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NEW JERSEY

Outdoors

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Winter 1994



Explore the Winter Wilderness with Snowshoes • Discover the Morris Canal
Visit a Winter Garden Wonderland • Follow the Legacy of a Hunting Gun
Learn About the Eastern Coyote • Try Your Hand at Ice Fishing

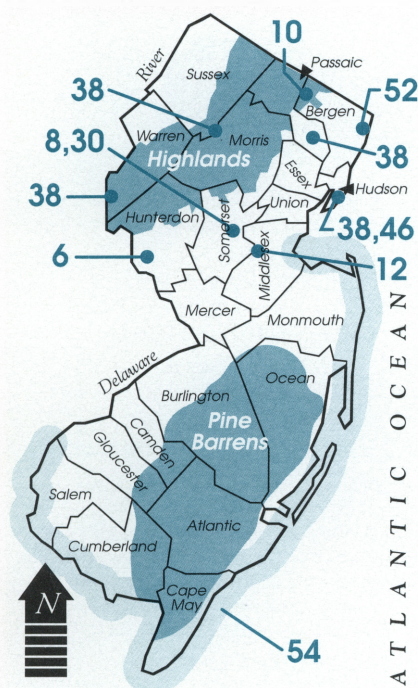


Single snowflakes perch
on top of moss and
lichen at the Delaware
Water Gap.

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Photo by Rich King

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Editorials



Jim Florio
Governor

Message from the Governor

For more than 300 years, New Jerseyans have enjoyed the wonders of the state's Highlands. Spanning a 1,000 square miles of spectacular landscape from the Hudson to the Delaware rivers, it stretches away from our metropolitan areas like a magnificent oasis. And like an oasis, it serves as the main source of pure drinking water for four million state residents.

The Highlands should be a place where we all join hands — Democrats and Republicans — to work together the way our ancestors did when they carved towns and roads out of the wilderness. Now we must work together to save the remaining wilderness by developing a plan to preserve this precious resource, similar to efforts we made to safeguard the Jersey Shore and the Pinelands.

The Highlands has been a critical resource for New Jersey for generations and we owe it to future generations to preserve it. We must continue our efforts to bring people together to develop a regional protection plan. And we must act to buy the land we want to save without delay, identifying it before it is lost to development.

We also have to continue to forge a federal-state partnership to encourage and speed up existing federal resources and create a national forest preserve within the Highlands. As the first step in that process, U.S. Interior Secretary Bruce Babbitt this fall announced a \$700,000 federal grant to add acreage to our current state forest lands in the Highlands.

Since 1990, we have dedicated more than \$6 million in Green Acres funding to preserve 2,000 acres in the Highlands and as of December another \$14.1 million appropriation was pending before the Legislature to acquire more acreage in the region for conservation and recreation. Now is the time to save this great resource for our children and grandchildren and ensure a better future where wise planning compliments economic growth.



Jeanne Fox
Acting Commissioner

Message from the Commissioner

"A journey of a thousand miles," according to a 6th Century Chinese philosopher, "must begin with a single step."

In the thousand miles of forests, mountains and lakes that make up the Highlands, New Jersey has already taken several steps to preserve the area that is home to 23 endangered species and a main source of drinking water for much of the state. But while we have been moving steadily forward, there is still lots of work to be done.

This fall, we identified more than \$75 million in Green Acres grants and loans to start us on our way in the Highlands and across the state. If approved by the Legislature, the largest portion — \$6 million — will be used to purchase 2,870 additional acres in the Highlands including woodlands in Morris County and a wooded ridge and forest stream in Passaic County.

But this money will also save other precious resources. A total of 135 projects will be funded statewide this year, half of them in urban areas. Whether it is a "Fisherman's Cove" in Manasquan, a new park in Trenton, or a municipal boat ramp in Brigantine, funds have been dedicated to projects with the most environmental significance and recreational potential.

All totalled, the latest round of Green Acres funding will allow us to convert 22,300 acres to open space in New Jersey, adding to the 310,000 acres saved through state bond issues since 1961. But that is a small drop in the bucket when you consider the state comprises 8,719 square miles of land and water. The journey to preserve our precious natural resources must continue — one step at a time.

State of New Jersey
Jim Florio
Governor



Department of Environmental Protection
and Energy

Jeanne Fox
Acting Commissioner

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Acting Administrator, Office of Publications

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

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Mailbox

Crazy for Quilts

I have been a subscriber to *New Jersey Outdoors* for 25 years. I am so pleased to see the article, "Quilts — Uncover a Rich Patchwork of History," by Dory Devlin (NJO, Summer 1993). I am a quilter, and I enjoy the history of early American family life which is uncovered when we discover antique quilts.

I am also an avid outdoors person. Our state has it all — mountains, little rivers, the Pine Barrens, and beaches. All our choices are so close, and we can enjoy them often.

Norma McAfee
Collingswood

Searching for Bats

I have enjoyed your magazine for quite some time now, but never as much as I have enjoyed your most recent issue, Fall 1993.

I am particularly interested in the article on bat conservation and protection. I am a caver and run across bats all the time. I find them fascinating. I am a science teacher by trade and always try to instill upon my students the importance of bats to the environment.

I may wish to visit the mine you mentioned in the article ("Going to Bat for a Misunderstood Mammal," NJO, Fall 1993) sometime in late spring or early summer with some of my more advanced students who have also shown an interest in bats and their importance.

I am aware that a hibernaculum is off limits during the hibernating season because if the bats are inadvertently awakened, they can run out of stored energy and starve to death even before they wake for spring/summer feeding.

William B. Vis
Old Bridge

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.

Editor's Note: Rick Dutko, a senior nongame zoologist with the Division of Parks and Forestry, says the Morris County bat hibernaculum is on private property and is closed to the public. But there are other possibilities for you and your students. According to Dutko, bats often roost in the summer in local neighborhood buildings like church steeples, nature centers and parks. Other resources to find out about local bat populations may include animal control officers, local historic preservation offices, and birding groups.

Standing Up for Squirrels

I just received the Fall issue of *New Jersey Outdoors*. I enjoyed reading the article on "A Healing Touch for Animals," which was about a "wildlife hospital." I also enjoyed the articles "Going to Bat for a Misunderstood Mammal," and "The (Jersey) Devil is in the Details."

I did not enjoy the article "Get Ready to Go Squirrel Hunting." I happen to enjoy watching the little creatures in my backyard. Their antics cheer me up when I might be feeling a little down. I certainly did not enjoy reading about hunting them and also did not appreciate the "recipe" listed.

Your magazine has always been very interesting and informative. The pictures are beautifully illustrated. But I certainly do not like reading anything about hunting . . . period.

Diane M. Zuppardo
Roselle Park

Editor's Note: New Jersey Outdoors is committed to covering all outdoor activities in the state — including wildlife conservation and hunting. Legal, regulated hunting is a legitimate and traditional use of wildlife. No species in the modern era has become endangered by sport hunting; indeed, the greatest threat to wildlife is from the loss of habitat. In fact, through monies generated from the sale of hunting and fishing licenses and taxes on related equipment, more than 200,000 acres of habitat have been preserved for all wildlife, including non-hunted species such as black bears, songbirds and tree frogs.

Sportsmen and women have also funded the restoration of beaver, striped bass, wild turkey and bobcat in the state. Although hunting may not appeal to all, people should be aware that hunting and conservation go hand in hand.

Highlands Map

I suggest that your "Story Locator" map, which appears on your table of contents page, be amended to include the New Jersey Highlands. This can be done in the same way that the Pine Barrens are depicted on the map.

Because of its myriad of natural resources and environmental value, the Highlands has lately been a subject of intense study by federal, state and private land conservation concerns. I believe its depiction on your map will make your readers more aware of its presence and, in the long run, will aid in the preservation of this important region.

John A. Denlinger
Piscataway

Editor's Note: The Highlands, a thousand square miles of mountains, streams and forests that stretches from the Hudson to the Delaware Rivers in northern New Jersey, will now be included on our Story Indicator map. Thanks for the suggestion.

Hunting Dog Trainer Dies

Richard Wolters, a highly regarded hunting dog trainer quoted in "Marks, Blinds and Falls: Testing Your Hunting Retriever" (NJO, Fall 1993), passed away in October. Wolters was a founding member of North American Hunting Retriever Association and the author of several books including *Water Dog* and *Gun Dog*.

Also, a clarification on the same story: a photo on page 45 of a retriever waiting for his water test inaccurately depicted the man standing at the water's edge. The man is a judge of the hunting retriever competition.

Not Just About Trout

No doubt somewhere you've spotted a bumper sticker that says "A bad day fishing is better than a good day at work." Well, that only tells half the story for New Jersey's 2,800 members of Trout Unlimited, a group that puts in a lot of good days of hard work to make sure that bad days of fishing are fewer and further between.

New Jersey's nine chapters of Trout Unlimited (TU) are part of an international organization of dedicated volunteers using sound scientific principles to promote quality trout and salmon fisheries for their intrinsic value and not necessarily their harvest. TU, which was formed in Michigan in 1959, today boasts 10,000 worldwide members and affiliates in such far-flung countries as Russia, Argentina, Japan, England, New Zealand and Spain. The 65,000 members of the 450 chapters in the United States alone work to protect free flowing rivers, wild trout, and the right of every citizen to fish in unpolluted, accessible waters.

Tom Lopezzo, who serves on TU's national Board of Directors and as chairman of the organization's New Jersey State Council, notes that TU's objectives "since the organization was formed include working with state fishery managers, water quality surveillance and habitat protection."

According to Lopezzo, TU's goals also include advocating integrated watershed management, good forestry and agricultural practices, and balanced land development. "We also work with the Division of Fish, Game and Wildlife's Bureau of Freshwater Fisheries to conserve, protect and restore cold water fisheries in New Jersey," Lopezzo says.

Members of New Jersey's TU chapters — North Jersey, Ken Lockwood, East Jersey, Hacklebarney, Ray Nierle South, Toms River, Central Jersey, Ernest Schwiebert, and Jersey Shore — don't just pay lip service to their organization's goals



Pete Westra fishes at the disabled access site on the Pequest River, which was developed by Trout Unlimited in conjunction with the New Jersey Division of Fish, Game and Wildlife.

and its mission to conserve, protect and restore fish habitats; they actively pursue it.

Rick Ege, vice president of the North Jersey chapter and a member of the Wildlife Conservation Corps since 1986, has fished many places around the country and notes that New Jersey has as much to offer as any of them. According to Ege, another of TU's objectives is to help people understand this fact. In addition,

he says, the ongoing efforts between the Division of Fish, Game and Wildlife and Trout Unlimited aim to help ensure that everyone has a chance to enjoy angling for trout in New Jersey's waters.

If they don't, it certainly won't be for lack of action on the part of New Jersey's TU chapters. The Toms River chapter recently donated \$2,000 towards the \$6,000 worth of electro-shocking, water



temperature and oxygen measuring equipment given by the State Council to the Bureau of Freshwater Fisheries. The equipment will be used to conduct research on the state's freshwater fish resources. Among its other activities, the Toms River chapter established and expanded a trout conservation area on — where else? — the Toms River.

The Hacklebarney chapter conducts

cleanups up along the South Branch of the Raritan River and organizes a "Kids Fishing Day" for foster children.

Various chapters work with planning boards, park commissions and other municipal and county agencies to protect trout habitats and are active in teaching a variety of courses throughout the state, including several in conjunction with the New Jersey School of Conservation's summer camp.

TU has an abiding interest in education. "The North Jersey chapter is proud of its

"We're significantly
more than
a fishing club.
We're primarily
a conservation
organization."

— Tom Lopezzo

ongoing youth education program," Ege says. Lopezzo agrees, saying, "We work closely with the 'Trout Shouters' at Hopatcong Middle School. These students were instrumental in having the brook trout declared New Jersey's state fish." Their teacher, Maryellen Soriano, he notes, was recognized at Trout Unlimited's 1993 national convention with the organization's Excellence in Education award.

