NEW JERSEY Outdoors

$4.25

Spring 1994

Exploring Lime Kilns • Discovering the Living Fossils of the Delaware Bay
Tracing the History of Hutcheson Forest • Visiting the Fascinating World of Insects
Eyeing the Walleye • Restoring Wild Turkeys in the Pine Barrens

MICHAEL BAYTOFF

A great blue heron wades at the Edwin B. Forsythe National Wildlife Refuge, Atlantic County.

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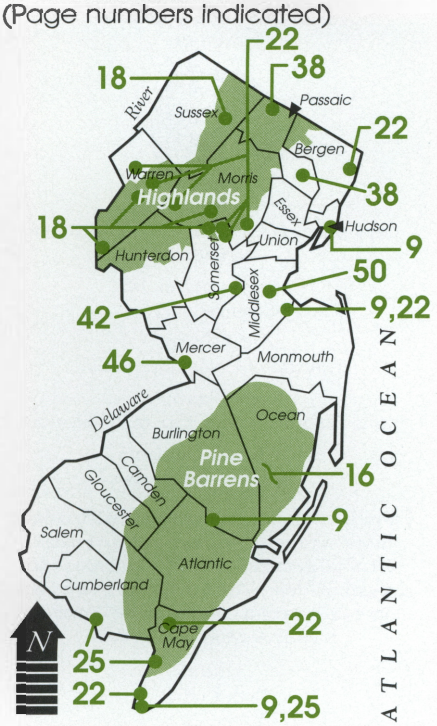

Departments

Covers

Front: Purple loosestrife blooms in Troy Acres at Great Meadows in Morris County. *Photo by J.J. Raia*

Back: *Illustration by Charlton Palmer*

Features

A lightning bug at the end of photographer David Orden's lens.
To see more of New Jersey's littlest wildlife, turn to page 30.

DAVID ORDEN

Editorials

Christine Todd Whitman, Governor

Message from the Governor

There are no resources more precious than clean water and air nor a natural legacy that we leave our children and grandchildren more important than open space. Investing in these and other natural resources today not only pays off now, but will pay dividends for generations to come.

That is why I have pledged to fight for the preservation of these critical natural resources as Governor of New Jersey. Protecting fish and wildlife habitats and forest areas will also help improve our air quality, preserve critical water supplies and provide recreational opportunities.

To this end, I have proposed developing a stable source of funding to save open space and farmlands. Over the years, New Jerseyans have chosen to make a substantial financial commitment to preserving open space through the many bond issues they have approved. However, we need to create a permanent way to acquire and protect additional undeveloped spaces to serve our large population.

One area that we must consider protecting is the Highlands of north and northwestern New Jersey which supplies 50 percent of the state's drinking water. Our watersheds are important because they have the natural ability to filter and cleanse water. Degraded waters represent a major economic threat to New Jersey. By protecting our watersheds now and not having to pay for water treatment later, we can save enormous amounts of money in the long run.

We also must revitalize the Jersey Shore, the linchpin of our $18 billion tourism industry. We need a master plan for the area that protects both the environment and economic vitality of the region.

But we can't do all of this alone. We need the help of local, county and federal governments, along with the support of business, environmental and community organizations. Working together, we can make an investment in our future — where environmental conservation and economic growth go hand in hand.

Robert C. Shinn, Jr., Commissioner

Message from the Commissioner

New Jersey is a beautiful state with its rolling hills to the north and west, its unique Pinelands to the south, and sandy beaches along the Atlantic Coast. It has some of the best and most diverse natural resources in the world, and I am happy to take up the challenge to keep it that way as Commissioner of the Department of Environmental Protection and Energy.

We are at a critical juncture in the state's history. We must balance economic growth with the need to protect and preserve the environment. I have long been a proponent of planning to save open space and agriculture in New Jersey and have worked throughout my career for preservation of the Pinelands and the state's farmlands, as well as for the protection of drinking water. I will continue to strive for sound environmental policies that ensure environmental conservation and encourage economic recovery.

As steward of the state's natural resources, I hope to develop statewide some of the programs I initiated in Burlington County — programs such as the Burlington County Conservation Easement Pinelands Development Credit Exchange, which allows development rights to be transferred to protect open space while clustering development in designated areas targeted for growth, and the Farmland Preservation Program, which saves agricultural lands for generations to come. Today, I am proud to say that more than 13,000 acres of farmland and open space have been preserved in Burlington County because of those preservation efforts. These programs have become national models and have great potential for future application in other areas of New Jersey.

I look forward to working with all of you to protect New Jersey's environment and keep the "garden" in the Garden State.

State of New Jersey
Christine Todd Whitman
Governor

Department of Environmental Protection and Energy

Robert C. Shinn, Jr.
Commissioner

Becky Taylor
Director of Communications

Roger Shatzkin
Acting Administrator, Office of Publications

New Jersey Outdoors
Spring 1994, Vol. 21, No.2

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

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New Jersey Outdoors (USPS 380-520) is a subscriber-supported magazine published by the New Jersey Department of Environmental Protection and Energy on a quarterly basis (Spring, February; Summer, May; Fall, August; Winter, November). Second-class postage is paid at Trenton, N.J., and additional mailing offices. Subscriptions are $15.00 for one year and $26.00 for two years payable by check or money order to: **New Jersey Outdoors**, NJDEPE, Bureau of Revenue, CN 417, Trenton, N.J. 08625-0417. Single or back issues, if available, cost $4.25. **New Jersey Outdoors** welcomes photographs and articles but will not be responsible for loss or damage. No part of the contents of this magazine may be reproduced by any means without the consent of **New Jersey Outdoors**. Telephone: Circulation and Editorial: (609) 292-2477; Subscriptions: 1-800-645-0038.

POSTMASTER: Send address changes to Editorial Office, **New Jersey Outdoors**, NJDEPE, CN 402, Trenton, N.J. 08625-0402. Send old and new addresses and the zip code numbers. The Post Office will not forward copies unless forwarding postage is provided by the subscriber. Allow eight weeks for new subscriptions and change of address to take effect.

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

***New Jersey Outdoors** is printed with soy ink on recycled paper that includes at least 10 percent post-consumer waste.*

Mailbox

Jersey City's Jewel

New Jersey Outdoors is one of my favorite publications, since I was born, raised and lived 47 years in Jersey City. I was more than impressed with the photo coverage of Duke Gardens and the accompanying text by Walter Choroszewski (*NJO*, Winter 1994). I certainly look forward to more of his work.

I would be remiss, however, if I did not point out my grave disappointment that the article on Liberty Science Center (*NJO*, Winter 1994) grossly fell short of complete because it never once mentioned that the science center is located in Jersey City!

My father, Max Davis, is an 87-year-old volunteer at the center — he is very proud to be a part of the center's focus on learning, as he is proud of its Jersey City location. Keep up the high quality of the publication.

Charles Davis
Lewisburg, PA.

Clearly Canada

In the Winter 1994 issue of the *New Jersey Outdoors* magazine, the author of the short article in the Roundup section entitled "Early Spring Season No Wild Goose Chase" made a common grammatical error. The author referred to Canada geese as Canadian geese.

To call the Canada geese Canadian geese is similar to referring to the plural deer as "deers." I fell victim to the same grammatical booby trap in an article I authored for my company newsletter. Then again, is it cactus or cacti? I enjoy your magazine very much — keep up the good work.

William G. Dalton
Interlaken

Editor's Note: We received several letters correcting our usage. The species referred to in "Early Season No Wild Goose Chase" is indeed Canada geese. Thanks for keeping us on our toes.

The Hunting Debate

I'm writing to tell you how much we enjoyed the article, "Get Ready to Go Squirrel Hunting" (*NJO*, Fall 1993).

This type of hunting, especially with black powder rifles, is challenging and fun. I heartily recommend it to all hunters.

Please keep up the good work, and, yes, "hunting and conservation do go hand and hand" . . . period!

Dr. J. P. DiLascio
Lyndhurst

On your editorial page, you claim that your 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 (New Jersey) residents with the information necessary to help the Department (of Environmental Protection and Energy) protect, preserve and enhance them." In my opinion, nothing could be further from the truth. The (Winter 1994 issue) contained article after article glorifying and encouraging the unnecessary and inhumane slaughter of the few species of animals that remain in New Jersey such as deer, squirrels and wild geese.

How in the world can you justify the slaughter of 5,001 Canada geese as necessary to reduce noise and droppings on corporate headquarters and golf courses, or the "tradition" handed down by a father to his twelve-year-old son of handling a lethal weapon and using it to slaughter whatever wildlife is misfortunate enough to cross its path? Why does the article on the return of coyotes in New Jersey fail to note that setting inhumane snares for these animals is a barbaric act that poses an unwarranted threat not just to the coyotes but to other wildlife as well?

Hunting can never be justified in today's society. Anyone who participates in this activity, which is now ironically referred to as a "sport," shows a complete disrespect for life, a total disregard for the suffering of innocent creatures, and an inability to preserve and properly appreciate the outdoors.

Laura Antonelli
Cherry Hill

Patrick Carr, a hunter education specialist with the Division of Fish, Game and Wildlife (DFG&W), responds: Some people oppose hunting, and the debate in these pages is not going to change their minds. A recent Rutgers University survey shows that they are in the minority. According to the survey, two-thirds of New Jersey residents support regulated deer hunting. Hunting is strictly controlled, and I urge those critical of hunting to consider the consequences of no hunting. Data collected by the DFG&W indicate that deer, wild geese and squirrel populations are increasing and are perhaps at their highest levels ever in the state due to habitat changes and wildlife management, which includes hunting. There is a need to manage and control the deer populations on public and private lands to prevent deer-auto collisions, damage to agricultural crops and homeowner's shrubbery and the destruction of vegetation in parks and forests throughout New Jersey. Legal, sport hunting is currently the most practical approach to controlling deer numbers in the state. In addition, money raised from hunting and fishing licenses and taxes from the sale of equipment for these sports remains the only consistent source of funding for habitat acquisition and wildlife management, which benefits all wildlife including endangered and nongame species such as the bald eagle, songbirds, and bobcats.

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.

PHOTOS BY ANNE LUTKENHOUSE

The Keepers of the Trails

When Bob Jonas hits the trail, he hits the trail. Armed with loppers, hand clippers and bow saws, he and other volunteers from the New York-New Jersey Trail Conference spend many hours maintaining nearly 400 miles of hiking trails in the Garden State.

Jonas, a resident of Westfield, is one of almost 300 New Jersey trail volunteers active with the organization. Based in New York City, the NY-NJ Trail Conference constructs and maintains hiking trails in southern New York State and northern New Jersey. In addition to maintaining the Appalachian Trail, volunteers help keep trails clear in the Delaware Water Gap, in Worthington, Hewitt, Stokes, Norvin Green and Ramapo Mountain state forests, plus in Ringwood, High Point and Wawayanda state parks.

"The trail conference matches the individual to parks with need," said Anne Lutkenhouse, assistant director of the trail conference. "As a volunteer organization, we keep recreational resources available to the public. This is especially important during tight budgetary times."

Volunteers "adopt" a section of trail, usually from a few tenths of a mile to several miles, and visit their trail a minimum of twice a year — spring and fall. During visits, volunteers repaint blazes (trail markings) on trees, clear overgrown vegetation, saw and remove fallen tree branches, pick up litter and ensure their section is passable and in good condition. They also look out for violations, like timber theft and dumping, and report it to supervisory personnel.

For larger trail projects, like building bridges and lean-tos, repairing erosion damage, installing rock steps, or cutting new trails, the trail conference organizes work trips. These trips are led by volunteer supervisors and serve as hands-on learning experiences for newer members.

Jonas supervises volunteers (18 individuals and groups) in Norvin Green State Forest, near Wanaque, where he is responsible for 50 miles of trail. Jonas is considered an expert in re-routes.

"Sometimes trails are overused or not in the best location," says Jonas. "Some of the older trails go back 50 years or more.

Volunteers from the NY-NJ Trail Conference help build a bridge in the Vernie Swamp Section of the Appalachian Trail.

They might suffer from erosion problems, ATV (all terrain vehicle) traffic damage, or simply be too close to a new housing development. In these cases, we re-route them."

Jonas has been with the organization for more than five years and volunteers more than 400 hours per year.

Jackie Corrieri of Union has been a trail conference volunteer for eight years. She maintains 2.7 miles of the Appalachian Trail and two miles of the Shawangunk Ridge Trail, both in High Point State Park.

Corrieri visits each trail five times a year. "I can't carry all the tools I need to do the job right in just two visits," she says. "So, sometimes I just paint blazes or go through with my weed wacker, loppers or saw. I really love being on the trails."

It's a chance to see the spectacular scenery that New Jersey has to offer.

Training is a big part of being a trail maintainer. "We have scheduled training sessions every 12 months with the experienced teaching the new people," Corrieri notes. "We offer beginning sessions (painting blazes, how to saw a tree, etc.), to more advanced training (erosions control, re-routing, bridge building, etc.). These training session are always very popular and informative."

While volunteers like Jonas and Corrieri are out there getting the job done, many sections of New Jersey's trails could use a little tender loving care. In particular, portions of the Kittatinny Ridge cutting through Worthington State Forest, Stokes State Forest and High Point State Park are up for "adoption." And you don't have to be a Paul Bunyan look-alike to get involved. Trail conference volunteers come in all shapes and sizes, young and old, male and female. They contribute from a few hours a year to hundreds of hours.

"We'll take just about anyone," Jonas says. "You just have to be able to walk a couple of miles. There's something for everyone."

For many volunteers, it is chance to see the spectacular scenery that New Jersey has to offer.

"First time hikers on New Jersey trails are frequently amazed by the tremendous beauty here," Lutkenhouse says. "Getting out and volunteering on these trails is a great experience. It's a chance to see what the Garden State really looks like."

While maintaining trails is its primary purpose, the NY-NJ Trail Conference also produces trail maps and hiking guide books, publishes a bimonthly newspaper, and works to protect environmentally sensitive trail lands. It coordinates a litter clean-up day each spring, when conference volunteers unite with scout and community groups in a massive trail beautification effort. The trail conference has a paid staff of three, but most activities are handled by volunteers.

To learn more about volunteering, call the NY-NJ Trail Conference at (212) 685-9699.

by Art Lackner, a freelance writer and media consultant from Eatontown

Striving for a Clean Commute

Brian Appezzato, a Department of Environmental Protection and Energy (DEPE) employee, commutes by bicycle every day from his home in the Chambersburg section of Trenton to the downtown area. It takes him eight minutes. His roommate travels the same route by car. It takes him 25 minutes.

"Every day since September, I have biked to work because I want to practice what I preach," said Appezzato, an environmental specialist in the Bureau of Stormwater Permitting. "While the traffic can be pretty horrendous, and Trenton streets are rough and full of potholes, I enjoy biking and the exercise I get from it. I do it as long as there's no snow on the ground."

Gay Pearson of the DEPE's Bureau of Air Quality Evaluation walks or bikes the two miles from her South Trenton home into her downtown office every day.

"I have never driven to work — I don't believe in it," Pearson says. "It doesn't save much time, and it's wasteful. I use my commute as a time to get my exercise, something I have to do anyway."

A Commuter's Nightmare

How did you get to work today? If you are like most New Jersey residents, you probably got in your car and drove — alone. The fact that most New Jerseyans commute to work in what are called "single occupancy vehicles" is a problem. It is a major cause of traffic jams and road congestion and a primary cause of air pollution. This reliance on cars is also a major contributing factor to dependence on imported oil, which affects the nation's economy and security. If driving alone is so bad, why do people do it?

The answer is relatively simple. People drive alone because it's easy and inexpensive. It's easy because you can just walk out of the front door, get in the car, drive to work, park in the company's parking lot and walk into the building. You can stop and do errands on the way, drop the children off at school, listen to a favorite radio show or just sit quietly. It's cheap because many of the costs associated with driving — like building and maintaining the roads, vehicular accidents or environmental damage — are subsidized. A gallon of gasoline is cheaper than some gallons of bottled water.

Because of all the cars on the road, New Jersey has some of the worst smog problems in the country. And the state now faces a federal mandate under the Clear Air Amendments of 1990 to reduce the number of cars on the road. All New Jersey employers with 100 or more workers must increase ridership within their companies by 25 percent. This includes government employers as well.

DEPE Leads the Way

The DEPE has taken the first steps necessary for developing and implementing an Employee Trip Reduction (ETR) program for its employees. Employee participation was critical and was best achieved by including them in all stages of program development right from the beginning.

At DEPE, efforts began with a quick survey to find out how employees get to work. It showed that 65 percent of the employees drove alone, 24.7 percent carpooled, 8 percent used public transportation, 1.5 percent walked or rode a bicycle and .8 percent used several options.

The DEPE also held a contest on Clean Up Your Commute Day, a fall event aimed at encouraging employees to find alternative ways to work to draw attention to the issue. Employees who did not drive to work alone were eligible for prizes. Participants completed a form indicating how they got to work, and the number of miles saved by not driving alone.

That one day, DEPE employees saved 5,000 miles of commuting by carpooling and public transportation.

Realizing that education is key to the success of initiatives like trip reduction, former Acting Commissioner Jeanne Fox also held an open meeting for all DEPE employees on Clean Up Your Commute Day. Some proposed policies to encourage employees to give up single occupancy commutes were discussed including preferential parking for carpoolers and train and bus fare subsidies for employees who use public transportation. Allowing employees to have input in the process is key to its success.

In addition to educating and motivating staff members, a pilot Alternative Workweek Program was made available to DEPE employees beginning in July 1993. This program gives employees greater flexibility in scheduling their work time. Workers can choose from two options that provide either a day off every week or every other week in exchange for working longer hours — which translates into fewer cars on the road on a daily basis as well as potentially happier and more productive employees. There are currently 718 employees in the program, which will be evaluated after 12 months to determine its effectiveness.

> Because of all the cars on the road, New Jersey has some of the worst smog problems in the country.

Future plans for the DEPE include preparing a report summarizing the ideas generated at the open meeting, setting up an internal working group to advise the commissioner on matters related to trip reduction, and possibly holding more events and contests. By keeping positive attention focused on the issue — including "gimmicks" and contests — people may think about changing how they get to work, at least once. Hopefully, once they try it, they will like it.

Jonathan Gell of the DEPE's Division of Parks and Forestry, who lives in Trenton, has been trying — and liking — alternative commuting for 22 years.

"I have walked to work for years because I enjoy it and because it's the right thing to do," says Gell. "I think more people are starting to agree with me, and since Clean Up Your Commute Day, I have noticed that the number of alternative commuters is increasing."

Cameron Johnson of the DEPE's Division of Energy, also a resident of Trenton, agrees it is the way to go.

"I like the freedom of not being dependent on a car, " she says. "I don't want to have to drag around 2,000 pounds of metal and wires everywhere I go."

by Nancy Wittenberg, director of the DEPE's Office of Energy

Hands-On Nature Centers

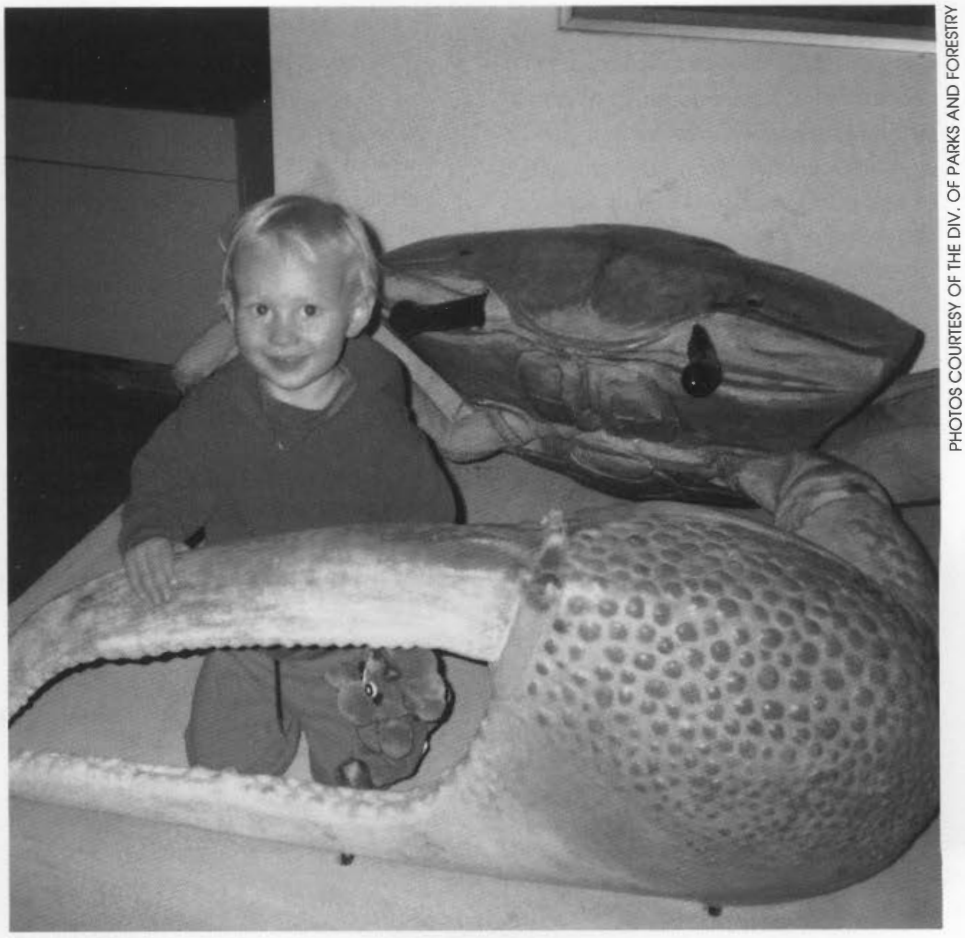
Examine the creatures which make their home in a Hudson River tidal marsh. Step back in time to the 19th century bog iron and glass blowing industries of South Jersey. Explore three unique habitats in the central part of the state. Discover the birds, butterflies and dragonflies that migrate through the southern tip of the Garden State.

These are just some of the activities provided by dozens of interpretive education programs throughout New Jersey that supply visitors with information about the state's environment, history and culture. Interpretive centers emerged in the late 1970s as part of a growing national trend to move away from the limitations implied by the term "nature center," says Frank Gallagher, who is coordinating interpretive and educational programs in the New Jersey Department of Environmental Protection and Energy's Division of Parks and Forestry.

"The term 'interpretive center' is intended to connote a deeper understanding of humans and their environment," explains Gallagher. "So you have a perspective of not only the natural resource, but also the cultural and historic resources."

New Jersey's interpretive centers nurture public awareness of the environment by illustrating the state's natural and cultural diversity. Being able to understand and appreciate these valuable resources is crucial to the health of the state and can lead to the preservation of historic resources and the protection of open space, Gallagher says.

"Environmental education is more than just the birds and the bees. We are dealing with critical issues in the environment," says Gallagher.



PHOTOS COURTESY OF THE DIV. OF PARKS AND FORESTRY

Gregory Plichta discovers a giant replica of a fiddler crab at Cheesequake State Park's Interpretive Center in Matawan.

Exploring Urban Wilds

On a fall morning, troops of fascinated Hudson County Girl Scouts listen closely as naturalist Kate McCaig of Liberty State Park explains their mission for the day — to explore the "wilds of Jersey City."

"We're going to be exploring the water," McCaig says to the 100 girls and their troop leaders gathered at Liberty State Park's Interpretive Center. "Things that swim, crawl and fly."

