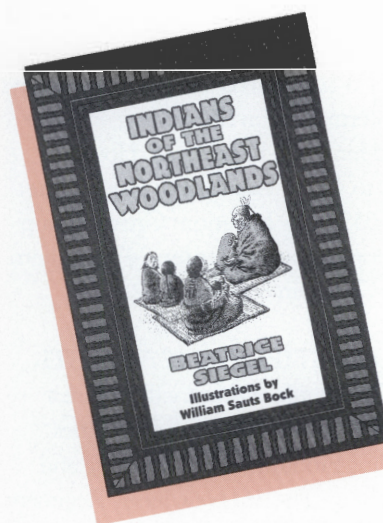
**The Historical Fisheries of Raritan Bay**, by Clyde L. Mackenzie, Jr., published by Rutgers University Press, appeals to anglers, environmentalists and professionals alike. It presents a detailed history of the Raritan Bay and its commercial fisheries, explaining the development of tools and techniques for taking shellfish and finfish. The author describes what life is like on the bay today and reminds us of what will happen if pollution continue. Cost is \$45 (hardcover) or \$16.95 (paperback). Available at bookstores. For more information, call toll-free: 1 (800) 446-9323.

**Indians of the Northeast Woodlands**, by Beatrice Siegel, released by Walker and Company, is a revised edition of the popular children's book. It describes what life was like for Native Americans before and after the arrival of the Pilgrims. Cost is \$13.95 (hardcover) Available at bookstores. To order by phone, call Walker and Company's customer service department at 1 (800) AT WALKER.

**Jerseyana: The Underside of New Jersey History**, by Marc Mappen, published by Rutgers University Press, is a collection of 54 monthly newspaper columns written by the author and is a colorful exploration into New Jersey history. The stories detailed within are bizarre, amusing and moving. Cost is \$38 (hardcover) or \$14.95 (paperback). Available at bookstores. For more information, call toll-free: 1 (800) 446-9323.

**1991 New Jersey Energy Master Plan**, developed by the New Jersey Energy Master Plan Committee, is a framework for action that will shape New Jersey's energy future. It emphasizes efficient conservation to strike a balance between current social, economic and environmental concerns. The 255-page report describes in detail New Jersey's energy sources, programs, needs, goals and the tools required for change. Available free by contacting the New Jersey Department of Environmental Protection and Energy's Office of Energy at (609) 777-1501.

**The New Jersey Outdoor Guide**, prepared by the New Jersey Division of Travel and Tourism, lists places to go for virtually everything you can do outdoors in New Jersey. Information is provided on individual activities at the state's numerous parks and recreational areas, as well as on visitors bureaus, tourist welcome centers, chambers of commerce and modes of transportation. Available free by calling 1-800-JERSEY-7.



**Tackling Toxics in Everyday Products: A Directory of Organizations**, released by INFORM, a national nonprofit environmental research and education organization, details the results of a survey of 250 organizations currently working toward finding solutions to the country's hazardous waste problem. Information is given on the organizations' activities, publications and products. Cost is \$19.95, plus \$3.00 shipping and handling. Available by contacting INFORM at (212) 689-4040.

Geological Survey Open-File Map No. 8, scale 1:24,000. **Surficial Geology of the Roselle Quadrangle, Union, Essex and Morris Counties, New Jersey**, by Scott D. Stanford. Cost is \$3. Orders for this New Jersey Geological Survey map should be mailed to the Department of Environmental Protection and Energy, Map and Publications Sales, Bureau of Revenue, CN 417, Trenton 08625-0417. Please make checks payable to "Treasurer, State of New Jersey."



# Outings

## Catch the Colors of the Season

As the weather becomes colder, the colors of the forest turn warmer. The cool green leaves that shaded us all summer will turn shades of yellow, red, orange, brown and purple before they fall.

Washington Crossing State Park in Mercer County is one of the many good places to take in the fall foliage in New Jersey. Red oaks, sassafras, red maples, sumac and flowering dogwoods give the park its reds in shades of scarlet, rose, bronze and maroon. The hues of yellow come from the white ash, tulip trees and hickories. Also of note are the wildflowers that bloom this time of year, including goldenrod, white and lavender asters, the spidery yellow flowers of witch hazel and the reddish-purple flowers of ironweed.