The North Jersey chapter works hand-in-hand with the Division of Fish, Game and Wildlife to teach fly casting and other skills to neophyte anglers. It also helped make it possible for the physically disabled to enjoy this popular sport by building access ramps and railed wheelchair supports, such as one on the Pequest River, adjacent to the state's Pequest Trout Hatchery and Natural Resources Education Center.

The East Jersey chapter has been involved

with fishing education at Pequest since its inception, teaching a minimum of three workshops there annually. This group also participates actively in stream cleanups.

"Trout Unlimited's partnership with the Division of Fish, Game and Wildlife enhances the success of our management programs," says the division's Paul Tarlowe, a senior biologist at Pequest. "At Pequest, the involvement of the East Jersey and North Jersey chapters enables us to offer a broader range of programs to the public."

Several chapters are affiliated with groups such as the New Jersey Environmental Federation and the Federation of Sportsmen's Clubs, and some work closely with watershed associations. The Ken Lockwood chapter, for example, has been working with the South Branch Watershed Association on water testing and a macro-invertebrate study. The Central Jersey chapter works with the Musconetcong Watershed Association, while the East Jersey chapter is active in the Highlands Coalition.

While most TU projects are undertaken by individual chapters, Lopezzo reports that all nine New Jersey chapters are "working together on the South Branch Project, an effort to clean up and restore the South Branch of the Raritan River, and all have made a commitment to work with the state on a project to upgrade the Musconetcong."

Although both these rivers are premier trout streams, as Lopezzo says, "We're significantly more than a fishing club. We're primarily a conservation organization." And, for that, New Jersey's anglers, environment and citizens can all give thanks.

by Denise Mikics of the DEPE's
Office of Communications

Profile

The Guardian of Historic Hunterdon

Almost every morning on his way to work, Donald B. Jones leaves his sprawling farm in Sergeantsville and passes over one of New Jersey's most significant architectural landmarks — the last original covered bridge in the state.

Jones shares a special relationship with Green Sergeant's Bridge in Hunterdon County. It is one of several historic structures that might not be here today if it weren't for this bow-tied crusader's dedication to conservation.

At 82, Jones — a lawyer, businessman and farmer — has led a life full of adventure and personal rewards. As owner of Charles Jones Inc., a thriving, Trenton title search business founded by his father, Jones still commutes to the office five days a week. He also manages his 253-acre farm. But even though his schedule is rather hectic, Jones has always found time to help preserve New Jersey's natural and cultural resources.

One of Jones' first causes was saving Green Sergeant's Bridge, the last survivor of New Jersey's 75 covered bridges. The battle started in 1959 when the bridge was nearly destroyed by a heavy truck or wagon. Hunterdon County officials decided the practical solution was to replace the bridge with one that could handle modern traffic, including large trucks and farming equipment. But Jones and a small group of people felt differently. They banded together to save the historic treasure that has linked the towns of Sergeantsville and Rosemont for nearly a century.

"It was a bitter battle, but it all turned out well," says Jones.

Jones was able to get a court order to prevent the county from removing any of the bridge. In the meantime, he convinced the New Jersey Department of Transportation to restore the covered bridge and build a new span parallel to it.



Donald B. Jones is credited with saving three historic sites in Hunterdon County — Green Sergeant's Bridge, the Prallsville Mills and the Locktown Church.

His actions saved the landmark, and the covered bridge became the official symbol and logo of Delaware Township.

Less than a decade later, Jones was called to battle again. The Prallsville Mills along the Delaware and Raritan feeder canal and Route 29 in Hunterdon County were up for sale, and some feared the property was in danger of becoming the site of a supermarket, an auto repair shop or a townhouse development.

The property had started as a single grist mill when it was built in the early 1700s. In 1794, John Prall Jr. bought the mill and made many improvements. He converted the wooden grist mill to stone and added a saw mill and several other stone structures, including one that was later used as a linseed oil mill, a plaster mill, a chapel, a post office and a store.

Jones credits the late Barbara Coar, an avid mill supporter, and David F. Moore, executive director of the New Jersey Con-

servation Foundation, with getting him involved in the preservation of the site.

"They got me enthused to the extent that I bought it," says Jones. "Not with the intention of using it, but to hold on to it until the state could take it over."

To save the historic mills, Jones purchased the site in 1969 for less than a \$100,000. He and other individuals then began making repairs and restorations, especially on the decaying roof of the grist mill. In 1973, the state purchased the property, and the site was added to the State and National Register of Historic Places. A year later, the mills became part of the Delaware and Raritan Canal State Park.

The Delaware River Mill Society within the office of the Delaware and Raritan Canal Commission has since been formed to help fund the restoration costs and keep the site open to the public. Today, the mills are the site of a bustling cul-

tural center that offers such activities as summer tours, exhibits, concerts and regional festivals.

"I'm very proud of what the mills look like today, but that's certainly not because of me," says Jones. "It's because of the members of the mill society. They've done a great job."

Following his triumph with the Prallsville Mills, Jones was recruited a third time to rescue yet another historic site.

"Maybe the news had gotten around that I was a sucker for saving things," laughs Jones.

This time, Jones found himself involved in preserving the Locktown Church in Hunterdon County, which was constructed in 1819. In the late 1980s, the church was purchased by a person who wanted to renovate it for use as a private home.

Many local residents were upset by this turn of events. After all, both the town and church were named after an infamous schism among the Baptist church members. In 1839, the congregation became divided over the issue of recruiting new followers for the church. Conservative Baptists believed people were destined to come to the church on their own, but reformers wanted to reach out and convert people. The conservatives, realizing they were becoming outnumbered, locked out the reformers. The infuriated reformers put their own lock on the church so the conservatives could not get in either. And an amused tavern owner near the church commissioned a sign for his business with three locks (the third lock is believed to have been included for aesthetic reasons). The sign displayed outside the tavern greeted visitors to the town for years until it disappeared.

To avoid losing the church forever, Jones again used his own money to buy the beautiful stone building from its new owner for \$96,000. Once again, an important landmark had found its way into Jones' safe hands, and he kept the church until Delaware Township was able to purchase it in 1989 under a loan from the state Green Acres program. No local taxpayer money is being used to make the loan payments, however, thanks to an-

Green Sergeant's Bridge in Delaware Township.



WALTER CHOROSZEWSKI

Many historic structures
might not be here today if
it weren't for this bow-tied
crusader's dedication to
conservation.

other generous gift from Jones. He donated \$43,000 in long-term bonds, which mature annually, that can be used to pay off the loan in its entirety.

In between saving structures, Jones has dedicated his time to preserving New Jersey's environment. He served on the Hudson River Planning and Development Commission, assisting with the creation of a pathway along the river. He also was involved with the Delaware Township and Hunterdon County planning boards and the New Jersey Tidelands Resource Council. He also serves on the Delaware and Raritan Canal Commission.

A self-proclaimed "nut about trees," Jones currently heads the Hunterdon County Shade Tree Commission. He is also former president of the New Jersey Conservation Foundation, an environmental group he lauds as the "greatest organization in New Jersey as far as saving

JIM AMON



The Prallsville Mills along Rt. 29 in Stockton.

open space and conservation."

Jones continues to be a proponent of open space, and he advocates that new home construction should be done in clusters to preserve the land.

"It really annoys me to see a house on ten acres of land," says Jones. "It's beautiful, but it's not sensible. Houses should be huddled more closely together to preserve the open space."

This savior of significant state sites and land is already looking toward the future protection of his own homestead. Jones is making plans for a conservation easement, a designation that prevents development on a piece of land, to ensure his property will always remain a farm.

"The whole area is so nice," says Jones. "It would be a shame to cut that up."

by Amy Franco, a journalism intern
from Rider College

Gardens

Duke Gardens: A Winter Escape

Throughout the long winter, many yearn for the green of spring and the splashes of floral color that lift the blues and grays of colorless winter days. But at Duke Gardens in Somerset County, one can find the ideal winter escape with 11 gardens of perfection presented under an acre of glass.

Duke Farms was the 2,500-acre country estate of the late James Buchanan Duke, a tobacco and utilities magnate. J. B. Duke's interest in orchids was the original inspiration for building greenhouses on the estate.

During the 1930s through the 1950s, Duke Farms cultivated orchids and eventually produced them commercially, along with a variety of other flowers, for the New York market. With the advent of air freight and an abundant supply of flowers from around the world, Duke Farms' commercial flower production fell into decline, and plans were made to raze the greenhouses.

It was Doris Duke, J. B. Duke's daughter, who decided to convert the greenhouses into display gardens. In 1958 she personally designed and began the creation of Duke Gardens, a showcase of 11 thematic presentations from diverse cultures and regions of the world.

Over the next few years she traversed the globe seeking ideas and specimens to complete her visionary displays, which were opened to the public in 1964. Now in its 30th year, the gardens are as spectacular as ever.

Although Doris Duke passed away in October, she arranged in her will to have the gardens remain open to the public, part of her continuing legacy of conservation and environmentalism.

The gardens are open for tours each afternoon, but advanced reservations are always required. Current reservations often run two to three weeks in advance, and there may be longer waits for weekends. There is a \$5 charge for the guided tours, which are limited to groups of eight.

The circular design of Duke Gardens allows the tour to end at its starting point in the Italian Garden. Here the garden is



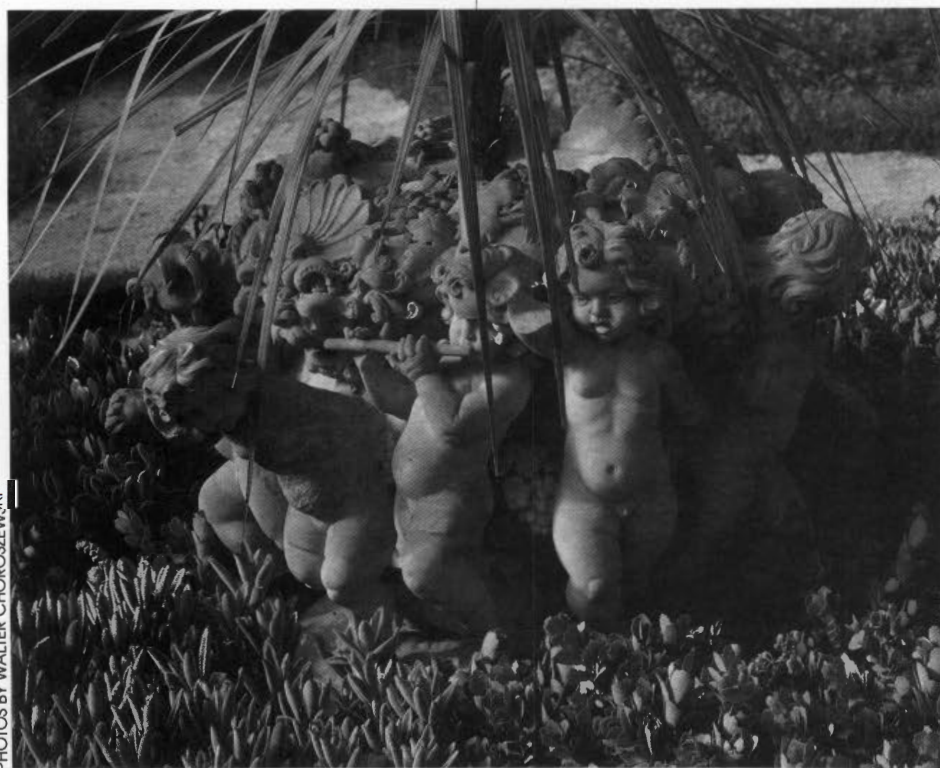
A succulent flourishes in the American Desert Garden.

modeled after traditional Italianate style which was laid out in a formal, conventional manner. Over the ages, many of these formal gardens were abandoned and allowed to grow according to the whims of nature. During the late 18th century these "mature gardens" were rediscovered for their romantic qualities achieved through the mixture of man's unwitting collaboration with nature. Like those mature gardens, Duke's Italian Garden offers symmetrical planting beds, accented by statues and fountains, as towering trees and climbing bougainvillea create a natural crown of flora.