After an orientation which includes watching a film about life in the tidal marsh, the girls help McCaig load up a truck with nets, shovels, skimmers and hip waders and head off in a caravan of cars to a salt marsh on the Upper New York Bay. Once they arrive at the beach, the youngsters begin gathering rocks and shells, which McCaig patiently identifies. The girls are then organized into three groups, and each group is given a seine, a large net.

Two by two, the Girl Scouts clad in hip waders slowly walk into the bay and haul their catch back to shore. Everyone curiously waits to see what turns up.

From the nets, scouts scoop up squiggling slimy shiners — a small type of bait fish — and rush them back to a bucket full of water. The big catch of the day is a little green crab.

"I feel so bad for him because everyone has been picking him up," says Girl Scout Dana Smerda of Bayonne, watching the crab make its way back to the water after the day's event.

Crabs are not the only environmental wonder to see.

"This is unbelievable. This is Jersey

> Interpretive centers emerged in the late 1970s as part of a growing national trend to move away from the limitations implied by the term "nature center."
>
> — Frank Gallagher

City," exclaims troop mother Jane Mackesy of Kearny, marveling at the natural beauty of the area with its marsh grass and pieces of driftwood. "I grew up in Jersey City, 10 minutes from here, and I had no idea this was here."

The center, which began its interpretive and educational programs in 1985, offers programs on nature and history, including endangered species, bird life, wildlife habitat improvement, waste management, the Statue of Liberty, Ellis Island, the Central Railroad of New Jersey Terminal, African music and culture, the Lenape Indians and the Hudson Estuary. The demand for these programs has increased so dramatically that group reservations must be made 13 months in advance.

Gallagher said there is a "natural connection" between the center and the surrounding school districts. The mission of interpretive and educational programs is to "foster a stewardship" for resources by illustrating the relationship between humans and the living creatures of the region.

Naturalist Bob Sommers leads a Sayreville Girl Scout troop (above) on a hike at Cheesequake State Park in Matawan. Children (below) tour historic buildings at Batsto Village in Wharton State Forest.

A horse-drawn wagon ride is among the activities available at Batsto Village in Wharton State Forest.

Interpreting the Natural Environment

Centers throughout the state offer an array of interpretive programming.

Cheesequake State Park in Matawan offers programs, trails and field trips through samples of a Pine Barrens forest, open fields, salt water and freshwater marshes, a white cedar swamp and an outstanding example of a northeastern hardwood forest. Workshops and tours demonstrate the effect people have had on the natural resources of the area since the 17th century.

Visitors learn about the historic and natural resources of the region — the clams, oysters and lobsters that used to live in Raritan Bay, the exploration of the area by Henry Hudson, the once flourishing clay industry and the Lenape Indians who lived in the area thousands of years ago.

At Wharton State Forest in Burlington County, history comes alive at Batsto Village with 40 buildings that reflect the agricultural and commercial enterprises existing on the site in the late 19th century. The village was once a bog iron and glass-making industrial center, and interpretive programming focuses on the site's historical significance. Programs are available year-round.

In addition, Wharton State Forest offers programs on the Pine Barrens and the reptiles and amphibians of this southern New Jersey region, including tree frogs and timber rattlesnakes.

If birds are your passion, the New Jersey Audubon Society's Cape May Bird Observatory in Cape May County conducts many field trips and programs on the migration of hundreds of bird species through the area. This interpretive center also focuses on the butterflies and dragonflies inhabiting the region.

There are many programs to choose from to get an up close and personal experience of nature and history in New Jersey parks and forests. For more information on the four sites profiled, call (201) 915-3409 for Liberty State Park, (201) 566-2161 for Cheesequake State Park, (609) 561-3262 for Wharton State Forest, and (609) 884-2736 for the Cape May Bird Observatory.

by Amy Franco, a freelance writer who lives in Birmingham

Learn Through Interaction

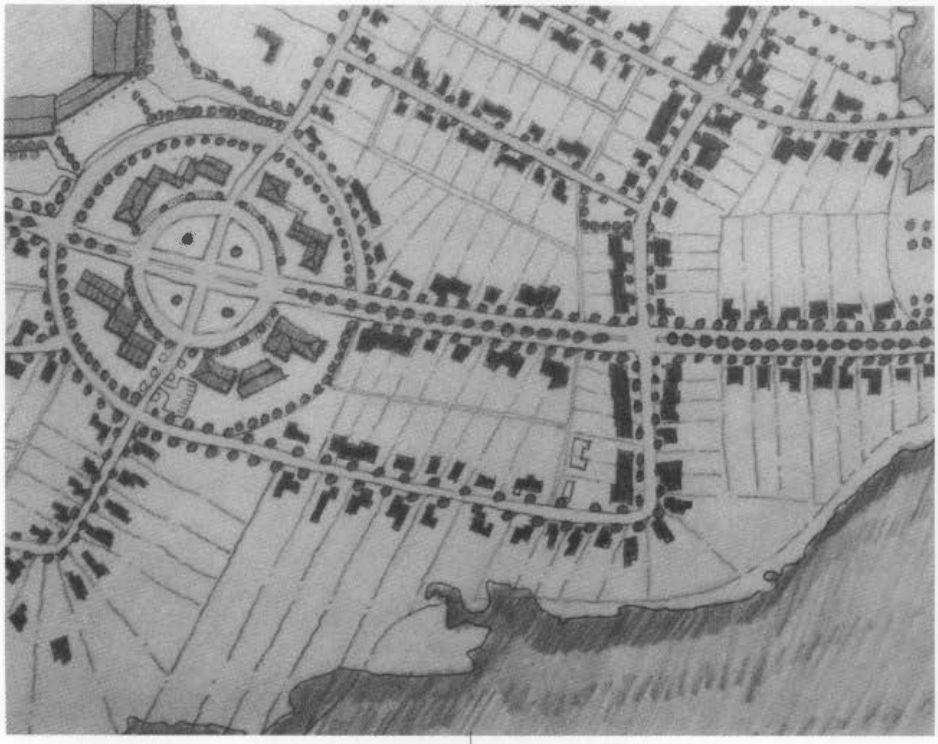
Following is a list of some of the state-run interpretive centers located throughout New Jersey and what they have to offer.

■ Northern Interpretive Centers	Open	Staffed Facility	Historical Programs	Environmental Programs	Self-Guided Trails	Natural Areas On Site	Phone
Boxwood Hall, Elizabeth	Y	■	■				(201) 648-4540
Grover Cleveland Birthplace, Caldwell	Y	■	■				(201) 226-1810
Liberty State Park, Jersey City	Y	■	■	■		■	(201) 915-3409
Long Pond Ironworks and Village, Ringwood	S		■				(201) 962-7031
New Jersey Botanical Gardens, Ringwood	Y	■	■	■	■		(201) 962-7031
Ringwood Manor, Ringwood	Y	■	■				(201) 962-7031
The Hermitage, Hohokus	Y	■	■				(201) 445-8311
Von Steuben House, River Edge	Y	■	■				(201) 487-1739
Waterloo Village, Landing	S	■	■		■		(201) 398-7010
■ Central Interpretive Centers							
Allaire State Park, Allaire	Y	▲	■	■	■		(908) 938-2371
Barnegat Lighthouse, Barnegat	S	■	■		■		(609) 494-2016
Cheesequake State Park, Matawan	Y	■	■	■	■	■	(908) 566-2161
Double Trouble State Park, Bayville	Y				■		(908) 341-6662
Edison Memorial, Menlo Park	S	■	■				(908) 549-3299
Ferry House, Titusville	Y	■	■				(609) 737-2515
Indian King Tavern, Westampton	Y	■	■				(609) 429-6792
Island Beach State Park, Seaside Park	Y	■	■	■	■	■	(908) 793-0506
Lebanon State Forest, New Lisbon	S		■		■	■	(609) 726-1191
Marshall House, Lambertville	S	■	■				(609) 397-0770
Old Dutch Parsonage, Somerville	Y	■	■				(908) 725-1015
Princeton Battlefield, Princeton	Y	■	■				(609) 921-0074
Rockingham, Rocky Hill	Y	■	■				(609) 921-8835
Trenton Battle Monument, Trenton	Y	■	■				(609) 737-0623
Twin Lights State Historical Site, Highlands	Y	■	■		■		(908) 872-1814
Wallace House, Somerville	Y	■	■				(908) 725-1015
Washington Crossing St. Pk. Nature Ctr., Titusville	Y	■	■	■	■	■	(609) 737-0609
Washington Crossing St. Pk. Visitor's Ctr., Titusville	Y	■	■				(609) 737-9304
Whitesbog Village, Pemberton	S	■	■	■	■		(609) 893-4646
■ Southern Interpretive Centers							
Atsion Village, Vincentown	Y	●		■	■		(609) 965-2968
Batsto Village, Hammonton	Y	■	■	■	■	■	(609) 561-3262
Belleplain State Forest, Woodbine	S	■		■	■		(609) 861-2404
Cape May Lighthouse, Cape May Point	S	■	■				(609) 884-2159
Cape May Point Park, Cape May Point	S	■	■	■	■	■	(609) 884-2159
Fort Mott State Park, Salem	Y	■	■		■		(609) 935-3218
Somers Mansion, Woodbine	Y	■	■				(609) 927-2212
Wharton State Forest, Hammonton	Y	●	■	■	■	■	(609) 561-0024
Walt Whitman House, Camden	Y	■	■				(609) 964-5383

Key: **Y** = *Open year-round* **S** = *Open seasonally* ▲ = *Staffed seasonally* ● = *Staffed by appointment*

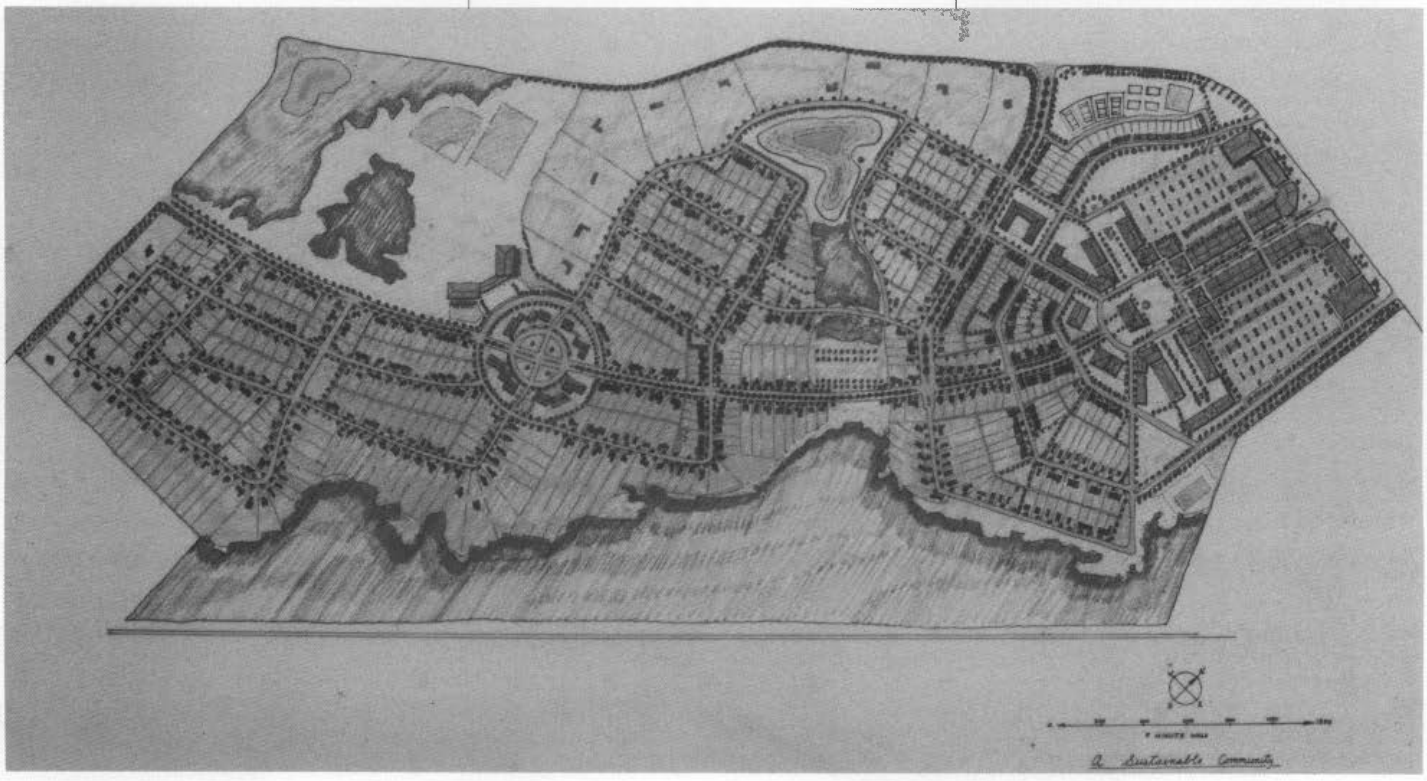
Green Architecture:
An Environmental Approach to Building

by Jim Morris



If you've ever seen a forest uprooted and replaced by houses that tower over barren landscapes, you can't help wonder: Isn't there a better way to build?

Architects increasingly are asking similar questions, and they have spawned a new movement in the profession to find better answers. Green Architecture or Eco-tecture, also known as sustainable architecture, combines elements of planning, engineering, landscape architecture, waste reduction and construction management to produce buildings that are less taxing on the environment. Sustainable architecture was the focus of the 1993 World Congress of Architecture, which drew more than 6,000 participants to Chicago this summer to discuss the theme of "Architecture at the Crossroads:



PLANS BY GARY E. MERTZ, ARCHITECT, PENNINGTON, NJ

Designing for a Sustainable Future."

"Sustainability means satisfying the needs of the present generation without jeopardizing the needs of future generations," according to the definition of sustainable architecture from the Center for the Environment at the American Institute of Architects (AIA). "The sustained design approach utilizes technology, creativity and strategic planning to restore diversity and conserve renewable resources."

According to the AIA, sustainable design includes five broad concerns — site planning, energy conservation, indoor air quality, building materials and recycling, and waste management. Building designs may include high-tech solutions, such as installing photovoltaic cells, which convert sunlight into energy for household use; new building materials, such as insulation made from seawater minerals; or energy efficient glass. However, sustainable design frequently includes less technical, more common-sense strategies, such as utilizing sun and wind patterns, shade trees and natural ventilation.

In fact, many practitioners argue that sustainable architecture is less a new movement than a return to common sense.

"None of this is really new," says Joe Costanza, a Moorestown-based architect and chairman of the Committee for the Environment for the West Jersey section of the AIA. "Over the last 10 years, there's just been more a unified direction of architects to question whether what we're doing is right."

This architect's rendering of a proposed site in West Windsor (lower left) shows a sustainable cluster development. A small shopping hamlet and open space (upper left) are within walking distance of the planned community.

The Principles of Eco-tecture

Homeowners and business owners can play a role in the new Green Architecture movement. Here are some ways to combine environmentalism with construction and design:

❑ **Siting and Design** First, question whether new construction is needed. Will it further reduce open space when nearby unused structures can be renovated? Can you choose a site in a mixed-use development where people can walk from their homes to work or recreation? Also consider the size of your project and stick to the philosophy of "smaller is better." Ask your architect to minimize the building size by optimizing interior space. Design space for storage and recycling.

❑ **Energy conservation** Energy-efficient designs can reduce energy costs by as much as 60 percent, according to the AIA. Energy-efficient design starts with intelligent site planning to maximize sun, wind and landscape conditions. For instance, trees on the east and west sides of buildings can reduce cooling requirements, and hedge rows and shrubbery can block winter winds. Strive for landscape designs that complement natural site conditions and incorporate native plant species rather than clearcutting in favor of expansive lawns, which can require intensive watering, fertilizing and pest control measures. Leaving native plant species intact also reduces construction site waste and helps reduce soil erosion.

Install energy-efficient lighting and appliances and water-efficient plumbing fixtures. Plan room for a clothes line to reduce energy use by dryers.

❑ **Indoor Air Quality** Most people spend 90 percent of their time inside buildings, and poor air quality is now recognized as a potential environmental health risk. Safe indoors air quality requires good ventilation and reduced use of building materials such as paints, glues, insulation, wood treatments and finishes, fibers and insecticides that emit pollutants. For example, use tacks rather than glue to secure carpets. In addition, new materials, such as wood finishes made of citrus peels and juniper berries, are being developed to replace traditional finishes and construction materials.

Some studies also have shown that strategic placement of indoor plants can remove up to 70 percent of some pollutants, such as formaldehyde and benzene.

❑ **Building materials** Aside from air quality concerns, the building material debate often has focused on use of tropical woods, such as mahogany, teak and ebony. Some communities have banned specific woods to help protect tropical rain forests. However, many rain forest preservationists argue that blanket bans are neither appropriate nor advisable. Instead, designers should seek sources that harvest these woods in sustainable quantities. Where possible, look for locally produced building materials because transportation consumes energy and produce pollution.

❑ **Waste Reduction** Construction and demolition materials account for almost 30 percent of the solid waste produced each year. Whenever possible, materials should be recycled, including using wood scraps for kindling and sawdust for composting.

> The most ecologically efficient pattern of settlement also happens to be the best one to live in, a compact, multi-purpose walkable community.
>
> — Robert Campbell

New Jersey, in particular, has a long history of focusing on land-use planning, one of the central tenets of sustainable architecture, according to Tom Hitchins, a Hewitt-based architect who has organized several seminars on topics in sustainable design. "We've got a leg up on sustainable design in New Jersey because we already had strong planning institutions and traditions," Hitchins says.

New Jersey's State Development and Redevelopment Plan promotes land use patterns envisioned by the sustainable design movement. The state plan calls for "Communities of Place," in which development is directed towards urban areas, towns, villages and centers, where the utilities, roads and commerce already exist, Hitchins says. The plan also promotes mixed-use development, where residents can walk or take mass transit between home and work.

Architecture critic Robert Campbell of Boston argues in a 1993 *Boston Globe* article that architects should use their planning abilities to direct clients and their projects toward these mixed-use communities. "We will save this planet, if we do, by understanding one basic fact: The most ecologically efficient pattern of settlement also happens to be the best one to live in, a compact, multi-purpose walkable community . . . where you burn fat, not petroleum," Campbell writes.

To promote sustainable design, advocates are pursuing a three-pronged strategy that seeks to educate the architecture profession, its clients and the general public, Hitchins says. To help educate the profession, Hitchins has worked with the Department of Environmental Protection and Energy's Division of Solid Waste to examine the benefits of minimizing waste on construction sites and with representatives of Rain Forest Relief to discuss sources of sustainable supplies of tropical woods. Educating clients, Hitchins says, is often done on a case-by-case basis, such as advocating a grocery store chain expand downtown rather than build outside town on open land accessible only by car.

Architects realize that sustainable design also must be cost-effective, Hitchins says. As many manufacturers have discovered with source reduction and pollution prevention programs, minimizing waste can also help maximize profits. For instance, sustainable design encourages cluster development, which seeks to preserve open space by concentrating development on only one portion of a property. This design can reduce total costs by requiring fewer miles of road and utility lines, Hitchins says.

Many other environmental design strategies also prove cost effective. Preserving the natural assets of a site, such as native vegetation or unique rock outcroppings, can enhance the value of the property. Marking areas to prevent heavy machinery from damaging tree roots on construction sites can also reduce waste disposal costs, Hitchins says.

Several independent studies also have shown that investing in energy-saving fixtures and equipment can produce financial returns of more than 40 percent.

Finally, by addressing concerns over indoor air quality, builders and designers may avoid potential costly litigation in the future and increase the productivity of employees who work in the building.

"We've been able to show that these things are dollar smart. Plus they're the right thing to do," Hitchins says.

On a larger scale, architects can help reduce the social costs of urban decay by encouraging more people to return to abandoned central cities and downtowns, according to Susan Maxman of Philadelphia, president of the Society of Architects and an advocate of sustainable design.

Penny Watson, a Bridgeton-based architect specializing in renovation project, agrees.

"Recycling buildings and recycling downtowns is the ultimate form of recycling," says Watson, who has turned down projects that would have destroyed farmlands.

Architecture critic Campbell argues that sustainable design must first examine how a building will affect a community. Too often, however, architects focus on more narrow issues, such as avoiding use of tropical woods to help protect rain forests. "If architects have anything to contribute to solving the planetary crisis of the 1990s, it is their ability to see the big picture," he says.

Failure to see the big picture in the past has produced unforeseen problems. When energy prices quadrupled in the early 1970s, many architects responded with energy-efficient designs featuring tightly sealed buildings with windows that didn't open. These buildings sealed out fresh air and sealed in unanticipated

indoor pollution problems.

In New Jersey, Hitchins sees architects and their clients increasingly asking bigger questions before designing. To find answers, architects frequently draw upon the expertise of other professions. One project might require an engineer's solution to reduce pollution contained in stormwater runoff, a landscape architect's recommendation for planting in unique soil conditions and an environmental consultant's research to prevent encroaching on potential endangered species habitats, he notes.

These issues can no longer be ignored, and advocates say that the environmental stakes are too important for sustainable design to be a passing trend among architects.

"I think this has real meaning because it's not just rooted in architecture," says Moorestown architect Costanza. "I don't see this as style. It's more philosophy."

It's also part of a larger change in society, some argue. "(Sustainable design) is as much part of the environmental movement as it is part of an architectural movement. It's just architects trying to be responsible," Watson says.

Jim Morris is a freelance writer from Basking Ridge and associate director of Continuing Education at Cook College, Rutgers University.

PHOTOS MAIN STREET NEW JERSEY

These before (top) and after (bottom) photos of The Valley Section of West Orange demonstrate the recycling of a downtown building. This facade rehabilitation project, "Downtown! West Orange," was coordinated by Main Street, New Jersey.

When Turkeys are "Hams"

Before European settlers flocked to New Jersey, 50,000 wild turkeys ranged from today's Sussex to Cape May counties. But by 1850, when land was cleared for crops and fuel, the turkey had disappeared from the state.

Within the last 15 years, the wild turkey has begun a comeback in the Garden State. And state wildlife officials are trying to ensure that these large game birds will continue to thrive from the north to the south.

Beginning in the mid-1970s, wildlife biologists began an intensive survey using aerial photographs, topographic maps and data on vegetation cover to determine the feasibility of restoring the wild turkey population in New Jersey. In spite of the urban nature of this 7,800-square-mile state, 2,300 square miles of forest and farms — primarily in north and southwestern New Jersey — were identified as good turkey habitat.

Wild turkeys bear some resemblance to their domestic cousins, but are more streamlined and have longer legs and wings. Female turkeys, called hens, stand 34 inches tall and weigh eight to 11 pounds. Male turkeys, called toms or gobblers, are 38 inches tall and weigh 16 to 22 pounds. While hens appear brown in color, males have feathers that are almost black and iridescent.

Turkeys are generally cautious creatures and can run at speeds of up to 20 miles an hour. Unlike their domestic counterparts, wild turkeys can fly up to 50 miles an hour.

The wild turkey began its resurgence in New Jersey in 1977 when the Division of Fish, Game and Wildlife (DFG&W) released 23 birds, captured in Vermont and New York, into the woods of Sussex County. Within two years, the population had grown enough to transfer some of the stock statewide including some to areas in the Pine Barrens, a 900-square-mile protected region in southern New Jersey with its oak-pine woodlots, hardwood trees and farmlands.