The park, located along the Delaware River eight miles north of Trenton, is easily accessible from Routes 29 or 546. It spans more than 800 acres in Mercer County, with trails and athletic fields that make the park popular for other activities such as biking and riding horses on designated paths; hiking; bird-watching, especially during the fall hawk and songbird migrations; kite-flying; soccer; football; and softball.

The quality and peak time of fall foliage in the park and throughout New Jersey depend on the weather, says Wayne Henderek, the park naturalist. "If you have an autumn that is unusually sunny and cool, with sharp temperatures in the 30s, it helps bring out the maroons and reds."

While last fall's foliage was colorful, the leaf-turning the season before was less attractive because of the very dry summer that preceded it, he says. The leaf-turning usually occurs about a week earlier in northern New Jersey's higher elevations such as Stokes State Forest.

For more information on Washington Crossing State Park, call (609) 737-0623.

By Michelle Anthony, a Trenton State College journalism intern



GREG JOHNSON

Washington Crossing State Park in Mercer County is one of several good spots to take in New Jersey's fall foliage.

## Other Areas to Enjoy

Some of the other places to see fall foliage in New Jersey are listed below. Since peak times vary throughout the state, call the place you wish to visit to find the best time to go.

### Atlantic County

Makepeace Lake, Route 625 between Weymouth and Elwood; New Jersey Division of Fish, Game and Wildlife, Southern Region Bureau of Law Enforcement - (609) 629-0555

The freshwater wetlands produce the brightly colored foliage of the sweet gum, black gum and maples.

### Pine Barrens Area of Burlington County and Ocean County

Lebanon State Forest, New Lisbon, off Routes 70 or 72, one mile east of Four Mile Circle — (609) 726-1191

The reds, oranges and yellows of the oaks, gums, sumac, sassafras and tulip poplars stand out amongst the predominant evergreens of this area. Also adding color this time of year is the cranberry harvest.

### Camden County

Hopkins Pond, Hopkins Lane between Kings Highway and Grove Street, Haddonfield; Camden County Department of Parks and Environmental Affairs — (609) 795-7275

This intimate park surrounds an old mill pond close to where a duck-billed dinosaur, the Hadrosaurus, was dug up in 1858. A spectrum of fall colors is provided by the tulip poplar, black and sweet gums, white and northern red oaks, dogwood, shagbark hickory, American

beech, red and silver maples, black locust and white ash.

### Cumberland County

Route 533 south to Route 601, through the Dix Wildlife Management Area, near the Cohansey River, south of Bridgeton; Bridgeton-Cumberland Tourist Association — (609) 451-4802

This area of the state is one of the lesser-known fall foliage secrets around. Don Murray, host of of WSNJ's "Outdoor World," claims it's better than New England with its black and red willows, tulip poplar, oaks, sweet and sour gums, sumac, ash, swamp maple, hickory and hornbeam.

### Middlesex County

Davison Mill Pond, Reva Avenue, East Brunswick; Middlesex County Department of Parks and Recreation — (908) 745-3930

The pond provides double the colors with its reflections of oaks and maples.

### Passaic County

Ringwood State Park, Route 17 North off Sloatsburg Road, Ringwood — (201) 962-7031

Home of the New Jersey State Botanical Gardens at Skylands, this mountainous northeastern area's colors come from its sugar maples, beeches, oaks and the brilliant red burning bush.

### Sussex County

High Point State Park, 1480 State Route 23, Sussex, off Route 23 — (201) 875-4800

The best vantage point is from the monument parking lot, which is the highest point of elevation in the state, with a 360-degree view of New Jersey, Pennsylvania and New York.



# Wildlife in New Jersey

## The Eastern Chipmunk

The eastern chipmunk, or *Tamias striatus*, is a common sight several months out of the year near stone rows, garden walls, old forests, woodpiles, parks or just about anywhere it can gather seeds, nuts and fruits. This lively little creature is found throughout the eastern United States, except in the extreme Southeast and in Florida. It also ranges through the eastern half of southern Canada.