Next is the Colonial Garden, characteristic of displays found in the South Atlantic states — particularly in South Carolina — with its camellias, azaleas, and magnolias.

Through a door which separates the differing climates, one enters the lush Edwardian Garden, a replica of Edwardian England's home conservatories which were brought to the United States in the Gay Nineties. A 19th century luxury only the wealthy could afford, these gardens featured rare tropical plants and orchids. This era is often referred to as the Mauve Decade because of a fondness for orchids and the pale mauve colors. Duke's Edwardian Garden is resplendent with a variety of

Cherubs dance in the English Garden.



PHOTOS BY WALTER CHOROSZEWSKI

orchids cultivated and grown on the estate.

The French Garden, with its forest green lattice walls that surround a fleur-de-lis patterned garden parterre, is a classical formal garden that was typical of 18th century France. This showcase garden is perhaps the Duke's trademark due to its colorful seasonal annuals laced throughout the perfectly sculptured boxwoods.

The next garden on the tour is the English Garden, which is divided into five sections, each a miniature version of a particular style. The Topiary Section has shrubbery trimmed and trained to architectural designs and fantasies. The Rock Garden and Herbaceous Borders are typical English designs with riotous seasonal flowers in front of a wattle fence of hazelwood. The Knot Garden is Elizabethan in design and features medicinal and culinary herbs. The Succulent Garden, laid out as a sun burst, was considered a luxury in 18th century England as the plants were imported each year because they could not survive the winter.

After the English Garden, a sand-covered path winds into the arid climate of the American Desert Garden, a natural array of cactus and succulents similar to those found in the American Southwest.

In sharp contrast, the tour leads to the Chinese Garden with its bold rock formations, pond and Isle of Immortals — a tribute to the spirit of the ancestors. A crooked walkway wards off the evil spirits as you cross the bridge to the Moon Gate, which leads to a Chinese lattice courtyard with its hand-tied bamboo.

Through the bamboo doors, one enters the Japanese Garden which captures a stylized naturalism. Partially built on a dry water bed, a narrow foot path leads to the Tea House. The spiritual culture of Japan is represented in the statues and shaped shrubbery, including the three-layer designs symbolizing "heaven," "man" and "earth."

After the natural flow of the Japanese

Garden, the tour enters the geometric precision of the Indo-Persian Garden, which is a miniature version of those constructed by the Moghul Emperors in the Middle Ages. The raised brick-patterned pathways, modeled after Shalimar Gardens in Lahore, lead along the running waters and fountains to the Chabutra, a miniature pavilion complemented with roses, the national flower of Persia.

After the formal designs of the Indo-Persian Garden, the tour moves into the Tropical Garden, where one is totally consumed by the lush foliage of a rain

One can find the
ideal winter escape
with 11 gardens of
perfection presented
under an acre of glass.



A statue adorns the Italian Garden.



Orchids bloom in the Edwardian Garden.

forest jungle.

Finally, the Semi-Tropical Garden is similar to those found in Spain; however, it also features an eclectic selection of specimens from around the world, including tree ferns from the volcanic high-plateaus of New Zealand and Hawaii, lacy South American Jacaranda trees and Birds of Paradise plants.

Duke Gardens, located along Route 206 South near Somerville in Somerset County, is open for tours from October through May. It is open daily from noon to 4 p.m., but closed in the summer months and the holidays of Thanksgiving, Christmas and New Year's Day. Reservations can be made by calling (908) 722-3700.

by Walter Choroszewski, a freelance writer and photographer whose latest book is The Garden State in Bloom

More to See . . .

Doris Duke left a legacy enclosed under glass in the gardens that bear her name. Portions of this spectacular horticulture from all corners of the globe can be seen in full color beginning on page 30.



MITCHELL HARRISON

Adrift in the Ramapos

Snowshoe prints lead into the Ramapo Mountains, an ideal location for this winter sport.

I'm one of those people who likes snow — from the days of the Flexible Flier to today. It's not because I enjoy the urbanized recreation we call downhill skiing, and I'm not satisfied by merely watching snow from inside my home as it falls on the other side of a window pane. Whenever I see snow I must walk in it, lie in it, listen to the sound of my boots compressing it. In short, I must experience it. That's what I intended to do that day last March.

The newscasters had already labeled this storm the "Blizzard of '93." Between two and three feet of snow had fallen in northern New Jersey, and temperatures

were in the high 20s. It was an ideal time for a snowshoe trek in the Ramapos — the mountains that extend from Rockland County, N.Y., into Bergen and Passaic counties.

To dress for the seven-mile, eight-hour trek, I selected underwear that stays near the skin but — to prevent chilling — doesn't get wet. I wore a polyester zip-up turtleneck and a waterproof breathable shell jacket. I chose nylon powder pants with a side zip for venting in case of overheating, but the zipper also makes the pants easier to get on and off. My hat was made of a combination of Gore-Tex and

wool. To keep my feet warm and dry, I wore wool socks with liner socks underneath and wool-lined pack boots. For my hands, I had cross-country skiing gloves. I also carried wool mittens in my day pack along with a wool sweater.

My entrance point was going to be Ramapo Valley County Reservation off Route 202 in Mahwah. As I drove north on Route 202, I was consumed by the stillness — few cars, few people. However, nature's "calm after the storm" had not yet set in completely as wind gusts were still nearing 30 mph.

Standing at trailhead, I admired the utter uniformity nature had produced. I knew, however, that once I trudged deeper into

The Ramapos' elevations vary from 200 to 900 feet throughout

this preserve I would begin to notice the varied intricacies that make up a winter storm. The forest of mostly deciduous trees was a scattered mass of gray and, of course, white.

I examined a New York/New Jersey Trail Conference map, oriented myself and began snowshoeing. Legs wide, exaggerated steps. I started west, crossing a bridge over the Ramapo River toward MacMillan Reservoir and onto that lake with the seemingly far-north name of Bear Swamp.

There were several indications that this was going to be a difficult trip. The snow was deep, and the wind made incredibly high drifts. In places, a crust had formed over the snow because of the mixture of snow and now-frozen rain that had fallen during the storm. I walked on along what was once a carriage road, which is now the Silver Trail, at the south shore of Scarlet Oak Pond.

The land, now owned and maintained by the Bergen County Park Commission, was originally purchased from Indians in 1700. Samuel Laroe settled the area in

1720. Part of the area was farmland, and a bronze foundry also stood within what are now the reserve boundaries.

I reached the MacMillan Reservoir and treated myself to a break. Sitting on the bank, the cold wind across the open expanse of water and ice was actually refreshing after a difficult ascent up the Silver Trail. Foot travel without snowshoes would have been nearly impossible that day. With only boots on, certain drifts reached my thighs.

The reservoir is egg-shaped with a dam at one end. It was encircled by forest with the exception of a broad, angling rock slab on the north shore which extends 30 yards away from the water's edge. Yellow birch and various types of oak leaned over the partially frozen lake. Chilled, I finally rose and walked — if that's what you can call it — toward the intersection of the Red/Silver Trail.

I smiled at two other adventurers as they kicked and glided their way on cross-country skis past me in the opposite direction. It looked like a much more efficient mode of locomotion than lifting — over and over again — what felt like row boats attached to my feet. But I knew I would come to appreciate the help of my Tubbs on the uphill sections to come.

The uphill portions in Ramapo Reservation are gradual, but abundant, as most trails lead hikers, showshoers or skiers to the mountains' ridge. From certain overlooks within the park, for example along the Ridge Trail, you can see the skyline of Manhattan. From other vantage points only contiguous forest can be seen. Elevations vary from 200 to about 900 feet throughout the Ramapo Mountains.

After passing Bear Swamp Lake, I switched from the Red/Silver Trail to the Cannonball Trail. I saw the remains of old houses, the debris mostly covered by snow with only corners of foundations visible. This was once a small community, but its remains were demolished when the county purchased the land.

Making the loop home, about five miles into my journey, I came across a series of rock outcroppings beside the Cannonball

Trail. I stopped to admire an ice formation that covered a portion of a boulder. Ripples in the ice distorted the image of the moss-covered rock below. I removed my gloves to feel the sculpted ice, the smoothness and perfection. I breathed deep, taking in not only the crisp air, but also the wildness that surrounded me.

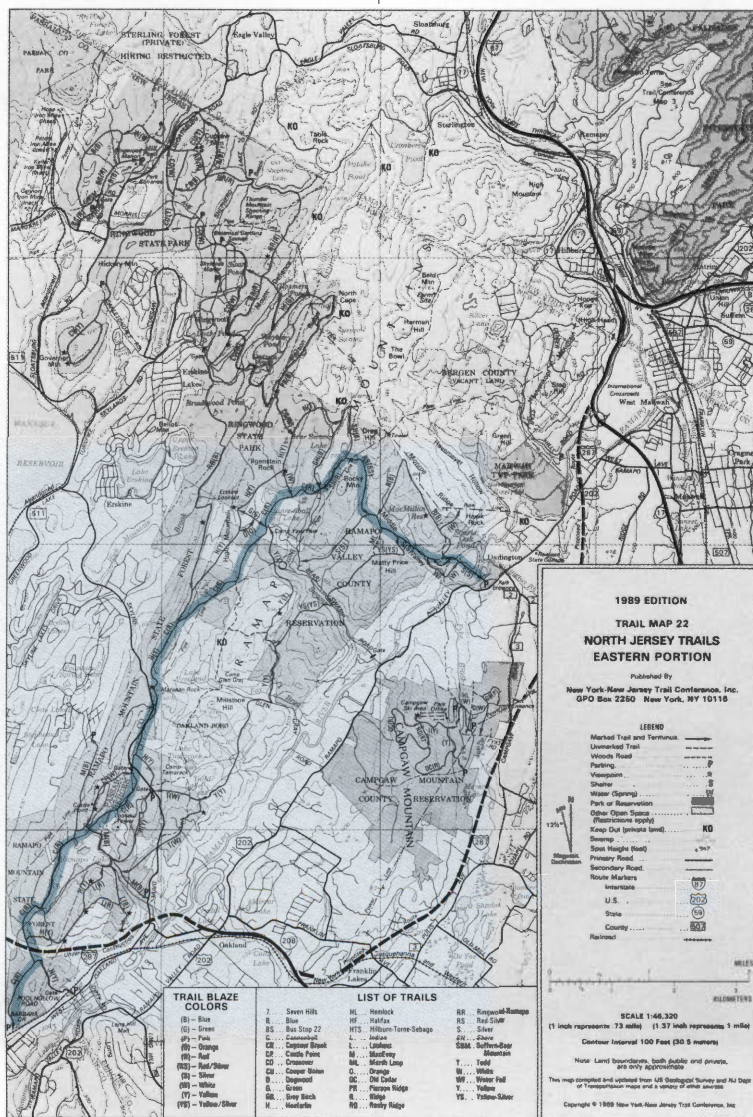
The Ramapos are ideal for winter recreation. The trail system extends from Sally's Pond in Ringwood, south to Ramapo Mountain State Forest in Oakland and east to the county reservation. The best map for the area is the waterproof New York/New Jersey Trail Conference's North Jersey Trails.

To get there: From the Garden State

Parkway take Exit 153B onto Route 3 West. Take Route 3 West to Route 46 West and then get off on Route 23/Route 202 North. From there take the Route 202 North Exit and follow Route 202 past Pompton Lake and through the town of Oakland. After reaching the Mahwah town line, travel approximately three miles, and the Ramapo Valley County Reservation will be on the left. If you reach Ramapo College, you've gone too far.

by Mitchell Harrison, a freelance writer who lives in the shadow of the Ramapos in Pompton Lakes

This is the route taken by author Mitchell Harrison on his snowshoeing trek through the Ramapo Mountains.



A New Environment for Cities

In the middle of a city once bustling with industry, only a block from a train station on the main New York-Philadelphia line, two blocks from a three-theater cultural center, and two blocks from a major state university stood several lots, desolate except for a menagerie of scraggly weeds.

But that was last year. Today, middle-income housing is rising out of that formerly empty urban landscape in hopes of luring people back into the city. Construction is evident throughout downtown. Behind the train station, the university and a nearby hospital are collaborating on a combined high-rise dormitory, parking garage and retail building. The hospital is also constructing a new wing.