The current population of turkeys in the state is estimated at 10,000, and there are 10 birds per square mile in some northern counties. There is also a spring hunting season for male turkeys and in 1993, 6,000 hunters participated, harvesting a total of 1,023 birds.

While wild turkeys flourish in the north, the population in the Pine Barrens has not. Between 1980 and 1993, state biologists and technicians captured and moved 333 wild turkeys from northern counties to the Pine Barrens. An average of 24 birds — including six to eight gobblers and 16 to 18 hens — were released in six southern counties during 12 separate stockings. In addition, 29 eastern turkeys from Arkansas were released in the region in 1986.

Despite these extensive stocking efforts, fewer than 1,000 wild turkeys — less than one turkey for every square mile — make their home in the Pine Barrens.

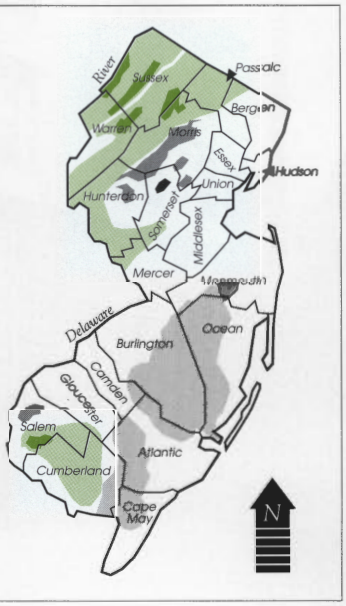
The DFG&W has embarked on studies to determine what is limiting the wild turkey population in the Pine Barrens. It is hoped that certain forest management practices, such as timber management regimes that favor oak trees or controlled burning to maintain open areas, might help increase the turkeys' numbers.

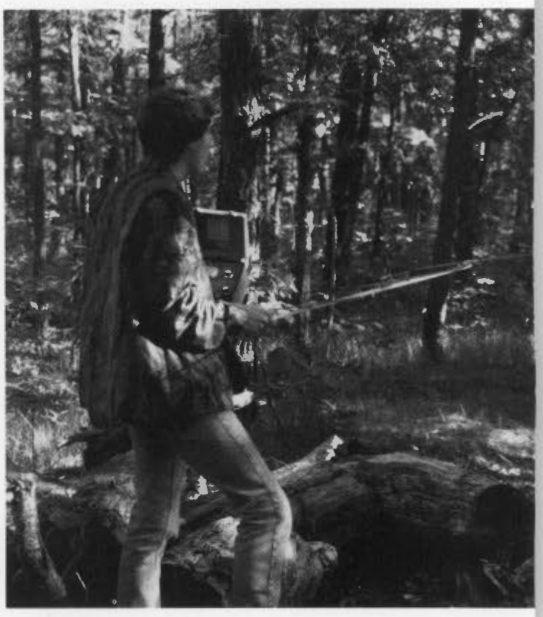
A 1986-87 pilot study of the turkey population in Wharton State Forest, made possible through the donation of funds and equipment by New Jersey chapters of the National Wild Turkey Federation, provided an interesting glimpse into the forces at work on the turkey population in the Pinelands. During the study, 30 hens were captured and equipped with brightly colored wing tags and radio telemetry transmitters.

These "radio ham" hens were located twice daily between March and December through radio tracking utilizing frequencies unique to each bird. The transmitter enabled researchers to locate nests, count

Wild Turkey Distribution and Population Density in New Jersey

- Less than 1 bird per square mile
- 1 to 5 birds per square mile
- 6 to 15 birds per square mile
- 16 to 25 birds per square mile
- Suitable range with no birds





Unlike their domestic counterparts, wild turkeys can fly up to 50 miles an hour.

eggs and predict hatching dates. The radios were also capable of alerting researchers when a turkey died, allowing them in most cases to determine the cause of death.

The study found that survival of adult turkeys in the region was good, but turkey broods seem to start out at a disadvantage. Hen turkeys in the 1986-87 study laid fewer eggs per nest than hens elsewhere in the state. In addition, survival of turkey chicks, called poults, was very poor after hatching. Within two weeks, 75 percent of the young birds were dead. Predation, mainly by red and gray foxes, was the primary cause of mortality.

Fewer eggs and poor poult survival seem to be the major factors hampering turkey population growth in the Pine Barrens, a phenomenon that is also being found on the coastal plains in Connecticut, Virginia, Alabama and Florida. In order to increase the number of wild turkeys in these regions, researchers must pinpoint the reason for this poor production.

A current theory points to the structure of the habitat as a key factor in survival. The heavy understory of blueberry, huckleberry, and other shrubs found in much of the region may provide an advantage to predators. In fact, turkey broods in the pilot study appeared to fare better in areas with less dense vegetation, including areas subject to controlled burning.

The DFG&W is expected to start a new two-year study of the wild turkeys in the Pine Barrens in 1994 or 1995 called the Wild Turkey Habitat Research Project. Funded through a $24,000 grant from the U.S. Fish and Wildlife Service and a $18,000 grant from the Wild Turkey Federation Superfund (a matching grant program between the local and federal chapters of the turkey federation), this research will involve banding and radio-tagging forty hen turkeys. The hens will be monitored for two breeding seasons, and the factors affecting their survival will be examined in detail. Most importantly, the study will focus on the brood-rearing habitat selected by the hen and its effect on the the survival of the young.

Monitoring such a large number of birds will be time-consuming. Because of the large numbers to be tracked, some radio locations will be made from aircraft. The field work for this study of wild turkeys will be done by a Rutgers University graduate student assisted by staff from the DFG&W. Division biologists will assist in capturing and tagging the turkeys as well as supervising the field work.

The study may help to identify ways to improve the outlook for these fine birds in this region. For then, after vanishing from the state for almost 130 years, wild turkeys may finally flourish in the Pine Barrens once again.

by Bob Eriksen, a principal wildlife biologist with the Division of Fish, Game and Wildlife

PHOTOS BY BOB ERIKSEN

A wild turkey hen (above) equipped with a radio transmitter. Technician Frank Markart (opposite page) tracks wild turkeys in the Pine Barrens with a radio receiver.

A view of the top of the lime kiln at Quarry Hill in Clinton in the late 19th century. Limestone and wood were fed into the top of the kiln through a hole. Piles of wood and the sleds used to transport materials can be seen in the foreground.

COURTESY OF CLINTON HISTORICAL MUSEUM

A page (below) from the ledger of James Mulligan in 1860. Limestone was quarried only during the warmer months, but the Mulligans provided a year-round business by purchasing low-cost coal in the winter months (see check at top of opposite page) and reselling it. After 1903, business transactions were conducted in an office (bottom of opposite page), which contained items such as an ornate stove, a weighing machine and roll-top desk.

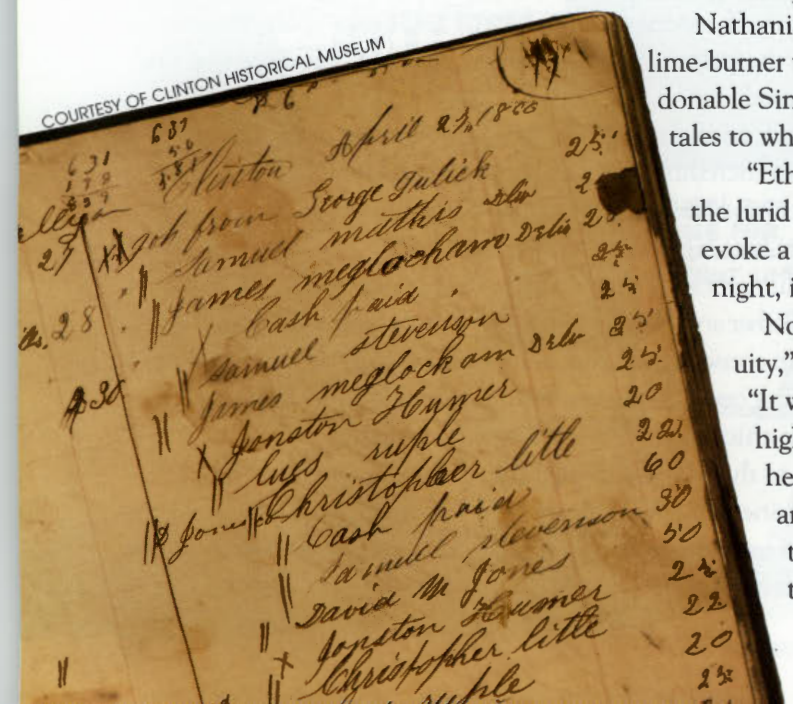
Hubert G. Schmidt's 1946 agricultural history *Rural Hunterdon* tells of farmers organizing "lime frolics," brightening their trips to a commercial lime kiln by banding together in their wagons and heading there in a group.

In addition to improving agriculture, the burning of limestone helped kindle new words.

"Lime, when it burns, burns with a wonderful white light," Rutsch says, and a lime filament used in lamps for theaters resulted in the term "limelight."

"In Search of Lime Kilns in Warren County," a pamphlet written by Gladys Harry Eggler and published by the Warren County Historical and Genealogical Society in 1991, notes that kilns have also been retained in local history as well. Several byways around the county still bear the name "Lime Kiln Road."

Eggler also writes that "ghostly tales sprang up around these fiery kilns," as "country folk would spin tales of Satan and the evil spirits that dwelled in the fires of the lime kilns. In addition to emitting an eerie glow, explosive outbursts of crackling limestone would lend credence to many ghostly tales."



COURTESY OF CLINTON HISTORICAL MUSEUM

Nathaniel Hawthorne's *Ethan Brand*, published in 1850, tells of a lime-burner who left his kiln to travel the world in search of the Unpardonable Sin. Hawthorne's story seems to be inspired by the same type of tales to which Eggler refers.

"Ethan Brand, it was said, had conversed with Satan himself in the lurid blaze of this very kiln . . . . He had been accustomed to evoke a fiend from the hot furnace of the lime-kiln, night after night, in order to confer with him about the Unpardonable Sin."

Noting the abandoned kilns "look already like relics of antiquity," Hawthorne includes a description of Brand's kiln in his book: "It was a rude, round, tower-like structure, about twenty feet high, heavily built of rough stones, and with a hillock of earth heaped about the larger part of its circumference; so that block and fragments of marble might be drawn by cart-loads, and thrown in at the top. There was an opening at the bottom of the tower, like an oven-mouth, but large enough to admit a

man in a stooping posture, and provided with a massive iron door. With the smoke and jets of flame issuing from the chinks and crevices of this door, which seemed to give admittance into the hill-side, it resembled nothing so much as the private entrance to the infernal regions. . . ."

Grisly goings-on at lime kilns weren't just the stuff of spooky stories.

"You had to be careful, because peddlers and migrants liked to sleep up on the kiln bank because it was warm. If the wind turned, they could be asphyxiated from the carbon monoxide," Rutsch says. And Warren County's pamphlet on lime kilns refers to an 1827 newspaper report telling of a man killed when the arch of his kiln gave way, "burying him in an avalanche of scorching lime."

The days when a farmer burned limestone or went on a lime frolic to pick up his supply are long gone. Lime, while still used to improve the soil, is produced by large-scale commercial operations both from pulverized and burnt limestone, and usually is found in bags at the home gardening center, not bushels loaded on horse-drawn wagons.

But some kilns still stand, like sentinels along country roads, mute reminders of the past.

Art Charlton of Easton, PA is a reporter for the Warren County bureau of The Star-Ledger.

MARVIN ROSS

A Tour of New Jersey's Lime Kilns

Although many lime kilns have disappeared, several historic structures can still be seen along New Jersey roads. Here are a few of the sites that still exist in the Garden State:

Clinton

The Clinton Historical Museum Village, near the Hunterdon County borough's well-know red mill, contains several lime kilns.

Franklin

Four large commercial kilns are located in this Sussex County borough a short distance off Route 23 along Lime Kiln Road.

Gladstone

A defunct commercial lime kiln still stands along Main Street in this Somerset County town.

Mansfield Township

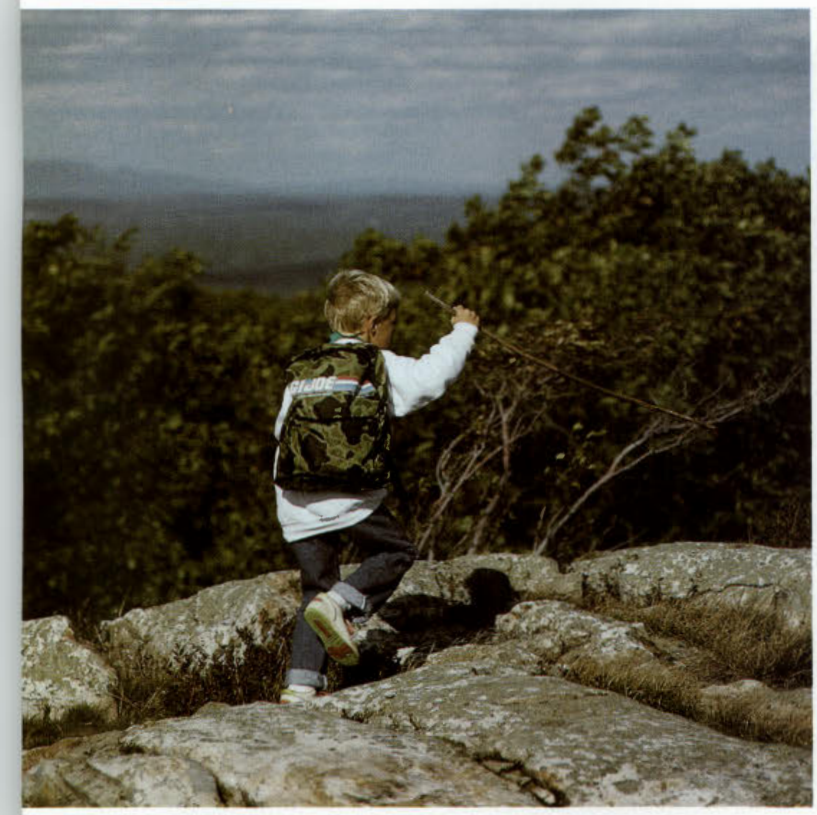
A double kiln is visible in this Warren County community along the north shoulder of Route 57 near Penwell. However, one of the two kilns has collapsed.

Mendham Township,

A few kilns remain in this Morris County township, including the ruins of a farmer's lime kiln along Mountainside Road.

Pohatcong Township

A large, three-bank kiln can be found along Carpenterville Road in this Warren County town.



Hiking With Children

Text and Photos by Arline Zatz

Wildflowers in every color of the rainbow dot the forest floor, while ferns uncurl, creating delicate patterns beneath the trees. Animals scurry about as grasses with tiny drops of dew sparkle in the sunlight.

Everything seems to spring to life this time of year, and it's the perfect time to take a hike. Hiking is an inexpensive stress reliever, a way to revitalize the spirit, a fun activity to experience nature first-hand, and an outdoor exercise that employs all the senses. Best of all, hiking is an extraordinary way to enjoy family togetherness.

Our first hike was with our three-month old son along an easy, flat sandy trail in the Pine Barrens. The fresh air and steady bobbing up and down in the pack on his dad's back put the baby to sleep almost immediately, while mom and dad enjoyed the scent of pine and the sight of wildflowers.

Through the years, in seeing nature through our children's eyes, and in answering their hundreds of questions on countless hikes along exciting, meandering trails, our own senses and appreciation for the outdoors were sharpened.

Preparing for this stimulating activity is simple. Chinese philosopher Lao-tzu observed that "The longest journey starts with just one step." It does. If your child doesn't walk yet, you do — so free your arms by using a child-carrying backpack and hit the trail. (It's best to wait until children are about three months old; that's when their neck muscles are strong enough to support the head and protect it from any jarring motion.)

As children become increasingly aware of the fluttering leaves or swaying branches, their joy will add to the pleasure of being outdoors. From the age of two, children are capable hikers, but do occasionally request to be carried. As they get older and are willing to walk several miles, frequent stops will still be required. That's because they can't resist scrambling over rocks, floating leaves downstream, hunting for tiny critters, or admiring a wildflower or colorful butterfly. It's best to allow more time than you think you'll need. Starting a hike early in the morning assures lots of leisurely time before the sun goes down.

No matter what your level may be, marked trails abound in the Garden State. The Kittatinny Mountains in the north offer unbeatable vistas, as do the Palisades overlooking the Hudson River. There are also pleasant trails in the Pine Barrens, or those which combine hunting for ersatz "diamonds" on a Cape May beach with hiking past lush hollies, large sand dunes and wildlife.

While hiking is great year-round, it's particularly rewarding in the spring as the buds burst open on trees and shrubs and the temperatures are mild. Planning each hike with a destination in mind works well because kids will eagerly keep up the pace if they know there's a special view ahead, a museum to explore, a cascading waterfall to admire, a fire tower to climb or, perhaps, a pond to sit beside and relax. Going home with a sense of accomplishment will make them look forward to the next hike.

A small backpack for each child is a good investment. It's amazing how willing it will make them to carry their own belongings. A pack is also a good place to stow away educational items such as a magnifying glass, binoculars, or an inexpensive camera. Most kids like to keep a diary of what they've seen on the trail and, if a pedometer is purchased, they can also keep track of their mileage.

Simple is always better when it comes to eating on the trail. Peanut butter and jelly sandwiches won't spoil on a hot summer's day or, if you prefer cold cuts or tuna, use small cartons of frozen juice to keep the food cold until lunch. Peanuts, popcorn, raisins, and fruit are nutritious snacks, but bring more than you think you'll need. Hiking increases the appetite and works up a big thirst.

Dress in layers so something can be removed if it gets too hot, or added if clouds roll in. Pants should fit loosely, and shorts worn only if you use sunscreen and are walking in open areas or along the beach. Long pants provide better protection against brush, sun, and pesty insects. Hats protect heads of all ages from the sun's hot rays or keep body heat from escaping during cold weather. A string or clip will keep the hat from flying away on a windy day.

Where to Hike with the Kids

North Jersey

❑ **Black River Trail,** Hacklebarney State Park, Long Valley, Morris County (908) 879-5677. Open year-round from 8 a.m., this three-mile, round trip trail is a kid's paradise. Situated in a gorge of unusual beauty, the park lies primarily in a glacial valley. The first half of the hike is downhill along a brook and waterfall. Hemlocks abound in this 574-acre park, and in spring jack-in-the-pulpit and jewelweed, a wildflower that reflects the light and resembles tiny jewels after a rainfall, can be seen. The park also features a playground and numerous picnics sites as well huge boulders to play on. *From Chester, drive west on Route 24 for three miles, following signs to the park entrance.*

❑ **Dogwood Trail,** at the Scherman-Hoffman Sanctuaries, 11 Hardscrabble Road, Bernardsville, Somerset County (908) 766-5787. Two miles of trails lead through lush woods and an old farm field loaded with butterflies, wildflowers, and woodchucks along the banks of the river. Deer are very common about an hour before sunset, and the Hoffman House Nature Center is filled with interesting exhibits. *Take Route 287 to Exit 26, Basking Ridge. Use the westbound exit, continuing through the traffic light at Route 202. The road becomes Childs Road. Bear right at the fork of Hardscrabble Road for about one mile and turn right at the sign to the Hoffman parking lot.*

❑ **Jenny Jump,** at Jenny Jump State Forest, Hope, Warren County (908) 459-4366. Legend has it that the park was named for a young girl named Jenny who, while picking berries at the crest of a mountain ridge, was surrounded by Indians. Her father, who was standing below, feared something bad would happen and yelled "Jump, Jenny, jump!" She did and, supposedly, was killed by the fall. Fortunately, this is only a tall-tale, and there is no danger here — only the beauty of the lush woods. Hemlocks abound as do natural rock "chairs" and the Swamp Trail leads beneath stately evergreens. *From Route 80, take the Hope exit and drive south on Route 521. In the center of Hope, turn left onto Route 519 North and follow signs to Jenny Jump State Forest.*

❑ **Loantaka Reservation,** Morristown, Morris County (201) 326-7600. Open year-round, dawn to dusk, this easy, well-marked 3.5-mile, round-trip trail is sure to delight all ages. Crossing a shallow stream over stepping stones is a highlight, and deer and raccoons are often spotted. In spring, skunk cabbage — named for its offensive odor — is abundant in the

continued on next page

Bandannas are very useful. They can be used to swat insects, as a temporary bandage, to repair a broken strap, and to wipe a sticky face. Footwear is important because your feet will be getting a good workout. While sneakers are fine for most areas, waterproof, lightweight boots are best when going through known wet areas — especially in spring. These should be worn with two pairs of socks — a thicker woolen pair over a thin inner pair. Gaiters, a fabric covering that fits over the top of the boots, are popular for keeping water and ticks from getting inside.

Essential items to have along on any hike include the following:

- ❑ A knife
- ❑ First-aid kit
- ❑ Flashlight
- ❑ Water
- ❑ Insect repellent
- ❑ Matches or a lighter
- ❑ Compass
- ❑ Whistle
- ❑ Toilet tissue and plastic bag to carry out waste
- ❑ A map of the area (from a hiking guide or the NJ Geological Survey, Map Sales Office, CN 402, Trenton, NJ 08625 or the New York-New Jersey Trail Conference, GPO Box 2250, New York, NY 10016)

Most trails are well marked by either paint (blazes) on trees, or by a pile of rocks (cairns). A double blaze indicates a change in direction, while three dots indicate the beginning or end of a trail. If you lose sight of the blaze in front of you, turn back immediately and find the previous one before continuing. Using this simple procedure will ensure never getting lost. Although problems seldom arise, it's best to be ready for any emergency. There are a number of books on first aid at your local library.

Poison ivy can cause severe skin irritation; it grows profusely as a plant, bush, or vine and can be identified by remembering "leaves of three, let it be." Poison sumac, identified by two opposite pointed leaflets and a main leaflet at top, and poison oak, found in swampy areas and identified by three leaflets, also cause skin problems. Never drink from ponds, streams, or rivers, and don't eat mushrooms or other plants without making an absolute identification.

Deer ticks that can carry Lyme disease have been a major concern in the state; using repellent may help as will tucking pants into socks and wearing long sleeves. But in case one has hitchhiked a ride on your skin, make it a practice to examine each other as soon as you arrive home.

Books on how to identify the birds, wildflowers, trees, rocks, mushrooms, and even cloud formations will enhance any hike. You may even want to start a list of what you discover on each trail. New Jersey's terrain is so diversified that you can plan easy, moderate, or difficult hikes in any direction. With 127 miles of shoreline, 1,400 miles of trout streams, more than 800 lakes and ponds, 40 state parks, 11 state forests, 5 recreation areas, 38 natural areas, and 24 historic sites, plus numerous hiking books on the market, planning a hike with the children is a snap. But, start with easy hikes so you can practice locating the blazes, reading a compass, or just lazily meander and enjoy the landscape. The trick is to take that very first step and enjoy all that comes after.