The eastern chipmunk is sometimes called a chippy, hackie or rock squirrel. A ground-dwelling member of the squirrel family, the chipmunk has two upper and lower chisel-like front teeth that it uses for gnawing. Adults measure 8 to 10 inches in length and weigh about 3 ounces. The chipmunk has a short head with rounded, flat ears and a flat, hairy tail.

Both sexes are identical in coloration. The chipmunk's short, dense fur is a reddish color, with five black-brown stripes down the back. Between the stripes on either side is a broad band of buff white. Its large black eyes are surrounded by thin buff rings with a brown outline, coloration that distinguishes it from other mammals typically found in its range. Its underside is white.

Chipmunks eat a variety of foods, including acorns, hickory nuts, beechnuts, cherry pits and seeds. They also feed on insects, slugs, bird eggs, baby birds, earthworms and small snakes.

The chipmunk is well known for its habit of storing and hoarding food, and its spacious cheek pouches helps it accomplish this. The amount of food a chipmunk can carry in these pouches is quite remarkable. One was recorded carrying 32 beechnuts. Another chipmunk managed 70 sunflower seeds, while yet another held 145 kernels of wheat. A chipmunk will use its front paws to fill and unload these pouches, being careful to make sure both cheeks are filled and the load properly balanced. When emptying its pouches, the chipmunk pushes upward with its forepaws on the outside of its cheeks, forcing the food out of its mouth.

Chipmunks are quite adept at digging

burrows. Elaborate tunnels allow them to store caches of food for the winter and provide a safe, comfortable nursery for their young. Entrance holes are unobtrusive, perhaps under an old log, tree stump, rock or stone wall.

Active during early morning and late afternoon, chipmunks return to their burrows during hot afternoon hours and at night.

When winter sets in, chipmunks plug

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Chipmunks eat  
a variety of foods,  
including acorns,  
hickory nuts,  
beechnuts, cherry  
pits and seeds.

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their entrance holes and settle in for a winter rest. Although chipmunks do not have enough stored body fat for true hibernation, they may sleep for several days at a time, waking to feed on stored food. On warmer sunny days, they may emerge briefly, then slip back into their burrows.

This vocal rodent uses three notes to communicate, ranging from a loud "chip" similar to that of a robin to a soft "chuck-chuck" sound, which may be repeated for several minutes. A loud "chip-r-r-r-r" trill is often heard when another animal trespasses on the chipmunk's territory.

The chipmunk is a very independent animal, spending most of its time alone. This solitary behavior is abandoned during the breeding season in late February and March. After a brief courtship and mating, the female will take on the sole responsibility of rearing the young, which are born in an underground nesting chamber following a 31-day gestation period. Litters

consist of one to eight young, but generally average three to five. A female may produce two litters a year.

Baby chipmunks are born blind, naked and completely helpless, weighing about a tenth of an ounce. Their ears open in three weeks and the familiar stripes appear on small furred bodies. Their eyes open after 30 days, and in another three weeks they will be weaned and begin foraging with their mother. When young chipmunks are about 3 months old, they seek out secluded areas in which to dig their own burrows.

Although chipmunks may live up to eight years under optimal conditions, life expectancy is generally two to three years. Many factors, including predation, automobiles and habitat loss, add to the hazards of living in the wild.

Exuberant energy, excited trills and stuffed cheeks make the eastern chipmunk one of the most endearing of all common wildlife.

By Debbie MacKenzie and Carole Skwarek, naturalists at the Division of Fish, Game and Wildlife's Pequest Trout Hatchery and Natural Resource Education Center in Warren County

Mark Schreiber of High Bridge is an illustrator and muralist. More of his paintings can be seen on the front cover and on pages 21-25.









High Breeze Farm in Sussex County was a working farm for more than 200 years.  
See page 16 for more on its history and current restoration efforts.

## In Next Season's Issue

Think 'Green' for the Holidays  
Discover New Jersey's Famous Firsts  
Make Your Back Yard a Haven for Birds