If this sounds like a new round of 1960s- and 1970s-style "urban renewal," that's not exactly the case. After years of considering cities as somehow *outside* the environment

(which was conceived as something nonurban, pristine, green and natural) — or considering cities as somehow *antagonistic* toward the environment — times have changed. Cities, as well as the need to rebuild their infrastructures, are beginning to be viewed in an environmental context.

"After decades of bad news on urban policies, I see good news ahead," says Dr. Carl Van Horn, acting director of the Eagleton Institute of Politics and professor of Public Policy at Rutgers University. Van Horn lives near and works in New Brunswick, the city described above.

Van Horn provided the keynote address this past summer to environmentalists and city and state officials attending a conference sponsored by the Department of Environmental Protection and Energy and the New Jersey Urban Mayors Association. The conference specifically ex-

plored issues of urban revitalization in an environmental framework.

Van Horn and others, who spoke at the conference or in subsequent interviews, agree that the pendulum has started to swing back toward cities as places where environmentalism can play a positive role.

For years, the words "city" and "environmentalism" were not often uttered in the same sentence. Like urban centers across the country, those in New Jersey declined following World War II. Flight from the cities was aided by federal policy, what with construction of the interstate highway system and a GI Bill that encouraged purchasing new homes. The vast highways drew people out of urban areas to new suburban developments and made it possible to skirt cities. The push to convert wartime industries to consumer goods such as home appliances and automobiles also encouraged growth of the suburbs at the expense of the cities.

In recent years, a shift in environmental policy and the focus of anti-pollution laws have started to shine a new light on urban environments. Suddenly, cities, once condemned as homes to pollution and "toxic waste dumps," are starting to look less like eco-demons and more like potential eco-saviors.

Van Horn sees this as part of a larger shift from older policies that broadly viewed environmentalism as the preservation of open space to current policies that see the focus of environmentalism as the protection of public health.

The cities, according to Van Horn, no longer are centers for the industries that, prior to current anti-pollution laws and regulations, belched toxic fumes and dumped contaminants in waterways. In fact, businesses centered in cities are no longer primarily based on manufacturing, but on information and service industries.

"Cars, parking lots and backyards have replaced industry as the environmental villain," says Van Horn. State and national policy now recognizes that the greatest current danger to the environment is the pollution created by individuals,



GEORGE LEVITES

The Johnson & Johnson corporate headquarters looms over the city of New Brunswick, which is undergoing a revitalization.

through such activities as driving cars or misusing fertilizers, pesticides and even household cleaners. Existing pollution control and prevention laws have gone a long way toward cleaning up industry, but it's a lot more difficult to change the behavior of every citizen in the state.

"In the 1950s, '60s and '70s, the automobile became king," says Van Horn, propelling development into suburban sprawl. But motor vehicles — which contribute nearly one-third the pollutants that make up ground-level ozone or smog — are now themselves clearly viewed as environmental spoilers.

The federal Clean Air Act, Van Horn feels, will help tip the balance from automobiles to mass transit and, perhaps, even persuade people to move closer to cities where they work.

"New Jersey's State Development and Redevelopment Plan [which seeks to funnel growth back into cities], changes in the nature of the economy, proximity to major transportation such as airports, and the desire to conserve energy all point to a renewed interest in the city," says Van Horn.

However, Alan Mallach, director of the Department of Housing and Development for the City of Trenton, sees no such transformation happening yet. "There has been no return to the cities," he says.

"It is very difficult for people in our country and society to look that far ahead," says Mallach, speaking of the transformations that lie ahead as possible results of the federal Clean Air Act.

"What needs to be done is change people's perception of cities. They have very negative connotations in people's minds," he says. What this will take, according to Mallach, is providing economic centers and green space in cities and upgrading urban neighborhoods to make them more attractive, to workers, residents and tourists.

"We need to deliver sites that are ready to move into. Buildings and sites that are as easy for a developer to set up in as it is in a cornfield in the country," says Mallach.

Both Van Horn and Mallach agree that an environmental key to reinvesting in

the cities is the new Industrial Site Recovery Act (ISRA), a state law that should make the cleanups of contaminated urban industrial sites easier for redevelopers.

"There is no question that the Environmental Cleanup Responsibility Act (ECRA — the law preceding ISRA) was a major problem for cities. Though we don't know if ISRA will do everything necessary, it is a major improvement," Mallach says.

According to Lance Miller, DEPE's assistant commissioner for Site Remediation, ISRA should help because it provides uniform guidelines that all properties must meet to be certified as clean. Miller notes that the new law allows less intensive cleanups for sites that will be used for industrial rather than for residential purposes. In addition, ISRA establishes a \$50 million fund that small businesses and municipalities can use for cleanup loans and grants and also provides grants for municipalities to perform initial investigations into potentially contaminated sites in their cities.

"No one is trying to develop the vacant sites in our cities because no one knows for sure what is out there," says Miller. "The new law will help municipalities pay to determine the degree of contamination — if any — at various properties. This, in turn, will arm them with the information they need to market these sites to prospective investors.

"In the past, without this information, it was simply 'buyer beware,'" he says.

Trenton Mayor Douglas Palmer, who is president of the Urban Mayors Association, also feels that slowing suburban sprawl, reducing air pollution and returning cities to their historic roles as centers of economic activity, will not happen without commitment and policy geared to accomplish these specific ends.

"Small and large industrial sites are abandoned and unused because of the costs environmental regulations impose," says Palmer. "ISRA will offer greater opportunity for the necessary redevelopment, so industries can be put on tax roles instead of being tax burdens."

Allan Mallach agrees that cities can be

In the short term, no one is quite sure exactly whether or how quickly New Jersey's cities can be revitalized. But the time seems ripe.

made very attractive. "Competitive industry can take advantage of cities' locations and large labor forces," he says.

Palmer also calls for increased environmental education for urban students, so they too can begin to understand how their neighborhoods and cities fit into the larger environmental picture and how they can help improve things in the long term.

In the short term, no one is quite sure exactly whether or how quickly New Jersey's cities can be revitalized. But the time seems ripe.

Van Horn points to New Brunswick as once again on the upswing. He credits a partnership among the city, Rutgers University, city-based Johnson & Johnson pharmaceuticals and a redevelopment group called New Brunswick Tomorrow with transforming the city "from decaying industrial town to a modern economic, university and cultural center."

DEPE Acting Commissioner Jeanne M. Fox, a New Brunswick resident for the last 10 years, says she has seen the city's ups and downs and the long way it has come while she has lived there. Fox thinks citizens and policy makers have a choice in looking at the urban environment.

"You can see the devastation in New Jersey cities," she says, "or you can see the opportunities."

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

“How’re We Doin’?”

Testing to See If the Environment Makes the Grade



By Rick Sinding

How clean is New Jersey’s air? How drinkable, fishable and swimmable are the waterways of our state compared to 10, 15 or 20 years ago? Is the quality of our wetlands improving or deteriorating over time? Do we use our land more wisely or more foolishly today than we did in the 1970s and 1980s? Have the oil embargoes and other energy traumas of recent years made us more or less wasteful in our use of energy resources?

In other words, as former New York Mayor Ed Koch might ask: “How’re we doin’?”

When this question relates to the quality of New Jersey’s environment, in far too many instances the unfortunate answer is: We don’t know. We can — and do — make some educated guesses, and in many cases these guesses are probably pretty accurate. We certainly collect volumes of data, which allow us to draw a great many inferential conclusions about the quality of our air, land and water.

But what we at the Department of Environmental Protection and Energy are not particularly good at doing — indeed, what environmental agencies across the country, at the federal, state and local levels, are notoriously poor at doing — is gathering and disseminating information that tells us, in simple, straightforward terms, whether the quality of our environment is better or worse than it used to be. Unlike economists, who can turn to a list of “leading economic indicators” to measure the overall performance of the economy, we have no commonly accepted, readily available, easy-to-understand list of indicators to measure the overall quality of the environment.

From Outputs to Outcomes

As more than one critic has observed, instead of putting the emphasis on environmental *outcomes*, i.e., on how the environment has changed, federal and state environmental agencies over the years have focused their attention and resources on measuring bureaucratic *outputs* — the number of permits issued, the dollar value of fees assessed, the percentage of fines collected. These data are then employed, almost by default, as surrogates for more meaningful environmental indicators. The more permits the department issues (or the fewer, depending upon one’s point of view), the higher or lower the dollar value of the fees it assesses, the larger or smaller the percentage of fines it collects, the greater or less is the presumed corresponding enhancement or degradation of the quality of the environment.

There are concerns over the validity of this presumption, along with a healthy dose of public skepticism about the wisdom of turning agencies charged with conserving, protecting, enhancing, restoring and managing the environment into nests of potential bureaucratic bean-counters. These concerns have given rise and momentum to the development of environmental indicators — objective measures of environmental quality that can be used by policy makers at all levels of government to direct public attention and resources where they are most needed.



Pressure to Measure Progress

In an era of shrinking public resources and growing public scrutiny, environmental agencies across the country, including New Jersey's DEPE, are under increasing pressure to demonstrate that, for all the permits the department issues, for all the fees and fines it assesses, for all the rules and regulations it administers, it is actually achieving meaningful environmental progress.

The pressure is perhaps most intense in Washington, where Congress is demanding that the U.S. Environmental Protection Agency (EPA) produce evidence of what 20 years' worth of tough environmental laws and billions of dollars of public investment have purchased in the way of environmental improvement. The EPA's Office of Policy, Planning and Evaluation has begun to look seriously at indicators not only as a means of providing such evidence, but also as a strategic planning tool for use in developing future agency priorities.

At the state and regional levels, Florida and the Chesapeake Bay have led the way in the development of environmental indicators. Florida's SAFE (Strategic Assessment of Florida's Environment) Project represents the first major effort by a state to develop a comprehensive set of indicators measuring progress in nine specific environmental areas:

- ☐ Land Use and Resource Protection
- ☐ Water Quality
- ☐ Water Quantity
- ☐ Air Quality
- ☐ Wildlife
- ☐ Waste Management
- ☐ Infrastructure and Facilities
- ☐ Environmental Investment
- ☐ Public Perception



Alligators and the "Sneaker" Index

Nearly 150 indicators — ranging from total annual average rainfall to the percentage of abandoned artesian wells that have been plugged, from the number of single family homes participating in curbside recycling to the population of alligators — help paint a picture of the present state of Florida's environment, and provide historical data to depict trends over time. Thus, Floridians now know, for example, that the average population density of alligators 4 feet or greater in length for each mile of shoreline has increased significantly from 1983 to 1989 — a very positive indicator. They also know that the number of square miles of lakes meeting designated uses between 1986 and 1990 has declined — a negative indicator.

Likewise, in the Chesapeake Bay, where an aggressive EPA-sponsored restoration effort is under way, the collection and reporting of data on reported levels of phosphorus and nitrogen coming into the bay from "point sources" such as outfall pipes show very positive trends in water quality. These trends, in turn, can be plotted against specific programmatic goals (reducing the levels of phosphorus and nitrogen recorded in 1985 by 40 percent by the year 2000) to measure progress. The Chesapeake Bay program also looks at such indicators as acres of bay grasses, stream miles opened for migratory fish, acres under Integrated Pest Management, and the ever-popular "Bernie Fowler Sneaker Index" (which measures how far Maryland State Senator C. Bernard Fowler can walk into a particular body of water before he is no longer able to see his sneakers) to provide an overall picture of the environmental health of the area in and around the Chesapeake Bay.

Garden State Indicators

Inspired by the EPA, Florida, and Chesapeake Bay efforts, and emboldened by the knowledge that New Jersey's sophisticated environmental data base already contains virtually all of the information needed to develop a robust set of environmental indicators, the DEPE's "Sabbatical Team" — a group of employees selected from programs throughout the department to work together on policy initiatives that cross disciplines and programmatic lines — began in late 1992 to develop an environmental

The ever-popular
"Bernie Fowler
Sneaker Index"
measures how far
Maryland State
Senator C.
Bernard Fowler
can walk into a
particular body of
water before he is
no longer able to
see his sneakers.