Arline Zatz, the mother of two and author of Best Hikes With Children in New Jersey, *is a freelance writer from Metuchen.*

wet areas, as is jack-in-the-pulpit and other wildflowers. Also discover the shagbark hickory, the tree responsible for the spokes used in yesteryear's wagon wheels and today's ax handles. *From Route 287 exit at Route 24 in Morristown, heading east on South Street. Turn left on Spring Valley Road and left again on Loantaka Way.*

❑ **Lord Stirling Park,** at 190 Lord Stirling Road, Basking Ridge, Somerset County (908) 766-2489. The Canada geese that hang out at the start of the trails near Branta Pond are reluctant to move out of your way, but children may want to watch their funny antics and listen to their unforgettable "honk-honk" cries. Deer, pheasants, raccoons, skunks, opossum, and fox have been spotted in these woods, especially near the marshy, remote bend of the Passaic River where pickerel flip out of the water during spawning time. Here lady's slipper and trillium hide under the canopy of trees. There's also a bird blind and long boardwalks leading past hundreds of cattails. After, explore the solar-heated Environmental Center, the first of its kind in the nation. *From Basking Ridge, go south on South Maple Avenue. Turn left on Lord Stirling Road.*

❑ **Lost Brook Preserve,** at Tenafly Nature Center, 313 Hudson Avenue, Tenafly. Bergen County (201) 568-6093. Trails are open dawn to dusk year-round, and this easy 4.25 miles round trip is especially nice now when the forest understory is aglow with wildflowers including mountain laurels. If it's sunny, watch for snakes around Pfister's Pond, a favorite basking spot of the northern water snake. The marsh and rock formations here are most interesting. *From Route 9W in Tenafly, take East Clinton Street west. Turn right on Engle Street and right again on Hudson Avenue.*

❑ **Pequest,** at Pequest State Fish Hatchery and Natural Resources Education Center, Pequest, Warren County (908) 637-4125. The trails, open daily dawn to dusk, are excellent for teaching kids about natural resources. The pastures and fields are ablaze with wildflowers and butterflies in the spring; later in the season, corn stalks reach six feet high. The education center features "hands-on" exhibits, and there is a self-guided tour to learn how over 650,000 trout are raised here each year and used to stock the state's waterways. *From the junction of Route 31 take Route 46 east and follow signs to Pequest State Fish Hatchery.*

South Jersey

❑ **Belleplain Circular,** in Belleplain State Forest, Woodbine, Cape May County (609) 861-2404. Although Chief Nummy and the rest of the Indians are gone, the white-tailed deer, red foxes, and ruffed grouse they hunted are still here as well as Lake Nummy, their fishing hole. The woods along this three-mile, round-trip hike are lush with pitch pine, black and white oak, and American holly, while red-bellied turtles and frogs can be found in the low swamp areas. Bring a magnifying glass for a close-up look at sphagnum moss and cinnamon fern. *From Woodbine, take Route 550 west toward Belleplain. Turn left at Henkin-Sifkin Road and right at the park entrance.*

❑ **Diamond Beach** at Higbee Beach Wildlife Management Area, Cape May County (609) 292-2965. Make this round-trip hike of 2.5 miles a treasure hunt not only for the Cape May "diamonds" but for the bald eagle, barred owl, and 250 other species of birds. The diamonds are really tiny quartz pebbles polished by thousands of years of wave action before being washed ashore. The soft, sandy beaches also yield driftwood, giant horseshoe crab shells, and a 3,000-ton concrete vessel towed here and abandoned after it had sunk in a storm. *From West Cape May, take Route 607 (Bay Shore Road) north. Turn left at the junction of Route 641 and continue to the parking lot at the end of the road.*

Central Jersey

❑ **Cheesequake Cedar Swamp Trail,** at Cheesequake State Park, Matawan, Monmouth County (908) 566-2161. This is only one of three easy trails at this gem of a park. It meanders about 3.5 miles through a pine barrens forest, a freshwater swamp with an outstanding collection of Atlantic white cedar, and a mature hardwood forest. The short yellow trail is ablaze in spring with mountain laurel, trailing arbutus and one of the largest displays of the delicate pink lady's slipper. The nature center is loaded with interesting displays on animals and birds native to the area and includes three large aquariums filled with fish, and an indoor pond stocked with turtles. *Take the Garden State Parkway to Exit 120 and follow signs to the park.*

ILLUSTRATION BY PAUL KRAML

The Living Fossils of the Delaware Bay

by Pete McLain

Call them horseshoe crabs, king crabs, horsefeet, *Limulus* or "What's that weird looking thing?"

Whatever the name, the animal is the world's oldest living fossil, having existed for more than 200 million years. Only four species exist today — including three in the Far East — but only one makes its home on the East Coast of the United States and extends from Nova Scotia to Yucatan in Central America.

The Delaware Bay estuary of New Jersey and Delaware presently harbors the largest concentration of *Limulus polyphemus* in the world, over a million horseshoe crabs which come ashore in the spring, from the depths of the ocean and bay, to breed and lay their eggs.

The natural phenomenon and life history of the horseshoe crab is a sight which must been seen to be appreciated. Every year thousands of people witness the major April to June egg laying phenomenon, which occurs at their feet as they stand on the narrow sandy beaches of the lower Delaware Bay.

In actuality, the horseshoe crab is not a crab, but more closely related to spiders and scorpions.

Horseshoe Crabs Predate Dinosaurs

Millions of years ago prior to the dinosaurs, the horseshoe crabs in the group of animals listed as *Xiophosura* (sword tail animals) were the dominant animal life.

In 1588 the British naturalist Thomas Hariot first described what he called the "horsefoot" crab. In actuality, the horseshoe crab is not a crab, but more closely related to spiders and scorpions, both of which have six pairs of legs compared to a crab's five sets.

The Atlantic horseshoe crab, to some people, may be a frightening beast with a tough, helmet-like, spiny body, a spike-like tail, 10 legs with pointed ends and two pincers. It moves in a slow but determined manner, walks on the ocean bottom and also swims with ease.

In spite of its forbidding looks and manner, the horseshoe crab is harmless to humans and has turned out to be a major asset to the environment and human health.

The life history of the horseshoe crab is so unique and bizarre that it borders on the unbelievable. While it's still being studied

by scientists, a great deal is already known about the natural history of *Limulus*.

The horseshoe crab is a creature of the temperate sea. Some live in the deep water of the Delaware Bay year-round, but the majority migrate by crawling or walking to the edge of the Atlantic Ocean's continental shelf, about 60 miles offshore. The crabs feed by plowing along the ocean and bay bottom seeking small clams, worms, dead fish, and other small animal life. The crabs spend the cold winter months half buried in the muddy bottom.

Breeding Season Begins in April

Every year in April, for countless thousands of years, millions of horseshoe crabs arrive on the shoreline of the lower 30 miles of the Delaware Bay to begin spring breeding and egg laying. This egg laying continues from April to December, but the peak period occurs in mid- to late-May. At this time, during the high tide, hundreds of thousands of horseshoe crabs "cobble" over one another as they desperately try to leave the water to reach the beach to dig nests and lay their eggs.

The female horseshoe crabs are 30 percent larger than the males, weighing about four to six pounds. The males weigh about two to three pounds. The sex ratio of males to females is about three males to every female at spawning time.

At egg laying time, the female crabs exude a chemical, pheromone, which attracts the male crabs. It's not unusual to see nine or more males courting a single female. However, only one male will be successful in grasping the female with his specially adapted pedipalp claw, resembling a boxing glove, as he is pulled by the female up the beach where she digs an eight-inch deep hole in the moist sand. There the female crab deposits up to 20,000 lime green, pin-head size eggs, which are then fertilized by the male crab. Following the egg laying, the crabs return to the water.

Recent tagging returns indicate that a horseshoe crab may lay eggs more than once during a season. It's estimated that a single female crab may lay over 80,000 eggs a year. Dr. Carl Shuster of the College of William and Mary's Institute for Marine Science, a world authority on horseshoe crabs, estimates that only one in 130,000 eggs will hatch and develop into an adult crab. Therefore, it's imperative that the horseshoe crabs lay a fantastic number of eggs to ensure the future survival of the species.

DIANE C. LYELL

DIANE C. LYELL

PETE McLAIN

Horseshoe crabs emerge from the waters of the Delaware Bay to lay their eggs along the shoreline.

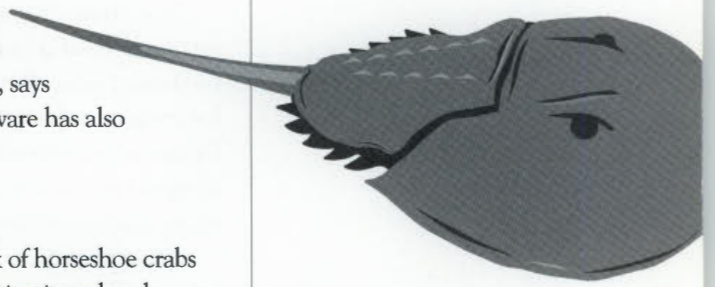
The horseshoe crab eggs are incubated for about 30 days by the sun's heat on the beach. When the larvae hatch they are about 1/16th of an inch in diameter and are washed into the bay, where they absorb their yolk sacks and begin to feed on the food-rich shallow water flats. The larvae grow in size by molting or shedding their hard chitin shells. They increase in size 25 to 30 percent with each successive molt. The males are sexually mature on their 16th molt at nine years of age; females mature at 10 years of age on their 17th molt. Records indicate that some horseshoe crabs may live more than 30 years.

Human Use and Abuse of the Horseshoe Crab

All is not fun and games for the horseshoe crabs. Since the days of the Indians, the horseshoe crabs have been used and then abused by man. The Native Americans used the crabs for food, their shells for bailing canoes and carrying water, and the long serrated and sharp pointed "telson" or tail as a point on their fishing spears. The long tail is used by the crab to help right itself if turned over by a wave. The tails are harmless to people and can be used to pick up horseshoe crabs.

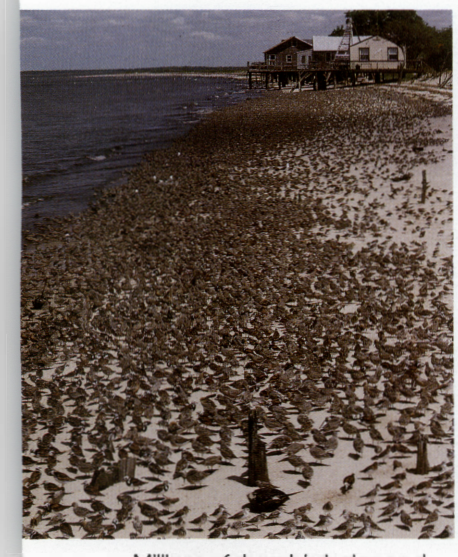
One of the most devastating man-created obstacles to the welfare of the horseshoe crab has been two centuries of harvesting for use as hog and chicken food. The crabs were also used for agricultural fertilizers from the 1800s to around 1950. In the 1870s more than four million crabs were reported taken a year and between the 1800s and 1930 an estimated 1.8 million crabs were harvested annually. By the 1960s the population declined to an estimated 42,000 crabs, and by the 1970s and 1980s the harvest was so low records were not maintained.

There is now an active fishery for horseshoe crabs for use as eel and conch bait. The taking of truckloads of horseshoe crabs from the Delaware Bay has resulted in New Jersey passing restrictive harvest rules. The regulations, effective on Feb. 16, 1993, require a valid permit and restrict the harvest of horseshoe crabs from May 7 through June 7 from the Cape May Canal to Stow Creek. This regulation requires people taking horseshoe crabs to obtain a free permit from the Division of Fish, Game and Wildlife and to make a monthly report of their catch to the Department of Environmental Protection and Energy, says Bruce Halgren, administrator of the division's Bureau of Marine Fisheries. Delaware has also passed similar regulations to protect horseshoe crabs.



Limulus Populations Growing

By 1985, Dr. Carl N. Shuster Jr. and Mark L. Bottom estimated the 1977 peak of horseshoe crabs nesting in the Delaware Bay was 273,000 strong. In 1990, a continuing study was instituted and partially funded by the multi-state, federally sponsored Delaware Estuary Program. Volunteers are used



PETE McLAIN

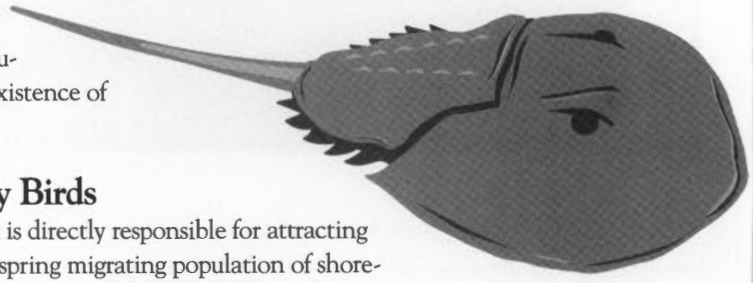
Millions of shorebirds depend on horseshoe crab eggs during their annual migration.

in New Jersey and Delaware to census the annual nesting crabs on a five-meter segment of several beaches on both daily high tides on the Delaware Bay.

Benjie Swan, coordinator of the three-year crab census, reports that there were 1,240,700 spawning crabs in June 1990; 1,224,800 in 1991 and 399,100 in 1992.

"The decrease in 1992 was thought to be due to adverse weather conditions and cold bay water," Swan says. "This annual crab census will help build a data bank pertinent to the Delaware Bay population dynamics of the horseshoe crab."

Karen Williams, a marine biologist formerly with the Marine Science Consortium of Seaville, who studied the nesting and spatial requirements of the horseshoe crabs on the Delaware Bay, says, "The greatest threat to the existence of horseshoe crabs is the destruction of the natural sandy beach nesting habitat. Bulkheading, beach destruction, filling with rubble, and possible oil and chemical pollutions are all major threats to the existence of the horseshoe crabs."



Crabs Support Migratory Birds

The horseshoe crab population is directly responsible for attracting and supporting the second largest spring migrating population of shorebirds in the Northern Hemisphere. Over a million shorebirds of six major species are dependent on horseshoe crab eggs to replace the body fat energy reserve which carries them on a 3,000 to 4,000 mile spring migration from South America.

"The birds arrive almost starved, and in 10 to 12 days they may double their body weight by gorging on the easily available horseshoe crabs eggs," says Larry Niles, chief of the state's Division of Fish, Game and Wildlife's Nongame and Endangered Species Program. "This renewed energy reserve will allow them to fly another 3,000 miles to the high Arctic to nest and raise their young.

"Without the Delaware Bay shoreline and the horseshoe crab nesting, we would lose probably 90 percent of some major shorebird populations like the red knot," says Niles. "The tremendous volume of eggs available, and the free swimming immature horseshoe crabs, provide a major link in the food chain of the fish and wildlife resources of the Delaware Bay."

Despite their ecological importance and the fact that they were the first visitors to the Delaware Bay shore, not everyone loves and appreciates the lowly horseshoe crabs. Some people who own summer cottages and homes along the lower Delaware Bay complain bitterly about the odor of the decaying crabs, which concentrate on their beaches due to the wind and tide. The commercial fishermen hate the crabs because they become tangled in their nets, and some swimmers are frightened when they step on a crab in the water. However, the annual spring arrival and departure of the Delaware Bay horseshoe crabs and the one million shorebirds it attracts is an event that increasing numbers of people are enjoying. The Nongame and Endangered Species Program is expected to erect three viewing and interpretive platforms — Reeds Beech in Cape May and Moores Beach and Fortescue both in Cumberland — where the public can view the shorebirds and horseshoe crabs without disturbing the feeding birds and nesting crabs.

Times have changed. The wildlife agencies of New Jersey and Delaware coordinate in a weekly aerial shorebird censuses conducted from April into June of the populations in both states, and the Delaware Estuary Program volunteers are actively censusing the horseshoe populations and gathering information as part of the broader efforts of studying the Delaware Bay. The states of New Jersey and Delaware have passed restrictive regulations on the harvest of horseshoe crabs, and a number of scientists are directing attention to our oldest living fossil, which is currently being recognized as a major modern attribute to our environment and our way of life.

While many may view the horseshoe crab as a frightening beast, others like the late James J. Finn, a tireless, promoter and researcher of *Limulus*, see a unique and special creature. "The beauty of the horseshoe crabs is literally in the eyes of the beholder," Finn said.

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

Horseshoe Crabs — Medical Miracles

In addition to its value to millions of shorebirds and other wildlife, the horseshoe crab is responsible for one of the most important medical advances in our era.

For more than 50 years, the horseshoe crab has been an excellent model for scientists to study cancer, the human eye and heart functions. But during the past 15 years, the horseshoe crab has become a major factor in testing human medicine by pharmaceutical companies.

In the late 1950s, Dr. Frederick Bang of Johns Hopkins University discovered that the blood of the horseshoe crab contained a clotting agent which would attack bacterial toxins. Scientists later isolated that compound from the crabs' white blood cells and produced a product called Limulus Amebocyte Lysate (LAL), which is used to test injectable drugs and other materials, including artificial limbs, for contamination.

Limuli Laboratories of Dias Creek in Cape May County is one of four companies along the East Coast that is licensed and inspected by the U.S. Food and Drug Administration, which supervises the manufacture of LAL. They collect horseshoe crabs and remove about 10 ounces of blood, which is blue due to a heavy concentration of copper. The live crabs are immediately returned alive to the bay.

The horseshoe crabs' blood is centrifuged to spin out the white blood cells. The white blood cells are then further broken down to obtain the specific coagulating agent called Lysate. Lysate is refrigerated and will later be further refined and freeze-dried into LAL, a white powder which is sold to various pharmaceutical and drug testing companies all over the world.

"The horseshoe crab is the sole source of this Lysate material which is used extensively for testing the purity of injectable drugs," says Benjie Lynn Swan, a research scientist at Limuli Laboratories.

The LAL is mixed in a test tube with an equal amount of a drug solution. The mixture is incubated for one hour at 37 degrees Centigrade, and then the tube is turned upside down. If a clot or a gel is formed, contaminants are present, and the drug fails the purity test before marketing or shipment.

This LAL test has almost replaced the live rabbit test for impurities. In the past, a rabbit's ear was injected with a sample of the drug to be tested. If the rabbit develop a fever, the drug was considered contaminated and could not be released on the market.

Swan says the horseshoe crab blood is faster, more economical and more sensitive than the rabbit tests in testing drugs.

PETE McLAIN

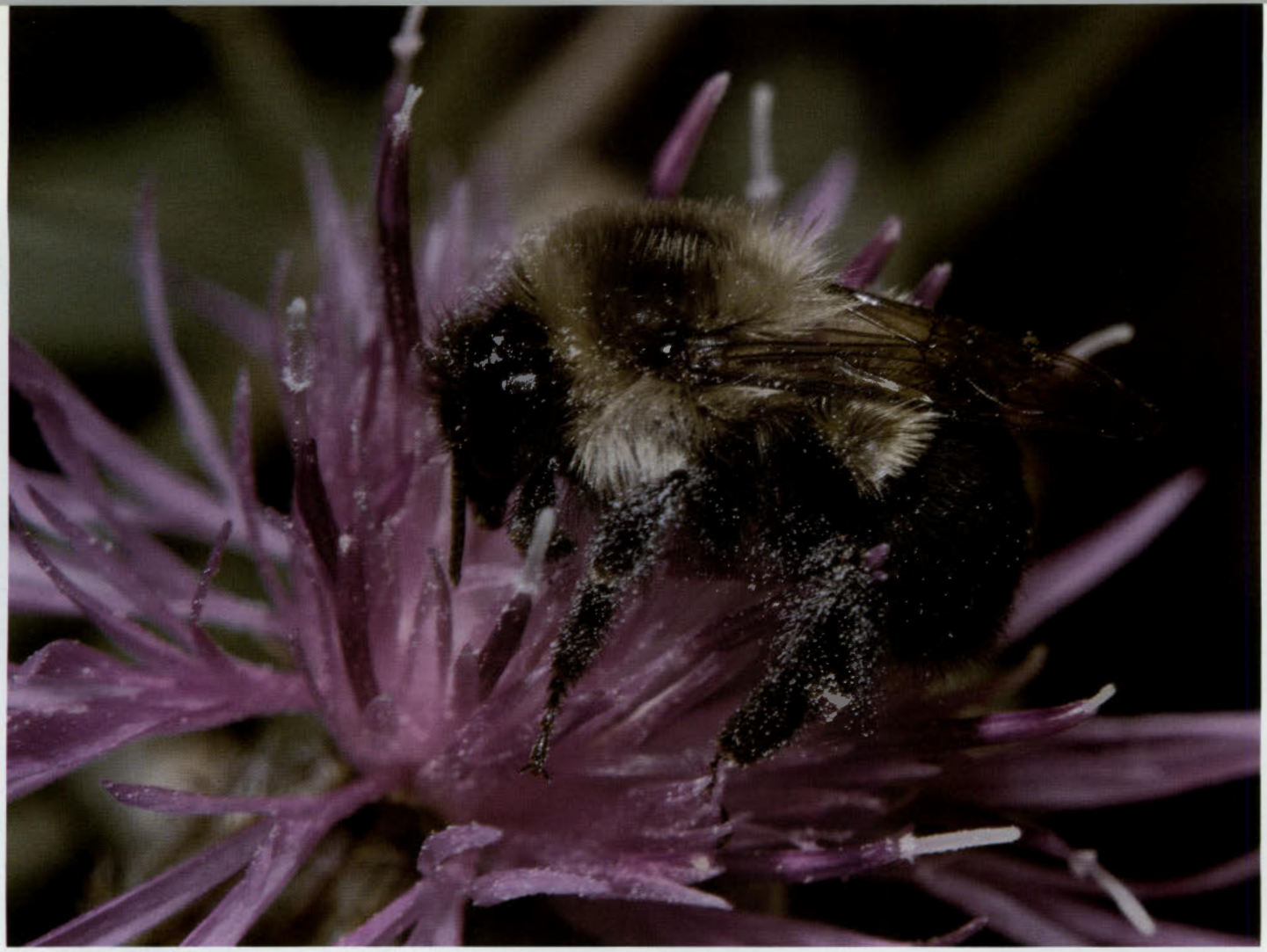
PETE McLAIN

Blood is extracted from the horseshoe crab (top) and later refined to test the purity of human drugs. The blood is blue due to a high concentration of copper.

Once the blood is extracted, the crabs are released alive back into the Delaware Bay. The blood is then centrifuged (bottom) to separate out the white blood cells, the basic ingredient for Limulus Amebocyte Lysate.

In Search of New Jersey's Littlest Wildlife

Photography by David Orden



Spring is a great time for things like gardening, hiking, and camping. But David Orden has found another unique hobby for this time of year. He shoots bugs.

His weapon of choice is not Raid or other insecticides, but a camera. And when Orden is finished with his prey, they just crawl or fly away.

Orden, a 46-year old computer programming analyst with Rutgers University in Newark, has been getting an up-close view of New Jersey's insects for about five years. During that time, he has captured insects doing everything from feeding to laying eggs.

"You see things you've never seen," says Orden. "You can see the wings' patterns and textures. You can see the beards and eyelashes on flies. You can see things you never see with the naked eye."

Orden's interest in bugs began after he was given a jeweler's loop, which magnifies objects 10 times. After exploring rocks and flowers, he discovered insects. It was then he decided to capture this fascinating world with his camera so he could share it with others.

"When I see something cool, I want to show it to my friends," he says.

Orden, who lives in Newark with his four dogs, can find insects in the most ordinary places — from inside his home to outside his urban office to parks and fields across New Jersey. His expeditions may begin in bushes or flowers or by looking for movements in the grass or for unusual specks on leaves or trees.

But capturing these tiny creatures can sometimes be a challenge. First, he stalks the bugs, often crawling after them close to the ground. Then, he waits for stillness; even the slightest breeze can move the creature out of focus.

Through his photography, Orden provides a glimpse into another world, where the members of New Jersey's littlest — a perhaps most abundant — "wildlife" species live out their daily lives. Through his camera, he provides an up close and personal view, making the ordinary extraordinary.