New Jersey's
environmental
indicators will
help us identify
where we have
made meaningful
progress in the
battle to preserve
and enhance
environmental
quality.



indicators project for New Jersey. First, they surveyed all of the department's programs to find out what kinds of data are routinely collected, and which data the programs felt would be most appropriate for use as environmental indicators. Then, working with the DEPE's Division of Science and Research, they convened a series of meetings with key scientific and technical staff to review the data and begin to draw up lists of candidate indicators.

In spring 1993, the DEPE hosted representatives from 13 New England and Middle Atlantic states, three EPA regional offices, EPA Washington headquarters, Florida and the Chesapeake Bay for a three-day "Northeast Regional Conference on Environmental Indicators" on the campus of Rutgers University in New Brunswick. Three months later, a one-day workshop at the DEPE's Trenton headquarters brought together business and industry representatives, legislators, local officials, environmental activists, academics and other interested parties for a full discussion of the potential development and application of environmental indicators in New Jersey.

Oh, Say Can You See: The N.Y. Skyline?

Now, armed with the best data and the best advice available, the DEPE is in the position to develop its own "State of the New Jersey Environment" report — a guide to both the progress we have made and the problems we continue to face in managing New Jersey's unique environmental resources. Unlike Florida, we will not count alligators — but we will count other critical species whose populations and growth rates are important indicators of the quality of New Jersey's environment. There will be no "Bernie Fowler Sneaker Index," but one or two similar indexes of visibility — the ability to see the New York skyline across the Hudson, say, or the clarity of coastal waters at Seaside Heights or Wildwood — may be used to provide graphic, New Jersey-specific indicators of trends in air and water quality.

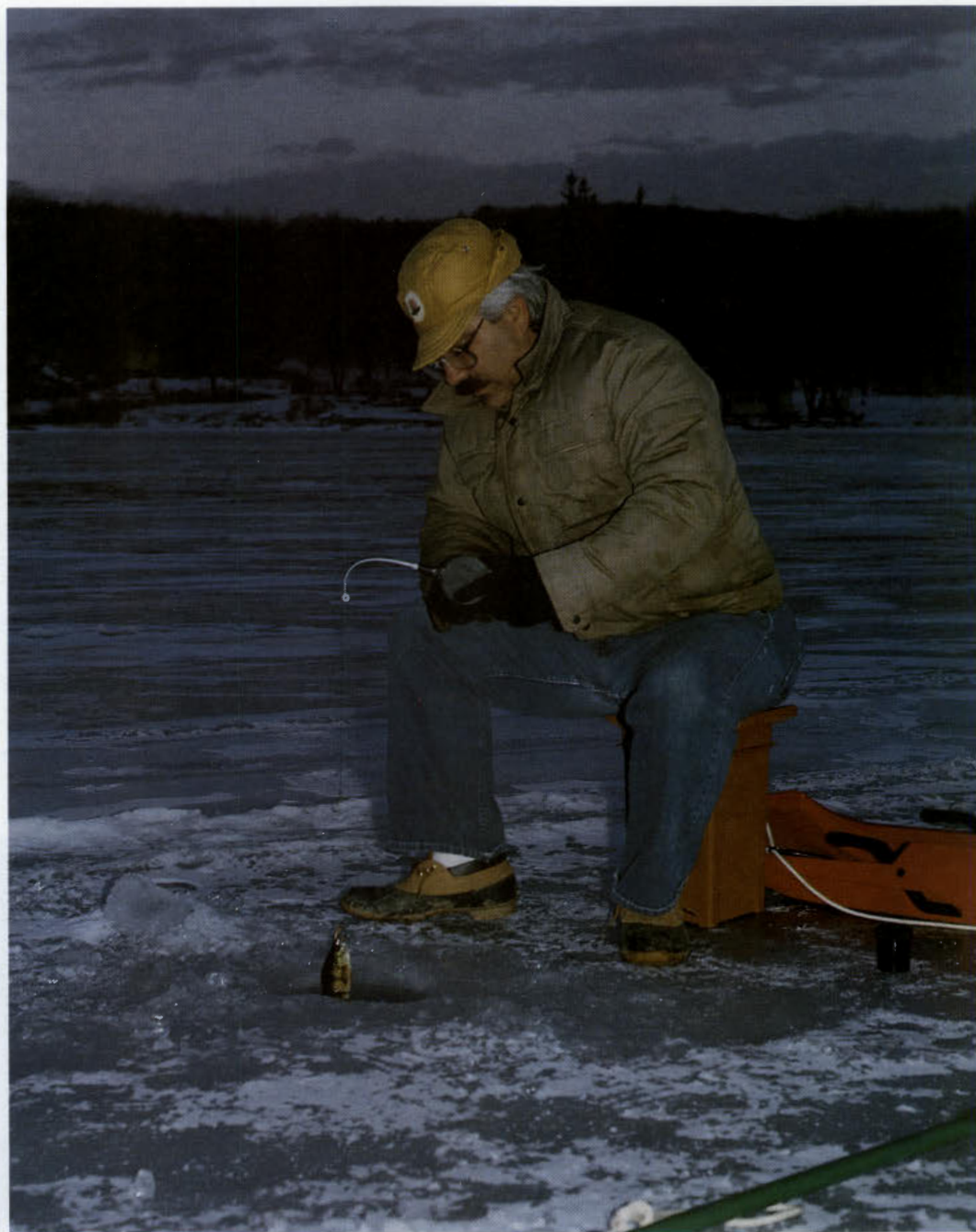
Most important, New Jersey's environmental indicators will help us identify where we have made meaningful progress in the battle to preserve and enhance environmental quality, and where significant challenges still confront us. In setting our environmental agenda, and in assessing priorities for the allocation of resources, indicators can give us guidance and direction, providing us with a very useful tool in decision making.

This approach is not without its dangers. As readily as indicators can be used, they can also be misused, with potentially severe consequences. It would be a serious mistake, for example, if an indicator showing steady progress toward achievement of air quality standards were seized upon as an excuse to shift vital resources away from air pollution control. Similarly, it will be very tempting — but wholly inappropriate — for government agencies either to take credit or to be saddled with blame for the quality of the environment as measured by indicators that are clearly outside their control. A good, objective environmental indicator measures broad trends in environmental quality, not the short-term performance of environmental agencies.

Despite these dangers, the uses of environmental indicators to society's benefit far outweigh their potential misuses. Whether one is passionately interested in environmental issues or cares only that the water coming out of the tap is fit to drink, New Jersey citizens and taxpayers deserve to know what the quality of our environment was in the past, what it is today, and what it is going to be in the future. A sound set of environmental indicators, when gathered thoughtfully and used wisely, can tell us a great deal about where we have been and where we are going. That, in itself, is good cause for employing indicators in our planning and policy making. For, as one EPA planner is fond of putting it: "If you don't know where you're going . . . well, there you are."

Rick Sinding is the DEPE's assistant commissioner of Policy and Planning.

Text and photos
by Jill Barnes



Get Ready To Go Ice Fishing

When leaves begin to fall from the trees, most anglers are storing their rods for winter. They don't know what they are missing.

Instead of waiting for the winter snows to melt and spring thaw to begin, they could be seeking the same prey they enjoyed catching during the warmer months. The sport to try now is ice fishing.

Heavily bundled winter anglers can catch a variety of panfish (sunnies, perch and crappies) or possibly a trout, pike, muskie, walleye or bass.

Ice fishing also can be a family endeavor. It's never too early to take a youngster fishing, even if the water is frozen. (See related article on page 21) And there are plenty of places in New Jersey

for anglers to go it alone or take the family.

Before you get started, one thing remains the same winter or summer: you need a freshwater fishing license. These are available through many sporting good stores and bait and tackle shops or directly from the Department of Environmental Protection and Energy's Division of Fish, Game and Wildlife. You also need to observe the size limits for various fish and different bodies of water as spelled out in the freshwater fishing issue of the *New Jersey Fish and Wildlife Digest* — available at most bait and tackle shops and also from the Division of Fish, Game and Wildlife.

Winter fishing equipment is simpler than its summer counterparts. There are two basic types of ice fishing rods — the traditional tip-up or a three-foot long pole. The latter resembles a regular fishing rod, only the eyes are bigger to prevent freeze-up. The main difference between the two rods is that the short three-foot pole is hand-held, while the tip-up just sits on the ice. A flag pops up when a fish hits the baited tip-up.

Some anglers prefer the hand-held rod because it provides a little more action. A fisherman can feel the strike with a pole in hand, thus adding to the excitement. Hand-held rods also give the choice of using bait or artificial lures. The baited hooks used with

the tip-ups usually just sit near the bottom. Those using the short pole can work the lure or bait — jibbing it under the water to entice the fish. On the other hand, a possible advantage of the tip-up is that you can set up more than one. Check the *Fish and Wildlife Digest* as to the number you're allowed.

Small silver teardrop lures can be used for jibbing. Many anglers also add grubs, mealworms and the like to the hook. Some of the more successful lures include the Swedish pimple (a silver body with a small, red tail that flutters when it moves), a Mr. Twister tail, or any small Rapala-type ice fishing jig. Ask your local tackle shop owner to help if you're not sure what to use. He or she also can tell you what's been successful on local waters and provide tips to possible "hot" spots.

Fish usually aren't as active in winter as in summer, so a slower retrieve is necessary when jigging. Fish don't like to move too far for a meal.

Light line, 2- to 6-pound test, is the norm for the smaller panfish. If the drag is working properly, that test line also should hold if you hook something bigger, such as good size pike (Budd Lake, Spruce Run Reservoir), a muskie (Greenwood Lake, Monksville Reservoir), lake trout (Round Valley Reservoir), or walleye (Monksville).

An angler can fish several holes at one time.

The tip-up (opposite page) is one of two types of rods used for ice fishing.



Chopping a hole through the ice can be accomplished in many ways, from using a hand-held chisel to a souped-up power auger. The power auger works best if the ice is very thick, say 15 inches or more. Most long-handled, metal chisels work just as well, but it may take a little longer to make that perfect hole. As a safety measure, tie a rope to the end of the chisel and hook it around your arm so it doesn't slip out of your gloved hands and down into the hole — lost forever. A slotted ladle also helps remove the ice chips from the hole.

For those lacking a high-tech ice chopper, some tackle shops will rent augers or other anglers will drill holes for a fee. Or you could fish a "used hole." Getting up early can possibly afford you a spot used by someone else the day before. If you have time, a Monday after a fishing weekend can offer its share of prime locations, and most likely you'll only have a thin layer of ice to poke through.

Before digging that honey hole, make sure the ice is safe. Always proceed with caution when venturing out on ice. Six inches or more usually provides safe footing. Common sense, though, works best. Many anglers fall through the ice because they are too eager to start the season, not willing to see it end, or not paying attention to warming trends. Bring along a buddy. That way you not only have someone to keep you company and listen to your complaints when the fishing is slow, but you also have help nearby just in case something should happen.

With a little care, keeping warm during an outing need not be a problem. Most warm clothing used for regular outdoor activities will serve well while ice fishing. The key is to keep your head, hands and feet warm.

A wool cap and hooded jacket should provide enough warmth for your head. If stocking caps make you itchy, the newer insulated baseball caps with ear flaps work great. Some tie or have Velcro snaps under the chin. Ski shops, stores that cater to the outdoor enthusiast and some catalog outfitters carry them.

Keeping hands warm sometimes can be a problem. You can keep them toasty by just leaving them in your pockets if you're using a tip-up. In other cases, hand warmers can provide some additional relief. A good pair of insulated gloves can also fit the bill. Scuba diving gloves also work great for ice fishing. Make sure you dry your hands thoroughly after reeling in your catch to prevent frostbite.

Insulated rubber boots, wool socks and sock liners are fine for your feet. If you have a tendency to get cold toes, electric socks (powered by battery) can keep your feet warm even in the coldest climates. Another good idea is the less bulky type of boot used in snowmobiling. The boot is rubberized to keep the feet dry, but porous enough to allow perspiration to evaporate. Insulated underwear adds a layer of comfort.