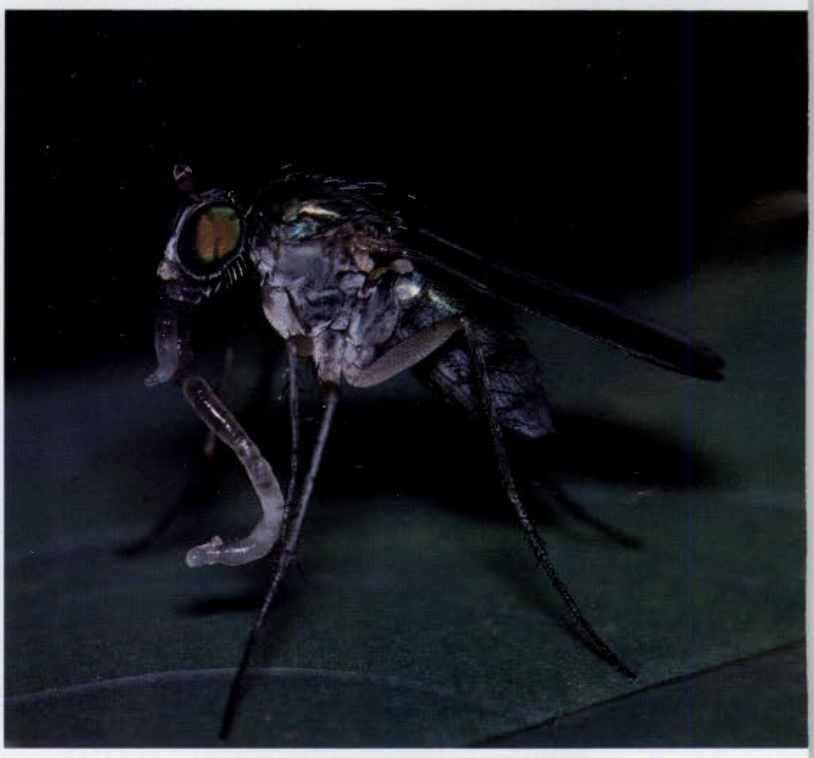
A bumble bee (above) is found dusted with pollen.

PHOTOS OF ORDEN BY MARVIN ROSS

A beetle forages in a cluster of flowers (left).

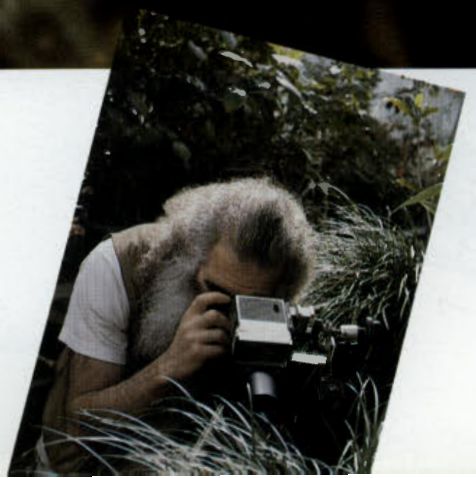
Three-lined potato bugs mating (below).

A long-legged fly (bottom).



A grasshopper looks mammoth perched on a plant stem (opposite page).

A tiny spider (above) is camouflaged as it sits on a flower base.



A fly (above) shows off its iridescent body.

A fly (right) laying larvae on a leaf.

An inchworm rests on a plant (opposite page) as an ant passes by.

PHOTOS BY JILL BARNES

Anglers Eye the Walleye

by Jill Barnes

For years, anglers have traveled to Canada or the Midwest for quality walleye fishing. But for local anglers, it might only take a drive to northern New Jersey.

The Monksville Reservoir in Passaic County is shaping up as prime walleye waters because of an intensive stocking program by the state as well as local sportmen's clubs.

The horseshoe-shaped Monksville Reservoir officially opened in 1988. Bordered by West Milford and Ringwood, it is three miles long and covers 505 acres. In its initial development, Monksville's purpose was to provide more drinking water for northern New Jersey. Today, it has also been added to the list of state fishing holes.

Growing Walleye

The New Jersey Division of Fish, Game and Wildlife did surveys before the reservoir was filled to see just what type of fish would bring the best return. In addition to Monksville's fare of large and smallmouth bass, pickerel, trout, catfish, panfish and an occasional muskie, the habitat, water temperatures, water clarity and available forge fish made the reservoir a good environment for walleyes. During filling, existing debris, brush, roadways and shoreline trees were left almost untouched to provide the best possible fishing conditions.

Walleye, members of the yellow perch family, are a popular game fish because of their size, their taste, and the fight they give when hooked. While the walleye are not big on jumping out of the water like bass, they will run circles around a boat.

Although the average walleye is probably around two to three pounds, Monksville may produce fish in the 10-pound range in the coming years. Fish in the five-pound class have already been hooked.

An intensive walleye stocking program began in the spring of 1988 when 600,000 day-old fry were released into Monksville Reservoir. That same year, the New Jersey Angler Sportsmen Association provided more than 2,000 fingerling fish ranging in size from six to eight inches. The Monksville Sportsmen Association also has contributed 4,700 fish — ranging in size from four to 10 inches — to the reservoir since 1990. Many of the walleye had their fins clipped with a notch in order to gauge the species growth during surveys in subsequent years.

As a result of private and state efforts, two million walleye have been stocked in Monksville since 1993. The state plans to stock larger walleye as the reservoir matures. Bob Papson, a state biologist with the Division of Fish, Game and Wildlife for the Monksville area, noted that the state began stocking advanced growth walleye — between three to four inches long — beginning in 1993.

The reason so many small walleye have been released is because there are relatively few large predators in Monksville. Papson has kept a watchful eye over the reservoir since the beginning and has seen walleye survey results that both encourage and surprise him.

In some of his initial shock testing in the spring of 1989 where a small current is put in the water to temporarily stun and net the fish, Papson found that some fish released by the New Jersey Anglers had grown 10 to 12 inches in less than a year. It seems the abundance of forage fish in addition to the lack of predators has helped the walleye grow and survive.

Since then, the number of fish caught in surveys has varied. Although Papson has captured walleye in all the spring shock and net surveys, he has seldom found fish during fall surveys. In the spring of 1993, 60 fish were netted in different parts of the reservoir, with the biggest weighing 5.3 pounds and measuring 23 inches long. But in the following fall survey, no walleyes were captured.

"I'm not sure why," Papson says. "Maybe they just go down deep in the fall." Monksville has depths of 90 to 200 feet along the old Wanaque River bed and near the dam, providing lots of hiding places for this much-prized fish. Anglers report walleye caught in late fall have been found in depths of 30 to 40 feet.

The walleye are closer to the surface in spring during their

Walleye are raised in the Hackettstown Hatchery.

A walleye caught in the Monksville Reservoir.

spawning time. In fact, the season is closed from March 1 to May 1 to protect them. Although large scale spawning has not occurred, Papson has witnessed signs that some walleye have begun the breeding ritual as early as 1990 by swimming up the Wanaque River, which feeds into the Monksville.

"We'll just have to see what happens with our netting and shock testing over the coming seasons to see what they yield," Papson says.

During the 1993 spring shock testing, Papson captured both a mature male and female to use as brood stock at the hatchery in Hackettstown. "We were very excited about that," he says. "We were able to extract walleye eggs for the first time and fertilize them. We hope to expand our own walleye production so we don't have to import eggs from other states as we have in the past."

In addition to state fishery efforts, other factors may also influence the survival of the walleye in Monksville. In response to drought conditions in the fall of 1993, water was drawn down from the reservoir to the adjoining Wanaque Reservoir to supplement the area's water supply. Many wondered if this loss of water volume would have any effect on the walleye population.

"I don't think so," Papson says. "In fact, it may help it by killing off some of the weed growth close to the shoreline. That would expose more of the rocky and gravel bottom which walleye tend to like. It also could improve the smallmouth population, which also prefer that type of habitat."

Catching Walleye

Armed with the history of Monksville walleye, how does the average New Jersey angler go about catching this fish? Just as Papson found in his surveys, the fishing seems to be best in spring after the spawn and then again in late autumn. Joe Curley, an avid Monksville walleye angler from West Milford, had his best fishing in the month of June. Last spring, he hooked a fish that was four pounds, 10 ounces and 21 inches long, as well as three other nice size walleye.

The walleye, though, still have a way to go in Monksville to break the state record of 13 pounds, nine ounces set last year on the Delaware River. In addition to the Delaware and Monksville, walleye may be found in Lake Hopatcong, Big Swartswood Lake and Greenwood Lake.

Those who would like to try walleye fishing must first get a freshwater fishing license from the Division of Fish, Game and Wildlife. Anglers should look for dropoffs that have gravel bottoms. One good spot in the Monksville Reservoir is along the eastern shore near the power cables. Another hot spot is the tree and brush area of the northern edge at the top of the Monksville horseshoe.

In spring, look for depths of about 10 feet of water near weeds where there is good forage to hook a legal size fish of 18 inches or better. The walleye seem to stay deep in the late fall. The fishing picks up in mid-November with lucky anglers hooking fish in depths of about 40 feet. Anglers might also try Monksville when the weather turns cold and ice fishing takes over.

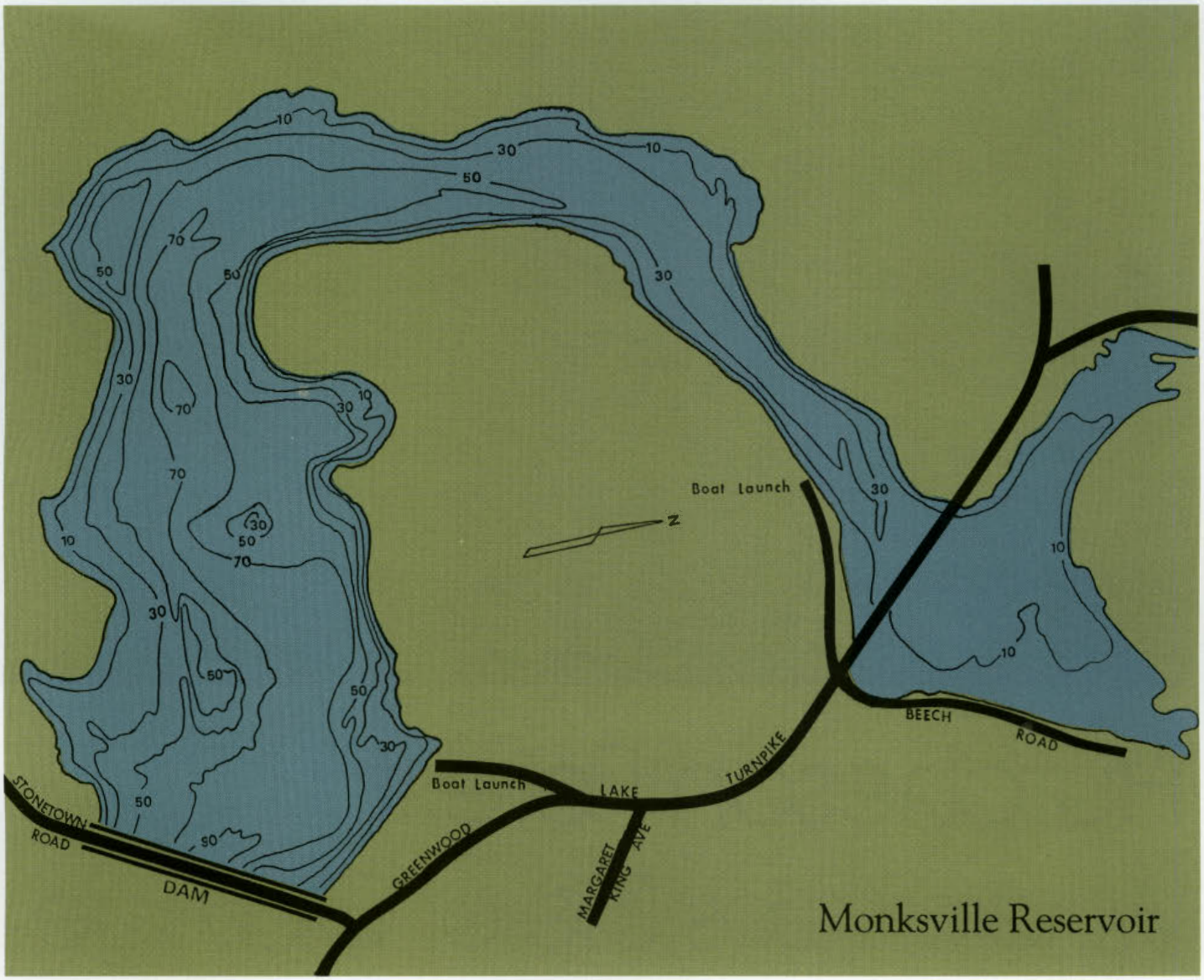
"We had people reporting fish from 22 to 27 inches," says Guy Cisternino, who runs the Monksville Bait & Tackle Shop near the reservoir. "Most were fishing right off the bottom using large shiners on floating jig heads. What also was encouraging is that most of the fishermen took pictures of their catch and released the walleye."

Catch and release is encouraged in these early years to ensure an ample breeding stock.

Lures that entice walleye include grubs, leeches and trolled Shad-raps or similar minnow imitators. Live minnows can be deadly. Using leeches or worms on a floating jig head also has produced results. The jig combinations have caught walleye in about 15 feet of water in the flooded timber, most time while fishing for bass.

Anglers have had some success using crankbaits and plugs along the brush and tree line. Colors that resemble rainbow trout are a good bet. Those who correctly use downriggers in warm weather come up with a few walleye along the old Wanaque River bed. Medium tackle probably is best, especially with live bait. Walleye don't always strike hard, so a more sensitive tip may be needed.

Once hooked, hold on, especially around the submerged trees where savvy walleye will charge in an attempt to break the line. Also be aware that walleye are toothy critters, so don't try to pick it



DIVISION OF FISH, GAME AND WILDLIFE

up by the lip like a bass or you could lose a finger tip.

In the future, the tailrace section of the dam which flows into the connecting Wanaque Reservoir might be a key spot for the walleye. Papson found that some walleye have gone over the Monksville Dam and taken up residence in the waters of the Wanaque Reservoir. Currently, that section below the dam is not open to the public, but the state is negotiating with the North Jersey Water Supply Company, which supervises the Wanaque Reservoir, to open the area to shore fishing.

"We thought we were close to agreeing on things last August, but it fell through," Papson says, however, noting that negotiations are continuing.

Monksville has two wide boat ramps with ample parking and trailer space. One ramp is located near the dam where the old Stonetown Road was, and the other is on Beech Road off Greenwood Lake Turnpike to the west. Motors are limited to 10 horsepower. For anglers without a boat, there's plenty of fishable shoreline.

Maps with the depths of Monksville are available from the International Map Company, 537 Shaller Blvd., Ridgefield, NJ 07657, (201) 943-5550. They show the river bed, brush areas and boat launches. These maps may aid in setting up your own fishing strategy for the walleye.

Jill Barnes is an outdoors writer who lives in Fair Lawn.

PHOTOS BY NICK ROMANENKO

A worm's eye view of the canopy above Hutcheson Forest.

Hutcheson Forest: Where Trees Die of Old Age

by Daniel C. Church

Perhaps this is the forest primeval, but it is hardly hush. Vehicles buzz by on Route 514 between East Millstone and New Brunswick. Overhead, aircraft enroute to metropolitan New York airports traverse the oak-hickory wood lot.

More majestic oaks spread branches elsewhere in New Jersey. Likewise, there are larger hickories in the state. But nowhere else have state foresters found such a concentrated stand of mature specimens with a unique, documented claim. Somehow, through an accident of history, this 65-acre parcel in Somerset County's Franklin Township — now preserved by Rutgers University as the William L. Hutcheson Memorial Forest — has survived the clear-cutting that followed European colonization. It persists today as a tiny forest remnant of those vast woodlands that once blanketed Atlantic Coast highlands from Georgia to Canada.

"Virtually every acre of New Jersey was cut over," says Les Alpaugh, chief of the Bureau of Forest Management in the Department of Environmental Protection and Energy. "No other stand that I know of is 250 years old, and that's kind of amazing to me. You'd think there was a niche somewhere else; we're always looking."

And the Forest Burned

The history of one of New Jersey's last virgin forest can be found in its trees.

Early European navigators cruising the Atlantic coastline wrote about the pervasive glow from woodland fires set by Native Americans. The blazes so changed forests around Indian villages that settlers sometimes compared the airy woods there to European parks. The intent was practical, however. It cleared away the lower level of forest for better hunting and enriched the soil for

crops such as squash, beans and corn.

Protected by thick, cork-like bark, mature oak and hickory trees seem to have survived these brief, fast-moving fires fed by ground litter. In Hutcheson, evidence from tree rings shows fire swept through the area in 1641, 1652, 1662 and 1676 — a regularity some researchers at Rutgers find suggestive of those intentional burnings. John Kuser, associate professor of forestry at Cook College, Rutgers University, believes the aged oak and hickory population at Hutcheson is a direct result of those periodic burns.

"Oak is a pioneer species," Kuser explains, and further research into controlled burns elsewhere might document to what extent fire is an agent of natural selection, where the strongest and most adaptable plants survive.

Native Americans had harvested woodlands like Hutcheson sparingly, using oak strips to bind lightweight shelters and hickory wood for bows. The new European settlers, who often fled their homelands in search of religious freedom, made radically different demands. In addition to their moral imperative to replace "thick antichristian darkeness" with the "cleare sunshine of the Gospel," they built structures modeled after Atlantic European buildings with hardwood sills, walls and gables. They also cleared land for crops.

The Demon in the Woods

While many settlers were lured to the New World by tales of an earthly Eden with bountiful woods, the forest soon turned sinister. Even the 17th century botanist John Jossely, during his American travels, considered the "infinitely thick woods . . . dauntingly terrible."

There was also a heavy moral burden that rested upon Christian shoulders to reclaim God's country from "wilde beasts" and unrepentant Indians who "Conversed with Daemonds." As a result natural philosophy became moral philosophy.

English lexicographer Samuel Johnson scoffed at naturalists in the mid-1700s, saying, "They seem to think we are placed here to watch the growth of plants or the motion of stars. Socrates was rather of the opinion, that what we had to learn was, how to do good, and avoid evil."

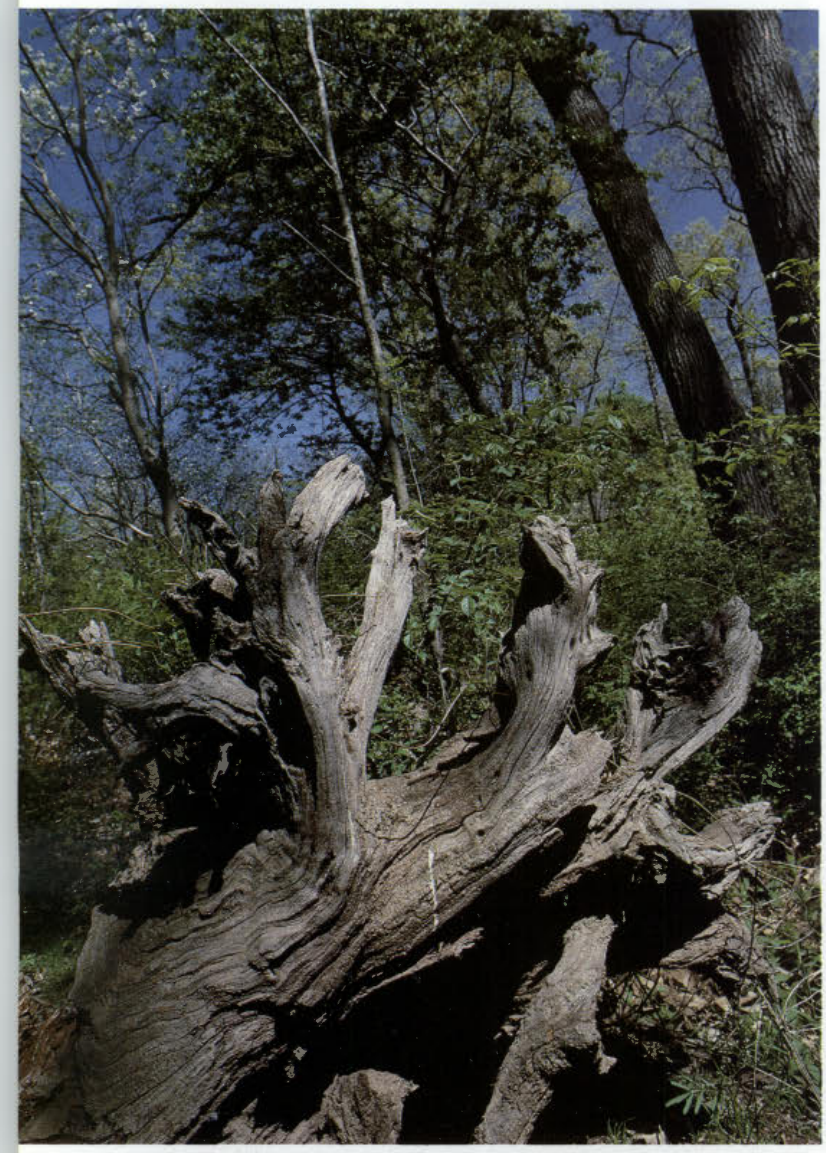
At first, the Europeans relied on native methods for forest removal. During the winter months, smaller trees were cut and larger trees were girdled and, when dead, burned. The deadfall often was allowed to decay, enriching the soil so corn or buckwheat could be planted around the stumps. Later, when technology produced sharper axes, woodlands were harvested wholesale and the centuries-old crop sold to domestic and industrial buyers.

Shortly after the colonies gained independence from Britian, some decried the desecration of the forests.

New Jersey native James Fenimore Cooper, one of America's first best-selling novelists, used his Leatherstocking stories to attack unchecked development. "They scorge the very 'arth with their axes," one of his characters declares in *The Prairie*. "Such hills and hunting grounds I have seen stripped of the gifts of the Lord, without remorse and shame."

Fungus growing on a downed tree.

A dogwood in bloom.



Hutcheson Forest is a unique blend of old and new growth.

New Jersey woodlands were particularly vulnerable to emerging regional markets, exposed on two sides to development along the Hudson and Delaware rivers. This makes survival of the 65 virgin acres in Hutcheson especially surprising.

Kuser, the forest geneticist, has one guess why Dutchman Mynheer Cornelius VanLiew in 1701 began planting on surrounding lands, but spared that particular tract. "It's not a particularly good site, it's all red shale," Kuser says. "The worst part of his lands he never cleared." In general, Kuser adds, better forests towered over areas that are or once were fertile farmlands.

Still, Hutcheson does contain large trees predating VanLiew's tenancy, says Edmund Stiles, professor of biological sciences at Rutgers and director of the forest. "There has been change," Stiles says, "but this still is representative of some of the largest trees in New Jersey. It is the only oak-hickory forest in the state that we know has never been cut."

The Inspiration of a Forest

Documenting these changes, since Rutgers' stewardship began in 1955, has produced a rich crop of more than 200 research papers or articles on topics ranging from forestry to forest songbird nutrition. Hutcheson's 65 acres were saved from the sawmill by the Citizen's Committee to Save Mettler's Woods (named after the land's last private owner) with funds from the United Brotherhood of Carpenters and Joiners of America. Hutcheson got its new name from the president of the union, and its holdings have since grown to 264 acres. The state's Green Acres Program, under the Department of Environmental Protection and Energy, alone has contributed $1.4 million toward buffering the forest edge against encroachment.