It's also smart to bring something to stand on, such as a piece of wood or cardboard, so your feet aren't in direct contact with the ice. And a five-gallon bucket makes a great seat in addition to carrying your equipment.

Sheds, ice shanties or modified tents on ice runners are other ways to keep warm. Some are lightweight and compact enough to fold. Those little units can really keep out the cold, especially if equipped with a small stove or lantern. A radio also adds a homey touch and can alert you to any approaching storms.

Armed with the correct equipment and clothing, the question now is where to fish? The answer is simple — any lake or pond that produced fish in warmer weather. And in winter, if you catch fish in a certain spot today, they are likely to be in the same place tomorrow and several days after that because fish travel more slowly at this time of year. If you have a map of the pond or lake (many area bait shops or state agencies have them), study the contours of the bottom. The mouth of feeder streams can be key areas, especially after a rain or on a warm day because of the influx of food.

Most lakes such as Monksville, Assunpink and Spruce Run are full of panfish such as perch, sunnies and pickerel. Catching them in winter helps cull the population and prevents stunted fish. Some private lake associations will give outsiders permission to fish. You might work out a deal for ice fishing privileges in return for helping out with some summer duty. That way both parties benefit.

Catching a large variety of fish means using different tactics.



Panfish roam near weed beds located by channels, drop-offs and deep-water points. Waxworms, mealworms, red worms and grubs are the best baits for panfish.

Cheese, ice spoons and larval baits can be deadly on trout. Fishing the deeper water where weeds are present can produce the bigger species of fish like the lake trout of Round Valley or the walleye in Monksville. Greenwood Lake on the New Jersey-New York border has been known to yield brown trout, plus it also has been stocked with muskies. Some of these muskies have found their way into Monksville as the two are connected by the Wanaque River.

Walleye and northern pike are considered winter trophy fish. Both feed on baitfish (shiners or minnows), but they also attack artificial lookalikes. Those seeking walleye in Monksville should look for gravel-bottom areas with bars and humps as well as deep grass and brush. Fish the deep edges of weed beds for pike in places like Spruce Run and Budd Lake. The fishing, though, may be tough in Spruce Run this winter because of the low rainfall last summer. Much of the shoreline weeds didn't grow because of the low water conditions which closed the waterway to swimming for part of the summer.

The author and son Erik show that ice fishing can be a family affair.



Pike and pickerel primarily are day feeders, so it usually doesn't pay to keep ice fishing for them into evening. Other fish, particularly walleye and perch, continue to feed into the night. Just bring along a lantern.

Largemouth and smallmouth bass also are a possibility. However, they seem to be more difficult to catch as they tend to be extremely sluggish during the winter months. The bass only seem to bite if the bait hits them on the head. Most are caught by accident.

If the action is a little slow, chumming (using bits of fish, worms or other baits) sometimes brings the fish. Grind or cut tiny pieces of bait, then mix with dry oatmeal or crushed egg shells and place it in a weighted container called a "chum pot." Drop the pot into a hole near your line, and it will attract smaller fish, which in turn attract the bigger ones.

Another helpful aid is a portable depth finder. They help to find drop-offs and weed lines. One of the best is the new Fishing Buddy by Bottom Line, which works with regular C batteries. The Fishing Buddy not only shows what's straight down, but also what fish may be present out to the sides. That way you can chop holes where you know the fish are.

If, after all this, you're not sure where to start fishing, ask around. Your local tackle shop, especially those near fishable waters, can supply helpful hints and point you in the right direction. Most tackle shops try to give reliable information — they want return business and bum tips don't help.

One of the simplest methods of finding the fish under their ceiling of ice is to take a quick survey of the area. If there are plenty of other hardy souls like yourself out there, then it's a safe bet the action is good. Ice fishers also tend to be more talkative about where the fish are biting than their warm-weather counterparts. Maybe it's a fear their tongues will freeze without use that makes enthusiastic talkers out of usually quiet anglers.

After choosing a likely location, pull up a sled or bucket to sit on, light your camping lantern for extra warmth — and enjoy. And bring the family. It's a fun outing in the great outdoors.

The New Jersey Division of Fish, Game and Wildlife puts out a publication called *Places to Fish*. It lists by county lakes, ponds, reservoirs and streams open to the public. It also gives the nearest town to the waterway and lists the types of fish available. Many tackle shops offer it as does the Pequest Hatchery. Or you can contact the Division of Fish, Game and Wildlife, CN 400, Trenton, NJ 08625, (609) 292-2965.

Jill Barnes is a freelance outdoors writer who lives in Fair Lawn.

Breaking the Ice with Children

When taking children ice fishing, it's a good idea to be prepared. The first rule is to take extra clothes. Youngsters have an inevitable way of dunking a foot or hand in water. Sunny days with little wind are probably the best times to venture out with the family, providing the ice has had adequate time to freeze. The sun can make things more pleasant on frosty days.

In addition to the basic fishing equipment, don't forget the snacks and hot chocolate — children tend to get hungry

in a hurry. Extra blankets can add warmth when the sun hides behind the clouds. You might even bring a sled and ice skates. A sled is great for hauling stuff to your favorite fishing spot, plus it makes a dandy place to sit. It also can be used to entertain the kids if they get bored. A child's attention span is limited, even when the weather is ideal and the fish are biting. With a sled, they can take time out to slide across the ice. Ice skates also can provide a diversion when the action gets slow.

Children tend to like the hand-held rods better than waiting around for the flag on the tip-up to pop. It gives

them a little more to do. Just make sure when they're jigging, they slow down a bit. Youngsters can exhibit a little too much gusto, but you never know what kind of erratic action will make the fish strike. Let children pick the lure that looks best to them. It keeps their interest up and it might even catch a fish.

If you bring a portable depth finder, let the kids watch the screen. It will keep them busy as well as teach them a little more about the sport.

Above all don't stay out too long. If the temperatures begin to drop, make sure your child can stand the extra cold. It's better to leave early and

come back another time than to have the kids hate it forever. Remember, you're all out there to have fun. Sometimes catching fish is secondary.

Note: Children under 14 years do not need a state fishing license. Children 14 and older do. Licenses for teenagers cost less than an adult license. Family licenses are available as well.



A boy (above) chops a hole in the ice with a hand-held chisel.

It's never too early (right) to get your first taste of ice fishing.



Following the Hunting Tradition

*Text and photos
by Robert Brunisholz*

Frost laced the bottoms of kitchen windows that cold December morning before the youngster and his father left the warmth of the house. Now, as the father-son team walked through a field browned by hoarfrost, the boy fended off the ache he was feeling in his fingers transmitted from the cold, steel action of the old double-barrel 16 gauge as he alternated it from hand to hand.

The father and son cut across a swampy section of low ground and headed toward a stand of cedar where pheasants sometimes grouped together in tight coveys to ward off the frigid winds of evening. The boy's father and his father before him had found pheasant and grouse in this very same spot for nearly 30 years.

The old 16 gauge had belonged to the father of the boy's father, and when the old man departed for a celestial hunt of his own, he had left explicit instructions: the gun was to be given to the boy.

As guns go, this one wasn't a state-of-the-art, shuck-out-the-shells piece with a long magazine tube that offered the reassurance of a quick third shot. Instead, it was a classic side-by-side, and the bluing was worn to a smooth patina near the mid-section of the barrels where hand wrapped around forearm.

The action was barely blue, but still slammed shut like a high-quality safe when a pair of waxy, brass-ended hulls were seated firmly in the chambers. On the walnut forearm, the fine, 24 line-per-inch checkering had worn smooth in a spot where the old man's wedding ring contacted wood during hundreds, perhaps thousands, of times the gun had been shouldered to follow the flight of a pheasant.

The boy was 12 when it was decided he'd grown big enough and responsible enough to handle his granddaddy's double. It had been the only gun his grandfather had ever hunted with, and the only gun the old man had owned. And though the old man said it would probably be shot out in a few years, he was mistaken, for it had been well made. The barrels were still true, and the ejectors clicked firmly into place with no sign of wear.

When the boy's father made the announcement that this was the Christmas on which the youngster should receive the gun, his wife cocked an uncertain eyebrow. Though married to a hunter and shooter, she harbored an inherent distrust of guns. She was a woman of urban upbringing. Try as she did, she couldn't make the connection between a machine made of wood and steel, and stitches in the fabric of a hunting tradition that bind the soul with intensely personal images of wheeling ducks, or pheasants cackling as they tower from a bramble bush on cold December mornings. To negate the old man's wish for the gun to be the boy's, was to loosen a strand in that fabric, and threaten to see the whole thing unravel like a cheap sweater.

The most difficult thing for the man was waiting until Christmas morning when the gun would be given to the boy. The boy's father knew the gun well. Sitting on the floor near a pile of less significant gifts, the man ran his fingers gently down the barrels, then used his sleeve to wipe away the tell-tale print furrowed throughout the light coating of oil. To the



A hunting experience can be
a tradition handed down
through the generations.

The man looked at the shotgun cradled in the boy's arms, remembering and relishing the innumerable times he watched his own father take proper lead on a cackling pheasant with that very same side-by-side.

casual onlooker, the man seemed intent upon the gun, but in his mind's eye, the boy's father was looking inward, seeing shadows of different winters with cold, clear skies, and hunts of years ago in which his own father would steady a handsome but nervous setter that was long gone, but far from forgotten.

The stock was worn, but the contrasting patterns of light brown-to-black walnut swirls nature had designed long ago in a tree remained rich. So deep was the figure, when held in just the right light, the polish of ages of handling often gave the illusion one could reach below the surface as if through ripples in a pond, and feel the swirling layers of growth.

That Christmas, when the boy received the gun, he could barely shoulder it, though he could do so sufficiently

to make hunting with it safe. As young as he was, the youngster knew enough to first break and check the action. Now certain the gun was unloaded and clear, he shouldered it, tracing the flight of a phantom pheasant. He meant no disrespect when the front sight bead came to rest pointing at the Christmas star atop the tree. It was, after all, his first gun and he had to feel the swing.

The youngster had to pass the required state hunter-safety course before he would be issued a license. But he'd done well with his tests and, now, late in the season, the young Brittany spaniel was working the same, tiny knot of cedar trees, just as the man and his father worked the edges with bird dogs and beagles, long before the boy was born.

The boy was several yards ahead of his father. The man's attention was momentarily diverted as he inspected a sapling rubbed bare by a buck, and with the distraction, he'd failed to notice the bell on the Brit's collar had silenced. The dog had locked up solid only a few feet ahead of the boy when the jarring report snapped the man to attention, but not soon enough. He saw only feathers parachuting to the ground.

As usual, the headstrong Brit broke early; its instincts — automatically figuring flight path and trajectory — placed the dog almost at the spot the bird would come to ground. Begrudgingly, the Brittany brought the dead bird back to the man, who in turn, handed it to the boy.

Standing together, the man and the boy admired the brilliant plumage and the two-foot-long tail. "That's a beautiful bird," the man said, "and you made a fine shot to get him."

The boy seemed awkward, almost embarrassed by the compliment. He told his father it was the balance, and the easy way the gun shouldered that made the shot simple. Neither knew at the time their lives would change from this moment hence. The subtle exchange of warmth and love between the boy and his father reached back through time. The man looked at the shotgun cradled in the boy's arms, remembering and relishing the innumerable times he watched his own father take proper lead on a cackling pheasant with that very same side-by-side.

The boy's father would always be there for discipline when required, and for guidance when it was necessary, and for support when that was needed. But what neither man nor boy understood at this moment was that their lives from this point on would intertwine for years to come, not only as father and son, but also as hunting partners, and the vortex of their friendship would swirl around memories of pheasants missed and pheasants bagged. The first shot the boy ever made with his grandfather's double would be mirrored in their minds forever.

The boy reached behind him, feeling for the slit of the game pocket in the coat where he gently tucked the pheasant — just as had happened with another father and son, years ago, during a time when our nation was going through the metamorphosis from agrarian to a “high-tech” industrialized country. For the two standing by the tightly herded cedar trees, time had changed nothing.