The forest has changed over the past centuries by the invasion of non-native plant species like Norway maple, the loss of native herbs, and defoliations by gypsy moths. A blight claimed nearly 50 percent of the 40-foot dogwoods that until the last decade provided an understory beneath the forest canopy, says Stiles. Deer, what one state forester calls "wood rats," have heavily browsed oak seedlings and other species. Severe storms too have felled the old oaks and hickories, with ash and maple growths filling in the newly created gaps.

These dynamic events have been documented — without disturbing the forest — by Rutgers scientists. Among their findings are that a long-standing theory that the area represented some final state, a so-called "climax forest," appears unfounded. Only in a protected area like Hutcheson can such assumptions be tested.

"You've got trees dying of old age," says Stiles. "It's quite natural, but in the United States, it rarely takes place."

Much attention is now being focused on the forest edge and how the woods reclaim abandoned farmlands. Graduate students each year crawl over carefully gridded acres, recording the succession of 120 plant species and more. Another experiment evaluates the effect of herbivores, from rabbit to deer, on regeneration. "Deer are very specific and are devastating the New Jersey forests, eating out the understory," says Stiles.

Beyond the scientific mission, each year the forest hosts thousands of school children and other visitors who follow the restricted single path through a natural showcase of biodiversity. One central message is that ecology and environmental preservation make sense not only in rain forests but locally as well.

"Most of the plants and animals in New Jersey are poorly studied," Stiles says. "One of the key questions is, when you disturb something, how long does it take to recover. If you don't cut, you'll get a Hutcheson Forest back in about 400 to 500 years."

A limited number of public and private tours are offered at Hutcheson Forest, with leaders covering such topics as forest ecology, natural history, conservation issues and ecological relationships. To be included on a mailing list or for more information on the tours, write to Director, Hutcheson Memorial Forest, Department of Biological Sciences, Rutgers University, P.O. Box 1059, Piscataway, NJ 08855-1059.

Daniel C. Church is a freelance writer who lives in Bethlehem, PA.

The Building of a Forest

Hutcheson Memorial Forest has existed for centuries without being cut down for its wood. But this virgin forest wasn't always a stand of majestic, old trees. Here is how a forest grows and the changes that occur when humans do not interfere.

A Forest Begins

Primary succession occurs in areas where vegetation has never grown, like bodies of water, sand and soil exposed by glacial retreats, volcanic deposits, landslides, banks and dune formations, or emerging beaches. A forest can begin after changes in soil, climate and the growth of other vegetation. It may start with lichens, mosses or small plants and later sprout herb-like plants, grasses, and shrubs before trees appear. Trees such as red cedar, red maple and some ash that require full sunlight to become established appear first, followed by species that need less sunlight to exist.

Forces of Humans and Nature

However, forests are always subject to the forces of nature and people. A tract can be significantly altered naturally at any stage of development by fire, disease, insect attacks, the introduction of new species or extremely hot or cold weather patterns or artificially through cutting. If the forest becomes reestablished after such events, it is called secondary succession. The new growth generally begins with herb-like plants or seedlings requiring direct sunlight.

The many different species of plants, trees and wildlife in the forest continually compete for space, light, minerals and water. While this competition may be limited in the early stages of the forest, it escalates as the forest grows. Depending on the conditions at the site, species may flourish or die depending on their need for space and their ability to coexist with others. Many trees need strong sunlight to survive and require openings in the forest canopy; others can exist in the understory of the forest. Competition also influences the growth pattern of individual trees, determining the amount of leaves and branches and when they will lose their foliage.

Virgin Forests

Natural, uncut forests like Hutcheson Memorial Forest differ significantly from those managed for wood products. These uncut forests often contain larger trees, more dead standing trees and downed logs, an uneven canopy with trees of many different diameters and ages, greater variations in light, temperature and moisture and multiple layers of vegetation. The complexity of these forests support a great diversity of life.

Forests are continually changing, whether it is measured in years or hundreds of years. The death of one tree is replaced by the germination of a number of seedlings, beginning a complete life cycle which can continue to be maintained if there are no new natural or human disturbances.

Forests are continually changing, whether it is measured in years or hundreds of years. The death of one tree is replaced by the germination of a number of seedlings, beginning a complete life cycle.

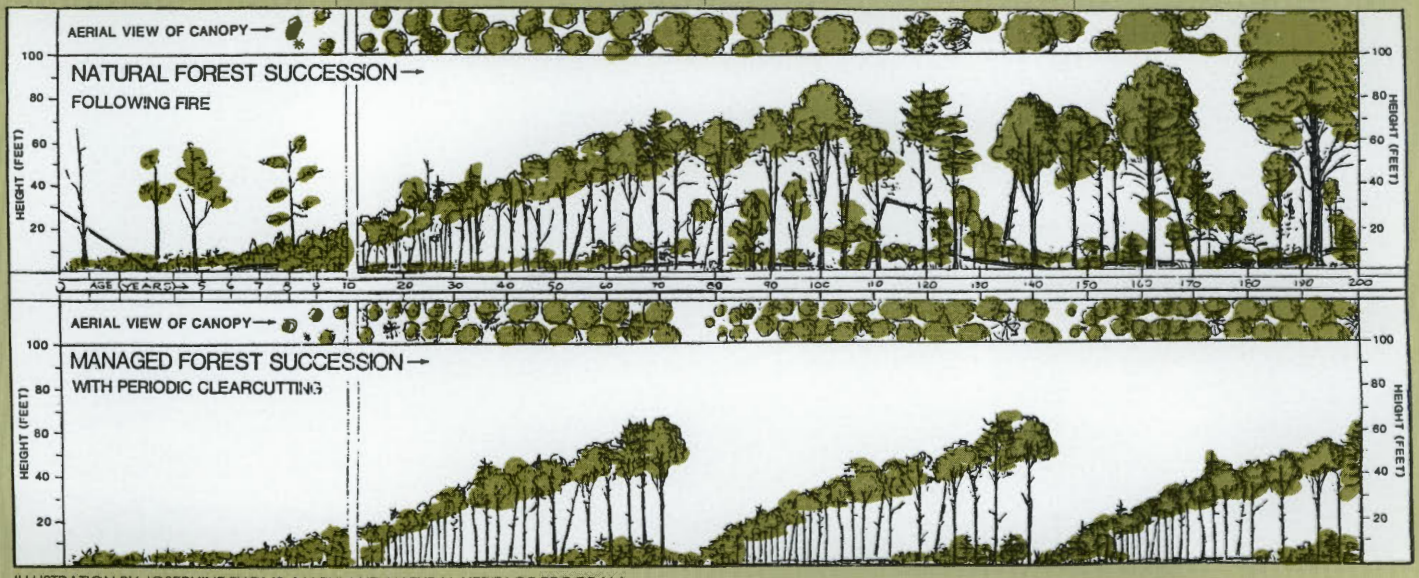
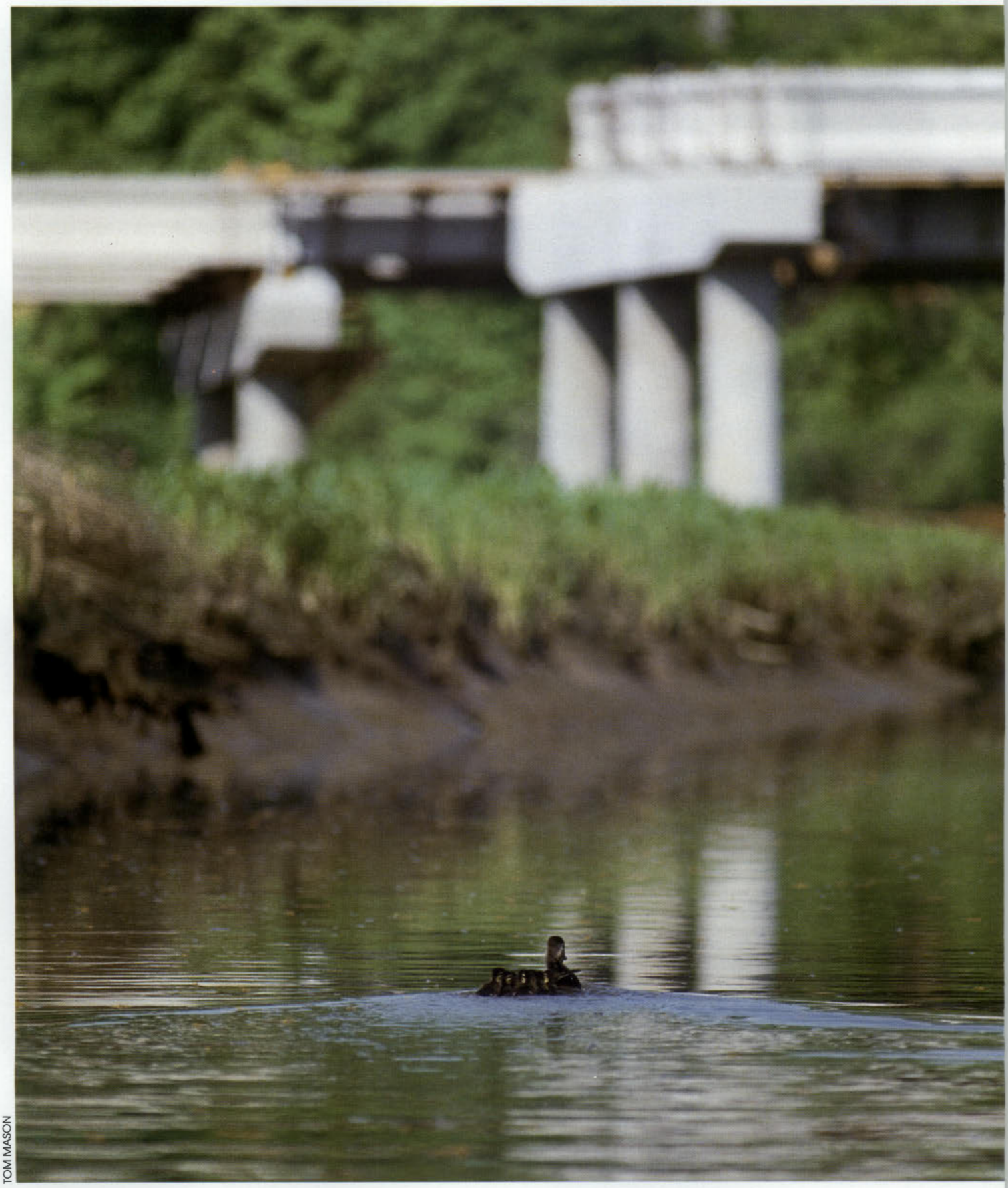


ILLUSTRATION BY JOSEPHINE THOMS, MARYLAND NATURAL HERITAGE PROGRAM

Afield

A family of ducks finds an oasis in Hamilton Marsh beside a newly constructed section of I-295.



TOM MASON

The Hamilton Marsh — An Urban Oasis

As you approach the sludge treatment facility, power plant and oil terminals of Duck Island, you enter the quintessential landscape of our 20th century consumer culture — a landscape devoted to the delivery of cheap energy and the removal of burgeoning waste.

And yet all around you, just beyond the fenced perimeters of the terminals and plants, are the green workings of an even more efficient system of energy production and waste removal — the Hamilton Marsh. The marsh is 1,250 acres of cattails and reeds, meandering streams, lily-covered ponds and islands of shrubs and forests.

Late one afternoon, I followed an abandoned rail line a hundred yards east of the Mercer Generating Station, through a wall of trees that opens suddenly on a sea of reed grass and cattails. This was the Camden and Amboy Railroad, which ran alongside the Delaware and Raritan Canal. This track is now operated by Conrail, and the canal is nowhere to be seen among the rushes and reeds.

Along the railroad embankment, tall feathery spikes of wild rice fringe the green expanse of the marsh. An oddly graceful arc of unfinished highway hovers over the area, an uncurling leaf of the coming clover.

Southward, the railroad track passes under a partially completed section of Route 295. The machines are silent at this hour; the humans have gone home. The waters of Duck Creek curl around the cement pilings. Swallows and martins weave through the shadows under the steel girder.

Further down the creek, a red fox trots into the late sunlight, sits down and yawns. He lifts his muzzle to the breeze and the white tip of his tail quivers. His work has just begun.

The marsh is 1,250 acres of cattails and reeds, meandering streams, lily-covered ponds and islands of shrubs and forests.

A belted kingfisher comes slicing and rattling along the creek. A great blue heron meditates at the top of an oak. I catch a glimpse of a common egret winging its way sunward towards the river. These gifts should be enough for one evening, but I want more. So I drive to

A frog hidden in algae at the Hamilton Marsh.

JIM AMON, DELAWARE & RARITAN GREENWAYS

Rice grass towers over the Hamilton Marsh.

TOM MASON

Roebling Park, don my gum boots and head out the causeway past Spring Lake.

I follow a path that skirts the edge of a wooded island and dead-ends into a swampy thicket of red willow and arrowwood. Along the way, I startle a bird from the marsh to my left, or the bird startles me — a grebe, I think, that goes chortling invisibly off through the reeds.

On my way back, I strike off on a second path, thinking it too will lead me eventually to Spring Lake. I wind through the thickets, wade through reeds and cattails and finally emerge, sweating and bewildered, at the foot of Annabelle Avenue in Trenton.

I think of an aerial photograph I once saw of Trenton and the cocoon-shaped darkness of Hamilton Marsh — how thoroughly and abruptly it cuts off the gridwork of the surrounding urban area. Each of those cut lines is a street like this one, ending in a wall of vegetation — a cement storm drain descending over the edge of a bluff, breaking up into ferns over a hardwood canopy, then the reeds standing out of algae-covered water.

At the end of every street is a story. One resident of Deutz Avenue in Trenton told me that she never used to wander further into the marsh than Sturgeon Pond because there was an old man who lived there who would shoot you for trespassing. In the 1940s and 1950s, a man named Russell Abrams did live in the marsh — hunting, fishing, and trapping muskrats. I was told I might find the ruins of his cabin out here beyond Spring Lake, but I have only managed to get myself lost.

As I regain the Spring Lake Trail and hurry through the gathering darkness, the grebe and I startle one another a second time. Is is the same bird, or a different one? How quickly a place can grow wild again in the wake of our passing — if we do not destroy it, if we learn to go as lightly as those who went before us.

MARY LECK

Water lilies decorate the waterways.

by David LaMotte, a poet, teacher and doctoral student at Princeton University and a volunteer with the Delaware and Raritan Greenways

TOM MASON

The Hamilton Marsh — A Historical View

The human history of the Hamilton Marsh is as rich and surprising as its natural history.

Most of the marsh lies within the Abbott Farm Historic District and National Historic Landmark in Hamilton Township. This complex of archaeological sites has yielded pottery and other artifacts dating back more than 6,000 years. In particular, the Abbott Farm district contains one of the largest village sites in the Mid-Atlantic states dating from what archaeologists call the Middle Woodland Period (500 B.C. to 500 A.D.).

The Middle Woodland Indians hunted game in the marsh, fished its waters, and made pottery from the rich clay deposits they found there.

In colonial times, parts of the marsh were diked, drained, and used for agriculture, though these meadows have long since become wetlands again.

In the early 19th century, Joseph Bonaparte, brother of the exiled Napoleon, built an estate along the Bordentown edge of the marsh.

The 19th century also brought the construction of the Delaware and Raritan Canal, as well as an adjacent railroad, which altered the flow of water, creating new ponds in the marsh and reclaiming a stretch of dry land between the canal and the river that became known as Duck Island. From the bluffs in Bordentown, you can still see the beginning of the canal at the mouth of Crosswicks Creek, where barges laden with Pennsylvania coal began their journey northward to the Raritan River and on to New York.

A brick factory was built adjacent to the canal, its great kilns fueled by the coal coming up the canal, and the clay deposits that had been used to make Indian pottery became the basis of a thriving brick-making industry.

These are only the highlights of an extraordinary history — hundreds, perhaps even thousands of years, during which human activity has been a part of the ecology of Hamilton Marsh.

Visiting the Marsh

Almost all of the historic structures are gone now, and Hamilton Marsh is threatened by development. But there still remain a few places to view this bountiful, ancient alcove.

John J. Roebling Memorial Park, at Sewell Avenue in Hamilton just off Route 206, is a renowned birding area with 300 acres of tidal wetlands, fresh water ponds and densely wooded bluffs.

The Bluffs at Crosswicks Creek, at Route 206 and Park Avenue in Bordentown, provide some of the most dramatic views of Hamilton Marsh. In many places, the bluffs are covered with graceful stands of oaks, mountain laurel and rhododendron.

Duck Island, at Lamberton Avenue in Trenton. Behind the sludge treatment facility, the power plant and the oil terminals is the great expanse of the marsh.

Preservation Efforts

Three of the most significant greenways in New Jersey — the Delaware River, the Crosswicks Creek, and the Delaware and Raritan Canal, converge on the Hamilton Marsh. This spectacular 1,250 acre urban wilderness provides an excellent setting for environmental education and urban recreation.

The Hamilton Marsh is the northernmost freshwater tidal marsh of the Delaware River. Ecologically, the marsh plays a critical role in filtering pollutants and contributing to the food chain of the Delaware River system. It includes tidal and non-tidal marshes, forested swamps, upland and second-growth forest, and an oak forest with hemlock, rhododendron and mountain laurel. There are ponds, five separate creeks, a canal and the Delaware River.

The state's Green Acres Program has taken the lead in preserving this area by committing approximately $2 million to acquire 275 privately-owned acres including wetlands and some of the spectacular bluffs overlooking the marsh. The state continues to work with the Delaware and Raritan Greenways, Inc. to bring attention to, and increase enjoyment of, this unique natural resource.

This arrowhead from the Abbott Farm Historic District dates from the Early Woodlands Period (500 B.C. to 500 A.D.).

ROB TUCHER, LOUIS BERGER & ASSOCIATES, INC.

How "Growing Soil" Can Feed the Needy

A farm in East Brunswick may soon be growing more than just crops. It may be sprouting future organic farmers and a charitable campaign to feed the poor in the inner city.

This spring, Cook College is establishing an organic farming project on two acres of experimental farmland in the heart of Middlesex County. The site, currently bare except for some rye that is used to keep the soil from washing away, has, at times, grown everything from ornamental trees to experimental crops. Located off Ryders Lane, the farm is part of the Agriculture Experiment Station of New Jersey, a research and outreach extension service of Rutgers University.

These fields are being sown by Rutgers University students, whose college majors range from environmental science to journalism. Some students will till the soil for credits toward their degrees, while others will participate just for the opportunity to get their hands dirty.

"I was thinking of something I could do for the city and making just two acres of soil better seemed like that something," says Shari Stern, a Cook College junior majoring in human ecology. "The spirit of growing food and working cooperatively just seems so exciting."

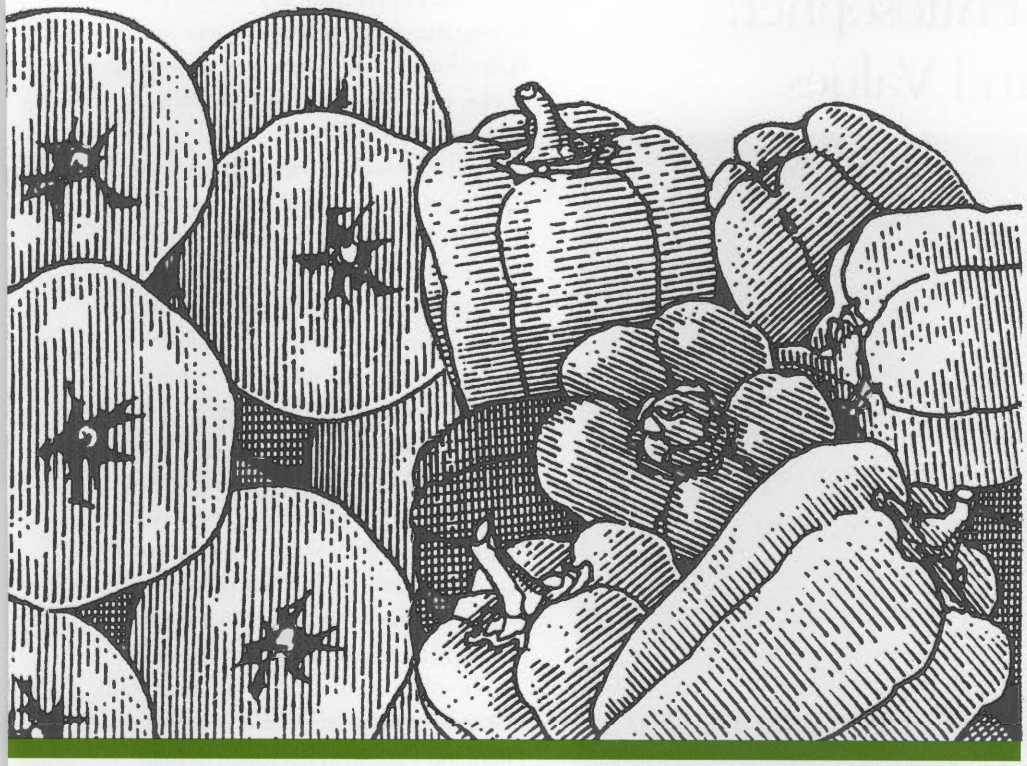
About 80 percent of the food raised will be donated to food banks and soup kitchens in the New Brunswick area. The rest will be sold to Rutgers University staff and students to help subsidize the cost of running the farm.

Growing Soil

There are other farms at Rutgers University dedicated to research, but this new project will give students a first-hand look at food production before it gets to the supermarkets. The produce will be grown organically; no synthetic fertilizers or pesticides will be used. The focus will be on naturally building up the soil to produce good crops.

"The important thing in organic farming is that it attempts to look at the soil," says Dr. Michael Hamm, an associate professor of nutritional science at Cook. "We are not really growing plants, we are growing soil."

About 80 percent of the food raised will be donated to food banks and soup kitchens in the New Brunswick area.



To raise the soil's organic levels to support plant growth without chemical fertilizers, nutrients and minerals must be added. An over-reliance on synthetic fertilizers may result in decreased organic matter in the soil, requiring even more fertilizer to get the same yield.

Organic farmers, on the other hand, rely on manure, compost or cover crops to provide necessary minerals and nutrients. One of the most important of these cover crops is legumes, which may consist of alfalfa, clovers or beans. Legumes have the ability to take nitrogen from the air and convert it to a form it can use. When these plants are plowed under and decay, the nitrogen breaks down and is added to the soil.

"Switching to organic — building soil fertility — takes four to six years," explains Dr. Stephen Reiners, a plant science professor at Cook. "We don't have a high organic soil level, but then again we don't want to come into a site that is perfect for organic. We want to show that we can build up the soil."

After the cover crop, the soil will hopefully have enough organic material to support crops, although it may may take a few years of adding manure, mulch and compost to increase the yield. Cover crops are usually used once every three years to keep the soil fertility high.

Fighting Bugs With Bugs

Organic farming presents other challenges as well. When plants are attacked by bugs and blight, farmers have to find alternatives to synthetic pesticides. They may turn to natural elements like bacteria. One such bacteria, *Bacillus thuringiensis*, or Bt, controls caterpillars — and is also safe for human consumption. Another pesticide, Rotenone, is derived from the South American derris plant and kills a broad variety of insects.

Another natural pesticide is insects. Some species like ladybugs, lacewing larvae and small wasps control aphids, caterpillars and other pests.