But while they stood there on that cold winter morning, satellites were spinning about the earth, sending coded messages back in trillionths of a second; computers were byting; microwaves were beeping. And oblivious of the two standing near the clumped cedars, thousands of 21st-century technologies forged ahead to form a new age.

Some would say that people who live only in that world, and base their happiness largely on huge amounts of money, trips to exotic places and the chance to outwit peers over power lunches, may attain happiness, but only in fleeting glimpses.

But for others, true and lasting happiness most often depends on the soothing salve of memories collected in the hushed solitude of a winter woods — shared with a son and his granddaddy's gun.

Bearers of the Tradition

There are others equally as fortunate, and who understand that our present passage through time defines not only who we are, but determines as best as mere mortals can, what we stand for in today's transitory world of constant technical change.

Bob McDowell is the director of New Jersey's Division of Fish, Game and Wildlife — a life he has chosen due largely to a love of the outdoors and a desire to try to shape the future for his sons. The tradition of hunting handed down from father to son plays a large role in the



The gun was a classic side-by-side, with worn bluing and a notch in the forearm where the grandfather's wedding ring made contact with the wood.

McDowell family.

McDowell, like many who understand that we are still at the mercy of natural forces, despite our external, sometimes arrogant, high-tech world, is a private person reluctant to reflect on the burning in the heart of a hunter. But, he does offer some insight about his own sons and the hunting tradition.

"Darrin, one of our three sons, served in Iraq during Operation Desert Storm," McDowell says. "Like any parents, we worried about him. When he wrote us, however, his letters contained very little about the war.

"What he focused on instead was his eagerness to return home and hunt with his mother Jan and me. Hunting — and for that matter fishing and just about any outdoor activity — has been a big part of our lives," McDowell says.

Like in many families, hunting is a tradition that has been handed down in the McDowell household. But tramping fields and downing a deer or a brace of pheasants is but a tiny part of the overall picture, according to McDowell.

"It's much more than just the act of hunting. The hunting tradition includes all of the outdoor experience. But hunting is just a vehicle, a way in which we can instill a feeling for the environment and an understanding that you are but one part of nature's scheme," he says. "Hunting ethics are important in our family, but manners in the field, and a caring attitude about nature in general, spills over into other parts of your life.

"I'm convinced such matters make people better even when they're not hunting. To survive in society today, we all have to obey rules, and hunting has rules also. But self-imposed ethics and a strong, caring feeling for all creatures, large and small, is all part of handing the hunting tradition down from generation to generation," McDowell says.

Roy Decker of Sussex County has two sons, and his wife Carol is renowned for her accurate and beautiful wildlife paintings. Decker and his family also come from a long line of hunters. For Decker, the tradition began when, as a youngster, he carried a stick in lieu of a gun while accompanying his grandfather on bird hunting trips.

"Personally, I couldn't imagine another way of life," Decker says. "Hunting, fishing and the outdoors is such a large part of our family, I couldn't even begin to picture us in another environment. Carol is an excellent turkey hunter, and she also loves to bowhunt, as do our sons. Hunting isn't part of our lives, instead we are part of the hunting tradition.

"As a family, the outdoors experience and hunting have kept us exceptionally close," Decker says. "My wife is not only a wife, nor are my sons merely my sons. They are, rather, my best friends. That's how passing down the hunting tradition has affected our family."

Perhaps the hunting tradition is not considered a serious matter by those who do not understand. But we all live by symbols, and if nothing more, hunting symbolizes our humbleness in the overall scheme of nature. To many, it is also a symbol of our affirming — rather than rejecting — the past. Merely stockpiling wood and a hunter's well-stocked larder tells us how far we've come from frigid and drafty caves, and that we can achieve what we dream. For the hunter, Christmas and winter bring us long silent nights spent in the warm oasis of love and companionship found only in the power of family and friends who share a need to return to snow-blown woods, and to walk within the shadows of mountains on cold, crisp winter mornings with your grandfather's double barrel tucked under your arm.

Robert Brunisholz is a freelance outdoors writer who lives in Califon.

Winning One for Women

Carol Ference of Clifton had just finished painting her nails at her post in the woods when she picked up her bow and shot a 90-pound doe. "That deer had my name on it," says the mother of three, a hunter for 22 years.

Ference is one of a growing number of New Jersey women who hunt. The National Shooting Sports Foundation of Newtown, Conn. estimates that 10 to 12 percent of those in the sport are female — a total of 3.3 million out of 18.9 million hunters nationwide in 1992.

In fact, the number of women in hunting has doubled nationwide in just the last 18 months, says Sue King, executive director of the Women's Shooting Sports Foundation in Houston, Texas.

Although statistics are not kept in New Jersey by gender, the number of women participating in state-required hunter education courses has increased over the last decade, says Cindy Kuenstner, a senior biologist and hunter education administrator for the central region of the Division of Fish, Game and Wildlife.

Undeniably, many women are introduced to the sport by husbands or boyfriends.

"My husband wanted a companion," says Madelyn Picone of Cedar Knolls, a member of the New Jersey Fish and Game Council who has been hunting for 45 years. "I just enjoyed going out with

my husband and my two sons. It's sort of a family affair, and I still continue to hunt even though I lost my husband 20 years ago."

Jan McDowell of Frankford began hunting 20 years ago with her husband Bob when her children were 2- and 4-years old.

"I got tired of not having anybody there for dinner," says McDowell. "At first, I went out to make my husband proud and to prove women can do it. But after 10 years and the deer were still winning the contest, you want to win one."

Kuenstner, who began hunting while a wildlife management student at Rutgers University's Cook College 11 years ago, says many women like the sport because of the personal challenge and a great appreciation of nature.

"What a great excuse to hang out in the woods," she says.

Ference was lured into hunting by training a bird dog with her husband Gerry. After putting the dog through its paces in the field, hunting was a natural progression, she says.

Ference practices hard at her craft and has passed her skills on to her son. "My son got his first two deer with his mother," she boasts.

King points out that women are beginning to discover hunting on their own. Stereotypes are also fading, she says.

"As the species evolved, men did the hunting because they could not stay home and nurse babies," according to

King. "But today because of things like birth control and day care, women are free to go out and enjoy the outdoors."

King says some single mothers are taking up hunting to introduce sons and daughters to the sport. Other women discover hunting after purchasing guns for protection. And still others are drawn in by all-female hunting classics held across the country.

"Hunting is no longer seen as a male or macho sport," says Larry Ference public relations administrator of the National Shooting Sports Foundation (and no relation to Carol Ference). "It is fun and relaxing, and you get to be outdoors."

But while more women are finding their way to the outdoors, the hunting industry has not been as quick to respond. Some women — particularly those who are petite — have trouble getting guns, boots and clothing in their sizes.

"Women do have problems

getting clothes to fit them," Picone says.

King says that was one of the reasons the Women's Shooting Sports Foundation was born in January 1993. In addition to promoting shooting sports and hunting for women, the organization also plans to lobby manufacturers to outfit women better for the sport.

But women have managed to overcome the obstacles and stand side by side with men in this sport. And they have learned to love hunting — from the beauty of their surroundings to the skill and challenge that goes into the kill.

"I got to learn a lot about wildlife and be in the fresh air and see the fall happen," McDowell says. "The women I know enjoy being in the wilderness and seeing wildlife in its natural habitat."

Bow hunter Mimi Dunne after a successful outing.



AL IVANY

Coyotes Calling

By Dory Devlin

Last winter, coyotes came calling on Harold Topakyan's Hunterdon County farm for the first time in 48 years. The farmer says they slaughtered about 30 lambs in a three-month period, until moving on to other prey when the winter freeze thawed.

"They were beauties, too," Topakyan says of his lost sheep. "They came and just cut their throats."

While such coyote attacks are not typical in New Jersey, these adaptive, resilient canines are being spotted more throughout the Garden State as their population thrives amidst a bountiful habitat. Rodents and rabbits are the more standard fare for coyotes, and wildlife biologists say there are plenty to be found in residential, rural and, sometimes, even urban areas to sustain a coyote population.

Brad Holloway, supervisor of the New Jersey Division of Fish, Game and Wildlife's Wildlife Control Unit, thinks some of Topakyan's loss may have been caused by turkey vultures. "But there's no doubt the coyotes did kill some of his lambs," says Holloway. Another Hunterdon sheep farmer in Whitehouse had a similar problem a few years ago, but the family of coyotes moved away after one of the pups was shot to halt the damage, says Holloway.

State trappers set snares on Topakyan's Stonybrook Farm in Changewater, but they came up empty. "Normally, when we get word it's usually too late. The damage is done," says Holloway.

As stories of coyote slaughters of sheep as well as domestic cats and dogs spread, the coyote's legend as a cunning predator grows with it. So, when coyotes come face-to-face with residents of housing developments that newly impinge on semi-rural areas, they are greeted with fear and, sometimes, panic.

"People get alarmed. They're not used to seeing wildlife so close," says Pat McConnell, principal wildlife biologist with the Division of Fish, Game and Wildlife. "And coyotes you will see because they are so adaptive."

Although coyote sightings are becoming more frequent, no one has ever reported being attacked by the animals in New Jersey, wildlife biologists stress. But when a family of coyotes was spotted in Saddle River last spring, residents of the affluent Bergen County community began to howl, requesting the state remove



the pair of adult coyotes and their pups. The owner of the 23 acres the coyotes were calling home did not find them bothersome, however, so local and state officials determined there was no reason to remove them, says Holloway. He notes that coyotes usually set up territories ranging from 3 1/2 to 7 1/2 miles, and Saddle River, with its large, wooded lots, is five square miles. That means the family sighted was probably the only one in town.

"People are concerned about safety — it always comes down to the safety of children," says Holloway. To avoid any trouble, McConnell says coyotes should be treated like any wild animal, not with fear, but respect.

"Don't approach and don't harass," warns McConnell. "A coyote will leave you alone if you leave it alone."

Coyotes number in the high hundreds to possibly a thousand in New Jersey, McConnell estimates — stressing it is only a guess because biologists don't track or tag coyotes. Mortality rates give wildlife biologists one indication of how many live in the state. On average, 30 coyotes are killed on New Jersey's roads a year, mostly in Hunterdon, Morris and Warren counties, McConnell says. That's a function of both the number of highly traveled roads and a growing population of coyotes, she says.

"There's been an increase in traffic volume and an increase in development, which puts animals in more contact with vehicles and people, increasing their chances to be killed," says McConnell.

Compounding the problem is the coyotes' wide range. They can be found virtually throughout the United States, and they have been seen in all of New Jersey's counties, except Camden and Hudson, says McConnell. Most reports of coyote sightings come in the spring, when coyotes have their litters, averaging five to six pups. Mother coyotes become a little less cautious, venturing from their dens to find prey for their young pups, says McConnell. That's why they are spotted more frequently. In the summer, whole families can be seen as the mother and father teach their pups to hunt and forage on their own. In the fall, they start to disband and begin what is generally a solitary predator's life.

A coyote's diet is varied — from fruit, vegetables and insects to

small mammals. Most coyotes live on rodents and rabbits, and they have found an abundant supply in New Jersey. They will eat deer, but usually one that has already been killed. Rarely, do they team up to snag an adult deer unless it is trapped by snow, although they will kill a fawn to feed their young pups.

The lore of the coyote as a wily trickster able to outsmart man has some roots in truth. Research shows a close relative of the coyote existed two to three million years ago. Private and governmental efforts over the centuries to eradicate the predator have only proved to make the species stronger. Like other animals under attack, coyotes became more fertile, breeding at an earlier age and producing larger litters.

In New Jersey, coyotes can be killed by farmers only if they are causing damage, but the kill must be reported to the state Fish, Game and Wildlife's law enforcement office, says Holloway. The better way to attempt to deter coyotes from scavenging herds of sheep is through electronic fencing or a good guard dog, biologists say. But farmers like Topakyan question how effective electronic fencing can be on a sprawling farm or in deep snow.