The challenge for organic farmers is to produce crops ecologically with natural materials that are often more costly and less effective than their synthetic counterparts.

While organic farming was dismissed in the past by conventional farmers, there has been a slow but steady reversal of that opinion. Organic farming organizations in New Jersey have increased in the last few years, and more farmers are giving organic growing a try. It is hoped that the new farm will increase interest in the field among the students.

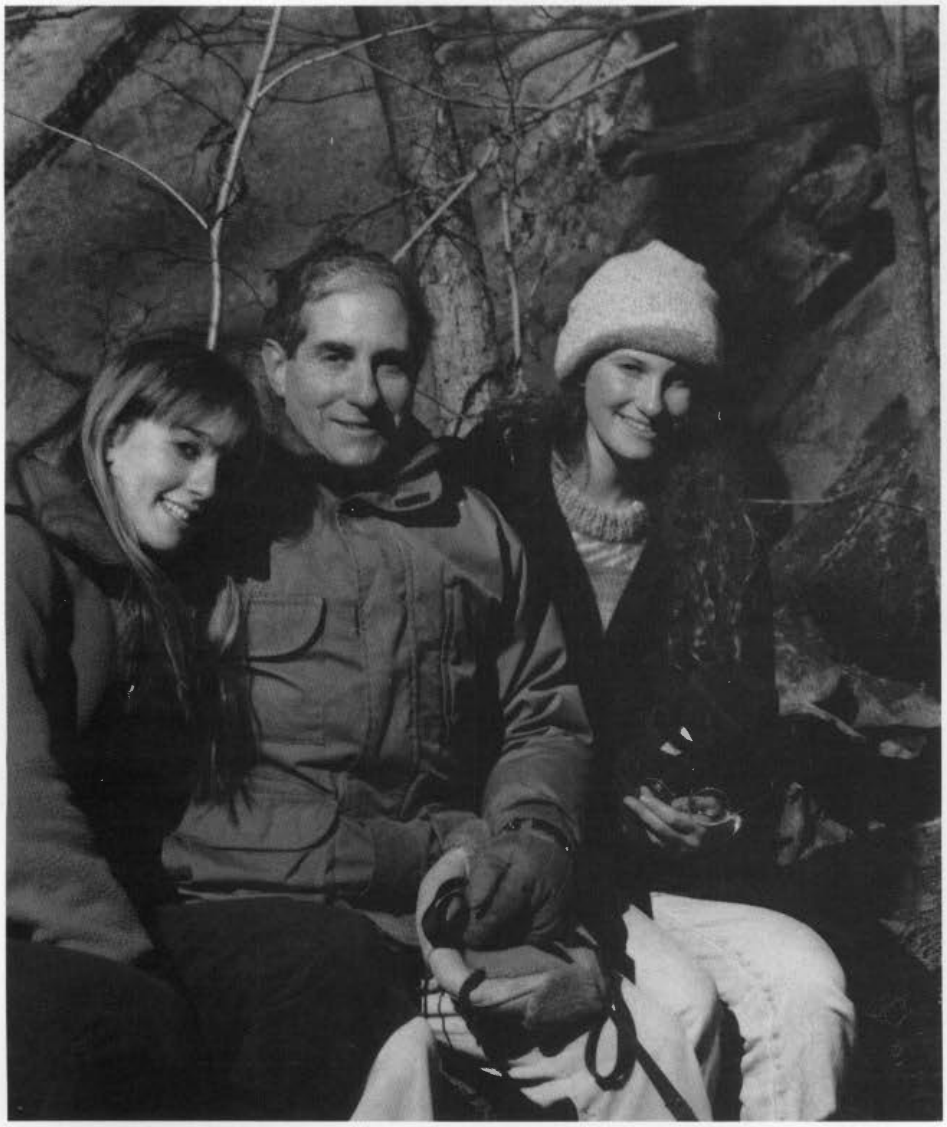
"Cook is a school for agriculture, but currently there are very few students with any interest in food production," Hamm says. "As fewer and fewer people are growing food there is more likely than ever a chance that we are going to have a crisis in food production in the future."

For students at Cook College, this old-fashioned technology will go a long way towards reaping a rich education. And for the poor and hungry of central New Jersey, the harvest may mean a rich bounty of "typical New Jersey fare" such as tomatoes, peppers, cucumbers, okra and collards by early summer at soup kitchens like Elijah's Promise in New Brunswick and food banks like The Community FoodBank of New Jersey.

"Very clearly, one advantage is the variety of produce that will be provided," says Kitty Schaller, associate director of the Community FoodBank, a central clearinghouse for 1,200 soup kitchens and food pantries throughout the state. "Produce has been has been difficult for us to land. . . . The USDA has been urging us to eat five (servings of fruits and vegetables) a day. This will provide a lot of that five-a-day fresh and that is the most nutritious thing that we can provide to poor people's diets."

by Paul Acquaro, a journalism student from Cook College, Rutgers University

The Environmental Philosopher: Combining Nature and Values



David Ehrenfeld on a hike with his daughters, Jane and Kate.

David Ehrenfeld embodies an environmental philosophy combining ethics and nature in his daily life — in raising his family, in teaching his students, in writing his books and articles.

"In today's society we have strayed from a path of peaceful living," says Ehrenfeld, a professor of biology and ecology at Rutgers University's Cook College. "And we have encountered numerous problems as a result. We need to rediscover the importance of using both nature and spiritual values as guides in our day-to-day lives."

Ehrenfeld often guides his ecology students to fields, marshes, woods and suburbs around New Jersey. His lectures involve active discussions and student participation.

"This is what I believe education is ultimately about, to get out and experience firsthand what we are talking about in class," says Ehrenfeld. "It's about students having the opportunity to deduce and to figure out for themselves how something works, not to sit in a class and listen to other people's theories."

And Ehrenfeld believes that a natural education must begin at a young age.

"The education of children, especially young children, is the most important challenge society faces," says Ehrenfeld, speaking from an office scattered with books and papers, a reflection of his busy and active schedule. "You have to teach values, communal values, and you must get children outside so that they can see nature and learn from it and use it to regulate their own lives. Ethical values and nature are essential to healthy living, and without either of these landmarks, children and all people are in grave danger."

Ehrenfeld has put his beliefs into practice in his own personal life. He lives in Highland Park with his wife, Dr. Joan Gardner Ehrenfeld, a terrestrial plant ecologist and also a professor at Rutgers, and their four children. Ehrenfeld and his wife have raised their family in a way consistent with their strong environmental beliefs. Nature is an important part of family life, and all enjoy the outdoors. Ehrenfeld's small yard has a garden and fruit trees, which provide a large part of the family's summer diet. Together, the Ehrenfelds spend a lot of time hiking in New Jersey.

"New Jersey has some of the most varied habitats of any state," says Ehrenfeld. "The shore, the floodplains, the Pinelands, the Highlands — these show tremendous diversity."

Ehrenfeld has also been active in preserving and protecting these priceless habitats. As a trustee of the Educational Foundation of America, he sponsored a grant for the New Jersey Conservation Foundation to help it coordinate the Highlands Preservation Campaign. The Highlands region of northern New Jersey is important, says Ehrenfeld, because it serves as an example of the many landscapes here in New Jersey. As a trustee, he says, the grant has been "one of my greatest achievements."

"We need to rediscover the importance of using both nature and spiritual values as guides in our day-to-day lives."

Also as a trustee, Ehrenfeld helped fund the American Littoral Society's Baykeeper Program. Designed to help New Jersey find and prosecute polluters, this program has boats cruising the waters of the New York harbor to monitor water quality and detect any pollutants. The Baykeeper Program also works to educate children and adults alike on water pollution and protection and to make them familiar with the state's rivers.

"When we know a river or stream, we will work much harder to save it," says Ehrenfeld.

But while Ehrenfeld and others work to preserve the environment, he sees society as straying from basic values, instead placing faith in the "fantasy of control," a myth that says that humans, in our advanced technological state, have the ability to control all things, including nature.

"We have a faith in the human control of nature," says Ehrenfeld. "This faith is misplaced because we will never have the control we think we do to manipulate the environment and nature without terrible side effects."

Instead people should look to nature and the way it functions as a working example of how to live in an interrelated community, of how to relate to one another.

"With the rise of the 'me-first' attitude has come a contempt of communal values," says Ehrenfeld. "Everyone's got this idea of their own individual rights, which are certainly important, but we've neglected the rights of the community, our sense of obligation and responsibility to each other."

In his latest book, *Beginning Again*, Ehrenfeld examines these changing relations among people, society, technology and the environment. The book carries the banner for a new field combining environmentalism and philosophy.

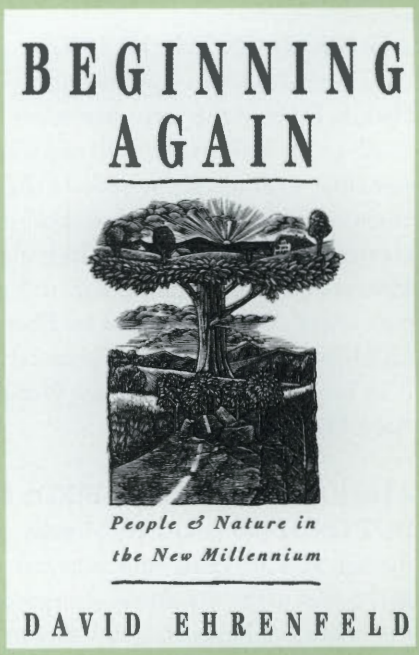
"Human population . . . is rapidly growing past the inevitable crash point," Ehrenfeld writes in *Beginning Again*. "It strains all resources of a tiring planet, as forests, fresh water and agricultural soil are consumed and lost. In the process, other species and their habitats are destroyed, the very atmosphere and climate are altered, and the cultural and ethical heritage of humanity is replaced by barbarism and moral anarchy."

Yet Ehrenfeld doesn't claim to be a philosopher. Instead, he feels his work is the natural result of his extensive education and experience.

Ehrenfeld graduated *magna cum laude* from Harvard College in 1959 with a bachelor's degree in American history and attended Harvard Medical School, graduating with special honors in biochemistry. In addition to his medical degree, he received a doctorate in zoology from the University of Florida, where he studied under the famous biologist and conservationist Archie Carr. After teaching at Barnard College for several years, he settled at Rutgers University.

The author of numerous books as well as magazine and newspaper articles, Ehrenfeld has addressed a wide array of environmental issues, ranging from animal navigation and agriculture to desert life and overpopulation. His published works include a textbook on conservation biology, a science fiction novel, his most celebrated work, *The Arrogance of Humanism*, and a regular column for the nature magazine *Orion*. He also was a founding editor of *Conservation Biology*, a leading journal in the relatively new discipline of conservation biology. Ehrenfeld has had a successful career as a teacher, writer and conservationist. In the future, Ehrenfeld said he would love to write more fiction, but he won't sacrifice teaching to do so.

"I love writing, but I don't think I could do it if I wasn't teaching," Ehrenfeld says. "When you are teaching real students in a classroom and outdoors, you feel and learn things you can't discover sitting in an armchair."



In his latest book, *Beginning Again*, Ehrenfeld examines the changing relations among people, society, technology and the environment.

by Monique Deforge, a journalism intern from Rutgers College, New Brunswick

Events

April

2 HOOKED ON THE HUDSON (also April 23) Learn more about the Hudson River in this three-part series. A beach comb explores the trash and treasures that wash up on the banks of the Hudson River and a shad festival celebrates boating and fishing on its waters. **Hours:** 11 a.m. (April 2), 9 a.m. to 5 p.m. (April 23) **Admission:** Free **Phone:** (201) 768-1360 **Location:** Englewood Boat Basin (April 2), Ross Dock Picnic Area, Englewood (April 23)

4 HIDDEN VALLEY FOR BIRDS & BUTTERFLIES (also every Monday through May 30) Bring binoculars and field guides to the woodlands, pastures and freshwater marshes of Hidden Valley to view birds and butterflies. **Hours:** 7:30 to 9:30 a.m. **Admission:** $7 (includes Cape May Birding Attack Pack) **Phone:** (609) 884-2736 **Location:** Cape May Bird Observatory, E. Lake Drive, Cape May Point

5 BIRDS OF THE SEASHORE (also every Tuesday through May 31) Join Pete Dunne for a leisurely walk through a refuge that attracts a great variety of birds because it offers so much including pastures, coastal freshwater ponds and beachfront. **Hours:** 7:30 to 9:30 a.m. **Admission:** $7 (includes Cape May Birding Attack Pack) **Phone:** (609) 884-2736 **Location:** Cape May Bird Observatory, E. Lake Drive, Cape May Point

9 BEST HIKES WITH CHILDREN A slide presentation by Arline Zatz, co-author of *Best Hikes With Children in New Jersey*, is a great opportunity for parents to find out which hikes in New Jersey are best suited for their youngsters. **Hours:** 2 p.m. **Admission:** Free **Phone:** (201) 635-6629 **Location:** Great Swamp Outdoor Education Center, Southern Boulevard, Chatham

10 CAROLINE FOSTER BIRTHDAY CELEBRATION Celebrate the birthday of the former owner of Fosterfields Living Historical Farm with tea, cake, and 19th century games. **Hours:** 1 to 4 p.m. **Admission:** Free. **Phone:** (201) 326-7645 **Location:** Fosterfields Living Historical Farm, Kahdena Road, Morristown

10 WILDLIFE SUNDAY Join in a celebration of New Jersey wildlife with children's crafts, displays, demonstrations, bird-banding and an award ceremony for those who "Build a Better Birdhouse." **Hours:** 1 to 5 p.m. **Admission:** Free **Phone:** (908) 789-3670 **Location:** Trailside Nature and Science Center, Coles Avenue and New Providence Road, Mountainside

13 BASKETRY Come learn the tips and tricks of basket weaving from nature's bounty of willow, grape and honeysuckle vines. For adults only. **Hours:** 7 to 9 p.m. **Admission:** $10 **Phone:** (908) 946-9694 **Location:** Kateri Environmental Education Center, Conover Road, Wickatunk

13 BUTTERFLY WALK (Every Wednesday through May 18) Enjoy up to 100 different species of butterflies which make their home in Cape May County in the spring. **Hours:** 10 a.m. to noon **Admission:** $7 (includes Cape May Birding Attack Pack) **Phone:** (609) 884-2736 **Location:** Cape May Bird Observatory, E. Lake Drive, Cape May Point

16 FESTIVAL OF THE SKIES This day is devoted to exploring things that fly through demonstrations and discussions of kites, rockets, balloons, model airplanes and more. **Hours:** 11 a.m. to 5 p.m. **Admission:** Free **Phone:** (908) 542-1642 **Location:** Dorbrook Recreation Area, Route 537, Colts Neck

16 LOON OUTING See several species of loons in their full breeding plumage on this spring outing at their South Jersey wintering grounds. Also enjoy other lingering winter waterfowl including oldsquaw, brant, horned grebe, mergansers, bufflehead and common goldeneye. **Hours:** 10 a.m. to 3 p.m. **Admission:** $10 **Phone:** (609) 884-2736 **Location:** Cape May Bird Observatory, E. Lake Drive, Cape May Point

16 SHAD BAKE Find out the different ways to prepare shad — including smoked, pickled and baked — and get a free taste. **Hours:** 10 a.m. to 3 p.m. **Admission:** Free **Phone:** (201) 915-3409 **Location:** Liberty State Park Interpretive Center, Freedom Way, Jersey City

17 EARTH DAY NEW JERSEY'S WALK-A-THON Celebrate Earth Day with a walk-a-thon at Liberty State Park. The event will help educate the public on environmental matters as well as raise money for environmental and community nonprofit organizations. **Hours:** 10 a.m. **Admission:** $1 per mile donation **Phone:** (201) 748-2114 **Location:** Liberty State Park, Jersey City

23 DINOSAURS AND EXTINCTION Celebrate Earth Day in a different way this year by exploring our past through games and displays about the great dinosaurs and other animals that have become extinct. **Hours:** 1 to 4 p.m. **Admission:** Free **Phone:** (201) 635-6629 **Location:** Great Swamp Outdoor Education Center, Southern Boulevard, Chatham

23-24 SHAD FESTIVAL Celebrate the return of shad to the Delaware River with arts and crafts, live entertainment, and food at the Lambertville's 13th Annual Shad Festival. **Hours:** 12:30 to 5:30 p.m. **Admission:** Free **Phone:** (609) 397-0055 **Location:** Bridge and Union streets, Lambertville

24 CANOE OUTING Bring your canoes to Blairstown for a trip down the scenic Paulinskill River. **Hours:** 10 a.m. **Admission:** Free **Phone:** (908) 852-0597 **Location:** Blairstown Grammar School, Route 94, Blairstown

24 OUTDOOR ADVENTURE EXPO The Monmouth County Park System is sponsoring an outdoor show featuring a variety of equipment for camping, canoeing, rock climbing, kayaking, caving and other outdoor activities. **Hours:** Call for information **Admission:** Free **Phone:** (908) 842-4000 **Location:** Turkey Swamp Park, Georgia Road, Freehold Township

30 BUTTERFLY WATCHING: WORKSHOP & FIELD TRIP This indoor workshop covers the basics of butterfly watching including field guides, binoculars, attracting butterflies to your backyard, helpful photography hints, an overview of different families, identification tips and the hows, whens and wheres to look for butterflies. This program is followed by a field trip to spot such species as orangetip, elfins and more. **Hours:** 9 a.m. to 3 p.m. **Admission:** $15 **Phone:** (609) 884-2736 **Location:** Cape May Bird Observatory, E. Lake Drive, Cape May Point

30 GARDENERS' DAY Visit Deep Cut Gardens and buy your perennials, herbs and small trees for spring planting. **Hours:** 9 a.m. to 5 p.m. **Admission:** Free **Phone:** (609) 842-4000 **Location:** Deep Cut Gardens, Red Hill Road, Middletown

30 SCOTTISH AND IRISH MUSIC FESTIVAL Andy Stewart and Gerry O'Beirne present a musical program of Scottish and Irish music. **Hours:** 8 p.m. **Admission:** $15 **Phone:** (609) 358-6513 **Location:** Appel Farm Art & Music Center, Elmer-Shirley Road, Elmer

30 WOOL DAYS (also May 1) Costumed interpreters, an old-fashioned sheep shearer and boarder collies will demonstrate old-time sheep herding and related activities at Longstreet Farm, a replica of an 1890s working farm. **Hours:** Call for information **Admission:** Free **Phone:** (908) 842-4000 **Location:** Longstreet Farm, Holmdel Park, Longstreet Road, Holmdel

30-31 KITE DAYS A family day celebrating spring includes food, music, wagon rides, pony rides, orchard tours, and kite making and flying. **Hours:** 9 a.m. to 5 p.m. **Admission:** $3 **Phone:** (609) 924-2310 **Location:** Terhune Orchards, Cold Soil Road, Princeton

30 N.J. BOTANICAL GARDENS ANNUAL PLANT SALE Buy locally-grown annuals, perennials, shrubs and rhododendrons and learn more about your garden at this annual event. **Hours:** 10 a.m. to 4 p.m. **Admission:** Free **Phone:** (201) 962-6527 **Location:** Skylands Manor, Carriage House, Ringwood

May

1 PET FAIR Free pony rides, K-9 demonstrations, stray pet contests and more will be featured at this fair for all pet-lovers. **Hours:** 1 to 5 p.m. **Admission:** $1 donation **Phone:** (908) 789-3670 **Location:** Trailside Nature and Science Center, Coles Avenue and New Providence Road, Mountainside

1 SPRING EDIBLES Want to learn which plants in your backyard woods are tasty and safe to eat? Come find out through slides on plant identification, a walk to search for edible plants and a "taste" display of prepared foods. **Hours:** 1 to 4 p.m. **Admission:** Free **Phone:** (201) 635-6629 **Location:** Great Swamp Outdoor Education Center, Southern Boulevard, Chatham

1 SUNRISE RUN-BIKE-RUN Join or watch the competition in a transition race consisting of a four-mile run, a 13-mile bike ride and a second, four-mile run. **Hours:** 8 a.m. **Admission:** call for information **Phone:** (908) 842-4000 **Location:** Seven Presidents Ocean Front Park, Ocean Boulevard, Long Branch

7 25TH ANNUAL MANASQUAN RIVER CANOE RACE An eight-mile race along the Manasquan River is a favorite for both beginner and experienced paddlers. Event includes solo canoe, men's tandem, women's tandem, family tandem and kayaking. **Hours:** 8 a.m. **Admission:** Call for information **Phone:** (908) 842-4000 **Location:** Iron Bridge, Howell Park Golf Course, Preventorium Road, Howell

7 MAY FAIR Knights, nymphs and gnomes turn Kateri Woods into a fairyland during this celebration of spring. Families can participate in singing, Maypole dancing, and field games as well as listen to continuous folk music on an outdoor stage. **Hours:** 1 to 5 p.m. **Admission:** $6 **Phone:** (908) 946-9694 **Location:** Kateri Environmental Education Center, Conover Road, Wickatunk

7 THE ANIMALS WE ARE AFRAID OF Want to overcome your fear of spiders? Come and meet spiders, snakes and bats at this presentation on "scary" animals. **Hours:** 2 p.m. **Admission:** Free **Phone:** (201) 635-6629 **Location:** Great Swamp Outdoor Education Center, Southern Boulevard, Chatham

7-8 ART SHOW AND SALE More than 50 artists display and sell their wood carvings, paintings, sculptures, etchings and drawings of North American wildlife at this annual event. Enjoy live demonstrations on techniques and bid at a silent auction. **Hours:** 10 a.m. to 5:30 p.m. **Admission:** Free **Phone:** (908) 766-2489 **Location:** Environmental Education Center, Lord Stirling Road, Basking Ridge

7-8 CRABAPPLE FESTIVAL Tour the Skylands Manor House and see floral arrangements from local gardening clubs as well as artwork from local schools. **Hours:** Noon to 4 p.m. **Admission:** Free **Phone:** (201) 962-7527 **Location:** Skylands Manor, Ringwood

7-8 MOTHER'S DAY WEEKEND CELEBRATION Complimentary wine tasting, wine cellar tours, food and a free gift for mothers are all part of this Mother's Day celebration. **Hours:** 11 a.m. to 5 p.m. **Admission:** Free **Phone:** (908) 475-3671 **Location:** Four Sisters Winery, Route 519, Belvidere

13-15 POW WOW This Ninth Annual Pow Wow and Festival is a weekend celebration featuring Native American drumming, singing, dancing and story telling. Also, sample traditional Native American cuisine and view and purchase beautiful handmade crafts. **Hours:** 9 a.m. to 10 p.m. (May 13); 10 a.m. to 10 p.m. (May 14-15) **Admission:** $1 to $5 **Phone:** (908) 525-0066 **Location:** Old Bridge Ice Arena, Route 516, Old Bridge

14 AFRICA'S BOTSWANA Learn about Botswana through the eyes of a world traveler and film maker. **Hours:** 2 p.m. **Admission:** Free **Phone:** (201) 635-6629 **Location:** Great Swamp Outdoor Education Center, Southern Boulevard, Chatham

14 CAPE MAY CENTURY RUN Join Pat Sutton in this annual event to spot as many species of birds as you can in the Cape May area in one day. **Hours:** 7 a.m. to 2 p.m. **Admission:** $1 donation per bird **Phone:** (609) 884-2736 **Location:** Cape May Bird Observatory, E. Lake Drive, Cape May Point

14 CREEPING CRAWLING CREATURES Touch live reptiles and pet other animals during this program. **Hours:** Call for information **Admission:** $3.50 **Phone:** (201) 460-1700 **Location:** Hackensack Meadowlands Development Commission Environment Center, DeKorte Park Plaza, Lyndhurst

14 SHEEP SHEARING Sheep shearers demonstrate the art of their craft. **Hours:** 10 a.m. to 3 p.m. **Admission:** Adults, $3; children and senior citizens, $2 **Phone:** (201) 326-7645 **Location:** Fosterfields Living Historical Farm, Kahdena Road, Morristown.

14 SPRING FLOWER WALK See the many flowering plants that bloom along the Paulinskill Valley Trail. **Hours:** 10 a.m. **Admission:** Free **Phone:** (908) 852-0597 **Location:** Paulinskill Valley Trail, Route 519, Halsey

15 BIRD BANDING Certified bird-bander Al Lubchansky demonstrates his trade by netting birds, recording scientific data, affixing identification bracelets and releasing the birds in this informative program. **Hours:** Call for information **Admission:** $4 **Phone:** (908) 946-9694 **Location:** Kateri Environmental Education Center, Conover Road, Wickatunk

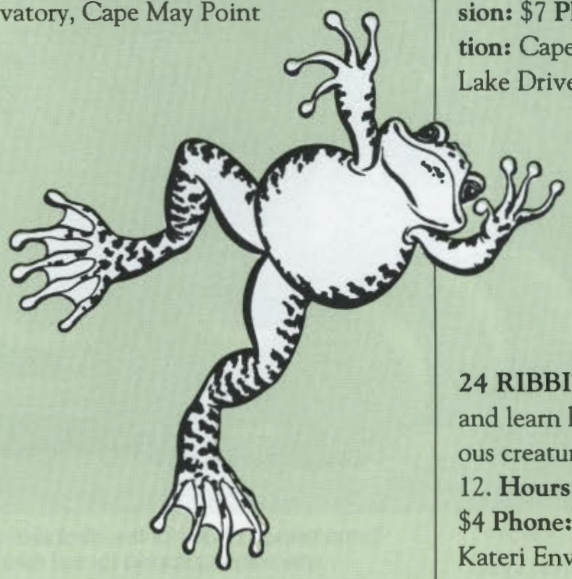
15 SPRING GARDEN FAIR AND PLANT SALE Attend a great sale and display on gardening. Soil test kits will be available as well as unusual perennials, annuals, house plants and shrubbery. **Hours:** noon to 5 p.m. **Admission:** $1 donation **Phone:** (908) 789-7810 **Location:** Trailside Nature and Science Center, Coles Avenue and New Providence Road, Mountainside

15 THOMPSON PARK DAY Climb a wall, pet a snake, or take a wagon ride during Thompson Park Day. Also on hand will be an arts and crafts sale, pony rides, paint-a-face, food, entertainment and more. **Hours:** 11 a.m. to 5 p.m. **Admission:** Free **Phone:** (908) 842-4000 **Location:** Thompson Park, Newman Springs Road, Lincroft

16 A BIRD'S EYE VIEW OF NATURE (through June 30) This one-person show by pilot/photographer Owen Kanzler provides aerial photographs of New Jersey's disappearing natural and agricultural environment taken between 1978 and 1993. **Hours:** 9 a.m. to 5 p.m. **Admission:** Free **Phone:** (908) 766-2489 **Location:** Environmental Education Center, Lord Stirling Road, Basking Ridge

17 SPRING BIRD HIKE (Also June 5) Identify bird species that appear in spring during leisurely hikes along the Palisades. **Hours:** 10 a.m. **Admission:** Free **Phone:** (201) 768-1360 **Location:** Palisades Interstate Park, Alpine

20-22 CAPE MAY SPRING WEEKEND Witness the annual spring shorebird migration as species such as warblers, rails, hawks, herons, and agrees stop in Cape May to feed on the eggs of horseshoe crabs. **Hours:** Call for information **Admission:** $240 with food and lodging or $85 without food or lodging (preregistration required) **Phone:** (609) 884-2736 **Location:** Cape May Bird Observatory, Cape May Point



21 FLY TYING DEMONSTRATION Join Trout Unlimited as club members demonstrate the fine art of how to tie a fish lure for the fly fishing rod. **Hours:** noon to 3 p.m. **Admission:** Free **Phone:** (201) 635-6629 **Location:** Great Swamp Outdoor Education Center, Southern Boulevard, Chatham

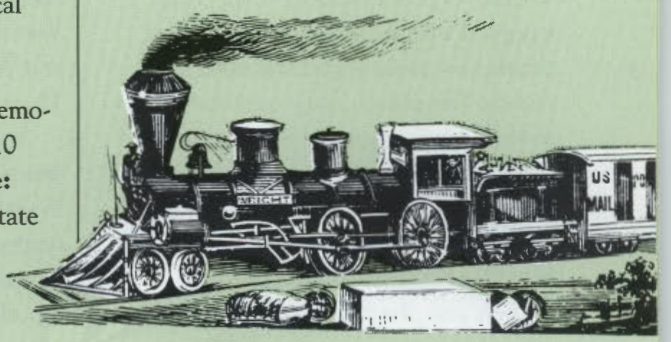
22 CROQUET ON THE LAWN Play croquet as part of a historical interpretation by costumed guides. **Hours:** 1:30 to 4 p.m. **Admission:** Adults, $3; children and senior citizens, $2 **Phone:** (201) 326-7645 **Location:** Fosterfields Living Historical Farm, Kahdena Road, Morristown.

22 RAIL EXPO Collect railroad memorabilia at this spring event. **Hours:** 10 a.m. to 5 p.m. **Admission:** $5 **Phone:** (201) 915-3400 **Location:** Liberty State Park, CRRNJ Terminal, Jersey City

23-28 SHOREBIRDS ON THE DELAWARE BAYSHORE Witness the world-famous phenomenon when millions of northbound shorebirds, including red knots, ruddy turnstones, sanderlings, and semi-palmated sandpipers, gather on the Delaware Bay beaches to feed on horseshoe crab eggs before migrating to their arctic tundra breeding grounds. **Hours:** 9 to 11 a.m. **Admission:** $7 **Phone:** (609) 884-2736 **Location:** Cape May Bird Observatory, E. Lake Drive, Cape May Point

24 RIBBIT Go frogging at Kateri Pond and learn how to handle these amphibious creatures. For children ages five to 12. **Hours:** 4 to 5:30 p.m. **Admission:** $4 **Phone:** (908) 946-9694 **Location:** Kateri Environmental Education Center, Conover Road, Wickatunk

28-30 AMERICAN INDIAN ARTS FESTIVAL Join 150 artists from 50 different tribal nations as they compete for awards for traditional and contemporary works. Musicians, dancers and storytellers will perform, and basket weaving, pottery, beading, flint knapping and sand painting demonstrations will be held. In addition, live animals such as wolves, birds of prey and buffalo will be on hand. **Hours:** 11 a.m. to 6 p.m. **Ad-**



Trees Make Good Business

Small businesses in New Jersey are finding a new way to grow under a state grants program.

Last fall, the Small Business Administration (SBA) awarded $904,889 in grants to 85 communities and nonprofit organizations throughout the state to hire small businesses to plant and maintain trees on public lands. These grants are matched with funds from participating agencies, creating an important working relationship between the economy and the environment.

More than 5,000 trees are expected to be planted as a result of these fall grants, providing such long-term benefits as cleansing the air, reducing erosion, giving sanctuary to wildlife, decreasing energy usage and contributing to the quality of life.

Environmental education will be a key component for some of the recipients. Eatontown's Meadowbrook School will incorporate an outdoor education site where children can be taught hands-on environmental curriculum. The Greater Newark Conservancy's Urban Greenshade program will hold tree planting demonstrations to help introduce inner city residents to the benefits of shade trees.

New Jersey has been awarded more than $1.8 million dollars in federal funds for the program since it began in 1991. As a result, 180 communities and organizations statewide have planted more than 10,000 trees.

The fall grant awards, which will be matched by 25 or 45 percent contributions from communities and nonprofit agencies, are listed below by county.

Atlantic	$ 10,000
Bergen	86,735
Burlington	67,988
Camden	29,159
Cape May	27,203
Cumberland	N/A
Essex	47,522
Gloucester	7,425
Hudson	42,145
Hunterdon	6,275
Mercer	75,823
Middlesex	15,136
Monmouth	68,415
Morris	124,872
Ocean	53,471
Passaic	13,062
Salem	9,950
Somerset	82,687
Sussex	9,277
Union	89,004
Warren	38,740

"Springtime Friends" is the art featured on one of Carol Decker's collector plates.

Collector Plates Feature Backyard Wildlife

A pair of cardinals engaged in the courtship feeding ritual in a garden is the first of six collector plates by renowned New Jersey wildlife artist Carol Decker being sold by the Bradford Exchange, a nationwide distributor of limited edition collector plates.

Decker, a longtime artistic contributor to *New Jersey Outdoors*, was commissioned by the Bradford Exchange (1-800-682-7590) for the "Nature's Garden" collection. The series, a panoramic view of a backyard garden, examines the plants and wildlife that can be found in the yard.

In addition to the cardinal plate entitled "Springtime Friends," three others plates are currently available. These include "A Morning Splash," which features blue jays at a birdbath; "Flurry of Activity," which shows finches at a bird feeder, and "Hanging Around," which depicts doves and robins on a hanging bird feeder. Other plates which will be available in the near future include humming birds and wildlife around a backyard pond.

Decker received the Woman of Distinction Award from the Girl Scouts Council of America in 1992 for her committment to the environment. She has also been honored by the National Wild Turkey Federation, the Salmagundi Club and the New Jersey Wings and Waterfowl Art Show.

Roundup by Denise Mikics of the DEPE Office of Communications and Eric Gonzalez, a journalism intern from Trenton State College

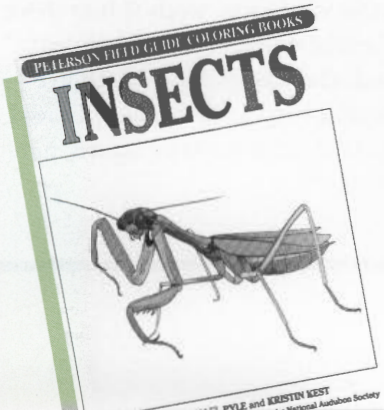
Bookshelf

Cleaner Times — A Clean Streets/Clean Beaches Curriculum, published by the New Jersey Department of Environmental Protection, Division of Solid Waste Management, and the United States Environmental Protection Agency, Region 2, is an educational curriculum for grades 4 to 7 to teach children that street litter can end up on beaches and in waterways through storm drains. The curriculum includes a video, student newspaper and teacher's guide. *Available for free. To order or for more information, call Peter Brandt at the USEPA at (212) 264-9338 or Sandra Huber at the NJDEPE at (609) 530-8593.*

Conservation Directory, edited by Rue Gordon, published by the National Wildlife Federation, is an annual, comprehensive listing of organizations, agencies, and officials involved in natural resource use and management. The 1994 edition provides 16,000 individual contacts as well as more than 2,000 organization listings. *Cost is $20. For more information or to order, call the National Wildlife Federation at (800) 432-6564.*

Cooking the Shore Catch, by R. Marilyn Schmidt, published by Barnegat Light Press, is a collection of favorite recipes for fish caught at the Jersey Shore. This illustrated, spiral-bound cookbook features favorite recipes from old-time anglers as well as from present-day seafood lovers. A great addition to the library of cooking enthusiasts. *Cost is $8.95. Available at bookstores and from Barnegat Light Press. For more information, call Barnegat Light Press at (609) 494-3154.*

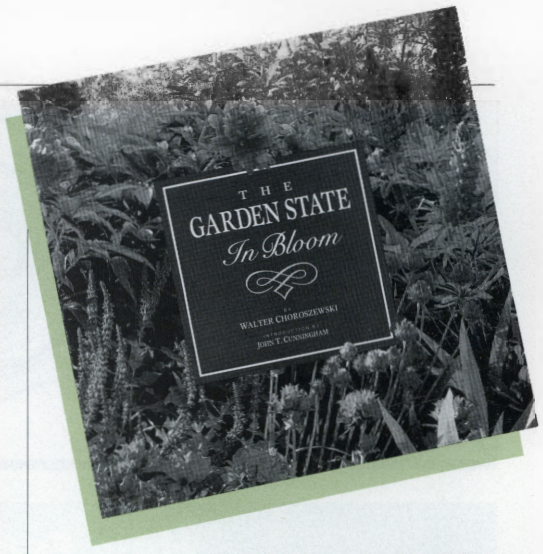
Discovering and Exploring New Jersey's Fishing Streams and the Delaware River, edited and published by Steve Perrone, is a fishing guide for freshwater anglers in New Jersey and Pennsylvania. This expanded edition has more than articles on fishing in streams and the Delaware River. Fishing techniques, stream locations, prime fishing seasons and other important information are provided in this guide, which comes complete with maps and photographs. *Cost is $10.95. Available at bookstores. For more information, call New Jersey Sportsmen's Guides at (609) 665-8350.*



New Jersey Trivia, by Al and Shirley Menendez, published by Rutledge Hill Press, is a compilation of everything you ever wanted to know about New Jersey and were afraid to ask. Explore the geography, leisure time activities, flora and fauna of the Garden State presented in a question and answer format. Learn more about the famous people who call New Jersey home including Thomas Edison, Woodrow Wilson, Whitney Houston, Paul Robeson, Walter Schirra, Frank Sinatra and Meryl Streep. *Cost is $5.95. Available at bookstores. For more information, call Rutledge Hill Press at (800) 234-4234.*

One Square Mile on the Atlantic Coast, by John R. Quinn, published by Walker Publishing Company, Inc., captures the essence of the Jersey Shore through this artist's sketchbook drawings and text. The second volume in "The America in Microcosm" series, this book describes coastal habitats and marine life and captures the beauty of one "ordinary" square mile in New Jersey. *Cost is $17.95. Available at bookstores. For more information, call Walker and Company at (212) 727-8300.*

Peterson Field Guide Coloring Book: Insects, by Robert Michael Pyle, published by Houghton Mifflin Company, is a unique way for children to study insects through coloring. The book contains pictures and stories on 200 of the most common and colorful insects of America, from the harlequin bug to the bumble bee. Illustrated by Kristin Kest. *Cost is $4.95. Available at bookstores. For more information, call the Houghton Mifflin Company at (800) 225-3362.*



The Birds of Cape May, by David Sibley, published by the New Jersey Audubon Society, is a look at the changing bird species of Cape May County, one of the premier bird watching spots in the Northern Hemisphere. The book examines new species that have been attracted to the area, such as the Mongolian plover and green-tailed towhee, as well as other species that have disappeared from the region, including the sedge wren, the grasshopper sparrow and the Henslow's sparrow. *Cost is $9.95. Available at New Jersey Audubon Society Centers. For more information, call (609) 884-2736.*

The Garden State in Bloom, by Walter Choroszewski, published by Aesthetic Press, Inc., is a look at more than 60 public and private gardens in New Jersey by a frequent *New Jersey Outdoors* contributor. This book features expansive arboretums, intimate cottage gardens, showcase display gardens and estates from New Jersey's golden age. *Cost is $37. Available at bookstores. For more information, call Aesthetic Press at (908) 369-3777.*

Wildlife Survivors: The Flora and Fauna of Tomorrow, by John R. Quinn, published by TAB/McGraw-Hill, Inc., is a study of the hardy organisms that will likely survive the human impact on the world. This book examines the environmental changes taking place in North America today and what plants and animals are thriving in this rapidly evolving natural world. *Costs are $21.95 for hardcover and $12.95 for paperback. Available in bookstores. For more information, call TAB/McGraw-Hill at (800) 822-8138.*

Explorer

Hey, Explorer!

Home Is Where Nature Lives

Hey Explorer! Have you ever thought about the number of living things that you encounter every day?

Besides friends, family and other students, you probably talk to or pass by many other people, including bus drivers, school staff, neighbors, store clerks and even strangers. You also may encounter all types of wildlife — from birds flying overhead and squirrels scampering across the lawn to insects crawling on the pavement, and spiders building a web in the corner of a room. Even trees, weeds and indoor plants add to the variety of living things existing around you.

All living things have the same needs as you do to stay alive. Think about it — what do you really need to survive?

Every living thing requires water, food, shelter and space. While you conveniently get water from the faucet, food from the refrigerator, and shelter and space in your home and surrounding community, other living things must search for different ways to meet their needs.

Within your community, around your home and school, and even inside buildings, many living things, like yourself, are attempting to fill their basic needs for survival. Isn't it interesting to know that they all share the same place that you call "home"?

by Tanya Oznowich, supervisor of the Environmental Education Unit at the Department of Environmental Protection and Energy

Think About It

How are the basic needs of other living things met? Find the answers by asking questions, reading or discussing some of these living things with family, teachers and classmates. Consider the needs of:

- Robins
- Red maple trees
- Gray squirrels
- Garter snakes
- White pine trees
- Crows
- Earthworms
- Raccoons
- Grasshoppers

Want to Learn More?

There are many places in New Jersey called "interpretive centers." The staff at these centers, located in parks and forests, teach visitors about the relationships between humans and other livings things which live — or once lived — in that area. To read more about interpretive centers, turn to page 9.

Explore Nature in Your Neighborhood

Find a convenient place outdoors near your home or school. Select a site where both human and natural activities can be seen together (for example, a field around an office building or a stream flowing by a parking lot).

You should visit this site as least four times during the upcoming year, preferably as each new season begins. The purpose of each visit is to discover living things, or evidence of their existence, in the same area that you call "home" throughout the year.

Use the activity sheet provided below to record your observations and thoughts (make a photocopy for each season). You may also take a clipboard, pencils, paper, crayons, binoculars, a portable shovel, a rake and a lens to help you find or draw plants and wildlife. Dress for the weather and bring something to sit on, allowing at least one hour for your visit. For each new trip, bring your old work sheets.

Wouldn't it be fun to compare what you find with another Explorer in New Jersey? Send us your information, and we'll exchange your information with that of another interested Explorer. Mail to: DEPE, Environmental Education Unit, CN 402, Trenton, NJ 08625-0402.

Seasonal Sightings Activity Chart

Date:

Time:

Season:

Site Description:

Weather Conditions:

Sounds heard:

Select one plant and two trees of different types.
On a separate piece of paper for each, describe or draw:

- ❑ Leaf shape/color
- ❑ Bark texture/color
- ❑ Buds or flowers
- ❑ Height and shape
- ❑ Odors
- ❑ Seeds/nuts/fruits
- ❑ Roots/grass/ground
- ❑ Signs of animal activity
- ❑ Signs of human activity

Animals observed and at what location(s):
(Example: Crows in the sky, toads in the leaves)

Animal signs found and at what location(s):
(Examples: Feather in sand, nest in the roof eaves)

On a separate piece of paper, note:

- ❑ What signs of humans are at this site?
- ❑ What changes have occurred, if any, since your last visit?
- ❑ What changes, if any, do you predict will occur before your next visit?
- ❑ What do you enjoy and appreciate about this site today?
- ❑ What are your concerns about this site?

Wildlife in New Jersey

The Red-headed Woodpecker

The red-headed woodpecker is one of New Jersey's most distinctive birds with its strong contrasts of red, white and black. While it is listed as a threatened species in the state, there may soon be more of them around — immortalized on a new license plate designed to raise money for wildlife conservation.

The new plate features the woodpecker perched on a tree with a splash of green leaves at the bottom. The plates cost $50, and more than 80 percent of the proceeds raised will go directly to the Division of Fish, Game and Wildlife's Endangered and Nongame Species Program to help save threatened and endangered species in the state.

The red-headed woodpecker, *Melanerpes erythrocephalus*, is about the size of a robin, measuring 8.5 inches long with a wing span of 17 inches. Unlike many bird species, the adult male and female are identical in appearance. In flight, the entire back half of the bird appears white because of patches of the color on the outstretched wings and rump. The young birds also have the white patches on their wings and rump, but they are buffy brown on the head, throat and back.

There is only one other North American woodpecker with a completely red head and throat — the red-breasted sapsucker found in the western part of the continent.

Red-headed woodpeckers prefer to live in open forests. They can be found in mature woods featuring large trees with a closed canopy and sparse ground vegetation or park-like areas in groves of trees where plants have been cut or lawn maintained. They also use forested areas which have been opened up by fire or selective cutting, and areas of dead and dying trees created by floods or fires.

Since acorns and nuts are important winter foods, red-headed woodpeckers usually live in forests where these nut-producing trees can be found.

The diet of these woodpeckers is as varied as their methods of feeding. They will eat animal and plant matter, depending on what is available during the season. While they generally eat ants and beetles, they also feed on grasshoppers, crickets, moths, caterpillars and spiders. These birds often eat on the ground, but they also glean insects off of bark and take fruit and berries from trees and shrubs.

With the help of the Wildlife Conservation plate, New Jersey hopes to revive the red-headed woodpecker — and other endangered and threatened species in the state.

The woodpeckers have also been observed fly-catching, swooping down from a perch to catch flying insects. One naturalist also discovered a red-headed woodpecker storing live grasshoppers in a crack in a fence post. More than 100 live grasshoppers were wedged so tightly they could not escape. The bird used this store of insects throughout the season, a practice farmers report having seen on several occasions.

The red-headed woodpecker also stores acorns and beech and hickory nuts in existing holes and cavities in trees for use during the winter. The availability of these winter foods is believed to influence whether the birds will migrate.

The woodpecker uses its long, narrow beak for several "pecking" purposes — from foraging for insects in trees, to hollowing out a nest, to attracting a mate by "drumming" on the side of a tree.

The nesting season for this species begins in May in New Jersey. Nest cavities are usually excavated in large, dead trees or limbs. Red-headed woodpeckers appear to prefer locations without bark that can provide vertical openings.

It takes one to two weeks for the bird to hollow out its nest. The entrance hole is usually about two inches in diameter, and the inner cavity averages 11 inches deep and four inches wide. The bottom of the cavity is lined with fine wood chips.

The female lays an average of five eggs, which are incubated by both the male and the female. Hatching occurs in 14 days, and the young are fed by both adults. The chicks are able to leave the nest at approximately three weeks of age. Red-headed woodpeckers will usually raise two broods in a single breeding season.

The red-headed woodpecker is listed as a threatened species in New Jersey, and its survival here may be in danger if conditions continue to deteriorate. The reason for this decline has been the loss of forested habitat in the late 19th and early 20th centuries as well as the advent of the automobile and the increase in roads and traffic. This woodpecker's habit of feeding on the ground and swooping across roads have made it vulnerable to vehicle collisions. In 1924, 39 dead red-headed woodpeckers were found on a 211-mile stretch of gravel road in Iowa. And this was before the days of bumper-to-bumper traffic traveling at 55 miles per hour.

With the help of the Wildlife Conservation plate, New Jersey hopes to revive the red-headed woodpecker — and other endangered and threatened species in the state. For more information or to get an application, call 1-800-W-PLATES.

by Jim Sciascia, a principal nongame zoologist with the DEPE's Division of Fish, Game and Wildlife

WATERCOLOR/GOUACHE BY NEAL MACDONALD

The Smokey Bear Statewide Poster Contest winner by Charlton Palmer, a senior at Middlesex County Vocational High School.

In Next Season's Issue

Slithering with Snakes in the Pine Barrens
Discovering the Crafts of the Barnegat Bay
Wind Surfing on New Jersey Waters
Growing Giant Summer Vegetables