For many centuries coyotes were found only west of the Mississippi River. But, biologists speculate, in the beginning of this century they embarked on a migration leading them north through Canada to the East Coast via Ontario to New York State, onto New England, Pennsylvania and New Jersey. Now they can be found in every state along the coast. (For that matter, coyotes are in every state except Hawaii.) The eastern coyote differs in size from its western counterpart; it is larger, possibly through cross breeding with wolves, biologists speculate. Males average between 35 and 40 pounds, while females weigh between 30 and 35 pounds. Western coyotes of both sexes are typically 20 to 30 percent lighter.

A few biologists believe the eastern coyote has been here all along in low numbers, but most biologists like Holloway believe the coyote has naturally expanded its range. The species' population is making inroads in states like New Jersey, he suggests, where development is replacing heavily forested areas — not normally inhabited by coyotes — with more hospitable wooded lots and fields with young growth.

The coyotes' western counterparts have been doing the same in places like Southern California, where they have been preying on domestic dogs and cats in areas where homes have moved into their habitats, says Caryla Larsen, a wildlife biologist with the California Department of Fish and Game.

"People want to live in the woods but don't want to deal with the animals that live there. It's the same with mountain lions and bears," says Larsen. "They were there first."

But people who move into areas also inhabited by coyotes are

going to have to live with them because history shows they are not going anywhere.

As coyotes continue to find welcome homes in what were once New Jersey's agricultural fields, in its wooded lots surrounding new development and its remaining open fields, the animals are here to stay.

"As long as that habitat is here, the coyote is going to be around long after we're gone," says McConnell.

"You can't get rid of them," echoes California's Larsen. "They are so adaptable to any situation. They are going to make it like cockroaches and English sparrows to the end of the world."



PHOTOS BY KAREN SERVIS

A young eastern coyote, whose mother was killed by a car, was rehabilitated by the Woodlands Wildlife Refuge.

Dory Devlin, who lives in Basking Ridge, covers Morris County as a reporter for the Star-Ledger.



A Winter Escape to Duke Gardens

Worldly Perfection Under an Acre of Glass

Photos by Walter Choroszewski

It began as greenhouses to grow orchids in the 1930s. It has evolved into Duke Gardens, a unique presentation of 11 gardens under glass. In the past quarter century, few photographers have been given the clearance to document these niches. For the history and a self-guided tour of the gardens, see the related story on page 8.

Both of these photos show the Chinese Garden.







New Jersey State Library

The English Garden
(opposite page) and
the Indo-Persian
Garden (above).



The American Desert Garden (above) and the Tropical Garden (opposite page).







The French Garden
(opposite page) and
the Japanese
Garden (above).

Plane Car, with boat at bottom of Plane,
near Phillipsburg, N. J.



MOUNTAIN SAILORS

In Search of the Morris Canal

By Michael Aaron Rockland

There are landscapes that haunt. Not the majestic sugar maple outside my window, even with the fog swirling about its trunk. The maple is beautiful, but it lacks the human touch, lacks history. It is the archeological feeling of places where people have been and are no more that haunts.

Canals are just such haunting places. They are at that junction between man's works and nature's — which is where I like to hang out.

New Jersey has two of these waterways, both of which were built over a century and a half ago, were abandoned 100 years later and now lie just out of sight, at the periphery of our lives. I have lived for years around the corner from the Macculloch Hall Museum in Morristown and only recently realized that George Macculloch inspired the Morris Canal, remnants of which are nearby. Earlier, I lived in Princeton, close to where the Delaware and Raritan Canal flows, but drove over one of its wooden bridges every day on the way to work without a glance.

One reason we tend not to see old canals is because there isn't much to distinguish them from rivers. Walking along the Delaware and Raritan, one observes its collapsing walls and thick vegetation, the cattails luxuriating in its shallows, the prodigious



Plane Car, with boat at top of Plane,
near Phillipsburg, N. J.



These postcards from the early 20th century show Inclined Plane 8 West in Stewartsville. The cards carried the day's more popular location of Phillipsburg to sell larger quantities.

FROM THE COLLECTION OF JIM LEE



number of box turtles sunning themselves on its banks, and one thinks: "What a lovely river!" But then one comes upon some rusting lock machinery or a concrete mile marker, nearly engulfed by vines, and realizes that, while nature is fast taking over, the ghosts of those who built and used this liquid highway are everywhere.

In the case of the Morris Canal, the ghosts are less apparent, for the canal has been largely obliterated. This is quite remarkable, considering this manmade waterway stretched 102 miles from Phillipsburg to Jersey City. Today, in Newark, the city subway runs in the canal's bed, and elsewhere the canal is covered by shopping malls, highways and condominium developments. But, while standing at the outskirts of a West Jersey town, one may notice a hint of a line heading across a vacant field which is entirely too regular or, while crossing that same field, stumble over some quarried stones or bits of shredded timbers — evidence that the Morris still haunts the area.

Finding the Morris often takes detective work. One fantasizes sending up a satellite with "remote sensing" capabilities to map what is sometimes undetectable on the ground, as if searching for the local version of Peru's Nasca ruins. But this is not quite

necessary: here and there in the woods is an indication of an embankment, or perhaps a shallow depression overgrown with weeds, or a crumbling stone wall, or an unnaturally tamed hill which was the site of one of the canal's inclined planes.

Still, with the Morris Canal there is more to think about than to traverse. It is as if the genius of Americans is indicated twice in the Morris — both in its construction, commissioned in 1824, and in its systematic and comprehensive destruction beginning in 1924. It was inevitable the railroad would replace the canal, that what one could do in five hours would satisfy practical Americans better than what required five days. But the Morris was not just superseded; it was annihilated. It was dynamited, filled in, buried, as if it held some shameful secret, all traces of which had to be expunged. In Europe, one comes across old canals still in desultory use and 2,000-year old aqueducts far more intact than the 19th century Morris Canal. That Americans would spend more money destroying the Morris than it took to build it suggests something less than attractive about our national character.

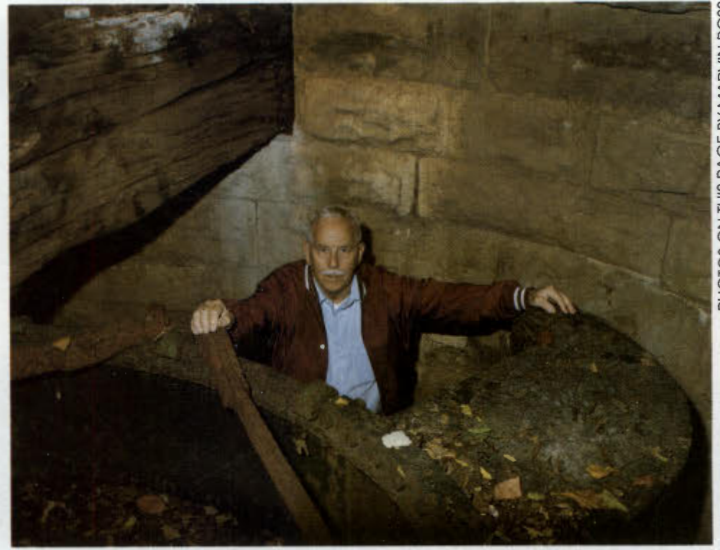
Nevertheless, one can launch an expedition along the route of the Morris Canal, discovering its remnants here and there. I have followed the route of the canal in my fashion. In Jersey City, I



Near the top of Inclined Plane 9 West, Jim Lee lives in the old plane tender's house (above).

Jim Lee stands beside the turbine at Inclined Plane 9 West in Port Warren (top right). The turbine acted like a giant water sprinkler to generate the energy needed to move boats up or down the 100-foot incline.

Lee squats in the tailrace (bottom right), a 150-foot tunnel which carried water away from the turbine. The tunnel is about five feet tall, but the water which flowed through it was generally only a few inches deep.



PHOTOS ON THIS PAGE BY MARVIN ROSS

discovered that the Big Basin, which cuts inland alongside the historic Central Railroad of New Jersey Terminal in Liberty State Park, is now the berthing place of the replica of Henry Hudson's ship, the Half Moon, and the departure point for ferries to the Statue of Liberty and Ellis Island. In Clifton, behind a gas station, I came across 150 feet of the canal that has been restored as a mini-park. Just outside Paterson, I found the shadow of the canal where it once traveled along the base of Garrett Mountain, just off Interstate 80.

Further west, I discovered a tiny piece of the waterless canal in a farmer's field. It looked like the foundation of an abandoned house. The stone walls were held together by vines, and I held onto them as I climbed down, jumping the last five feet into the bed of the canal, which was overgrown with the brambles of raspberries and wild roses. I got badly scratched, and then I couldn't climb out of the canal — indeed, I momentarily panicked, thinking I might be trapped down there forever.

After finally scaling the wall, I traveled to a place called Port Warren to see Inclined Plane 9 West. Jim Lee lives atop Inclined Plane 9 West, surrounded by the rusting remnants of the machinery which once hauled loaded boats up the hill.

Cables lie in the grass, rails in the bushes.

Jim Lee has been restoring his piece of the canal for years. It started as his hobby and became his life. The Morris inspires this kind of devotion. As Jim has written in his book, *The Morris Canal: A Photographic History*: "I think the Morris Canal was a beauty mark on the map of New Jersey, a place where men could work and boys and girls could play; a place where a Sunday walk on the towpath was sheer contentment; a place where there were more fish than fishermen."

More than does the Delaware and Raritan, which still flows between the two rivers which give it its name, the Morris Canal provokes nostalgia in canal lovers, perhaps because there is so little of it left — and a sense of loss is often key to nostalgia.

The great majority of New Jerseyans, nevertheless, are utterly unaware of the canal. Several high and dry towns in northwestern New Jersey, with no major rivers or bodies of water in sight, have "port" as part of their names — Port Murray, Port Colden, Rockport, Port Morris. Usually, one finds a creek in such towns, flowing within its proper banks again after 100 years of lending its waters to the canal. Usually, one also finds longtime residents who have no idea of the origins of their towns' names.



FROM THE COLLECTION OF JIM LEE

This Richard Schisler painting depicts Inclined Plane 12 East in Newark, now the site of Raymond Boulevard and the city subway.

At sleepy Port Morris, I asked a high school student where his town got its name.

"Don't know," he said, looking at me blankly.

"Did it have anything to do with the Morris Canal?"

I persisted.

"Don't know," he said.

If the canal's history is lost to many people, so is its stupendous mechanical achievement. In addition to 23 lift locks, there were 23 inclined planes on the Morris, each a poem to American ingenuity. Since the changes in elevation traversed were too extreme to move boats up and down by locks alone, boats were hauled over the mountain on rails using water power. Consider that the canal rose from Jersey City some 914 feet until it reached its high point at Lake Hopatcong, its main water supply. It ascended and descended 1,674 feet as it crossed the state to Phillipsburg, 16.5 feet of vertical movement per mile.

By comparison, New York's Erie Canal made one foot of vertical movement per mile, and the Panama Canal rises and falls only 85 feet in its 50-mile trip between the Atlantic and Pacific oceans. Boatmen on the Morris were a species of mountain sailors.

The Morris was celebrated around the world. The British

writer, Frances Trollope, who, in her *Domestic Manners of the Americans*, had few good things to say about Americans, showed uncharacteristic enthusiasm for the canal when she visited it in 1831. Trollope noted "a delightful day" spent in New Jersey "visiting with a most agreeable party, the inclined planes . . . on the Morris Canal." She records being taken with the way the canal "at one point runs along the side of a mountain at thirty feet above the tops of the highest buildings in the town of Paterson, below; at another, it crosses the falls of the Passaic in a stone aqueduct sixty feet above the water in the river."

Trollope's enthusiasm for the Morris' inclined planes is echoed by anyone who has ever taken an interest in canals, for an inclined plane was the equal of five or six locks. Using Scotch turbines — which were powered by the canal's own waters falling from a height and functioned like giant, rotating lawn sprinklers — the Morris Canal hauled 80-ton coal and ore boats on rails up and over the high hills of New Jersey. The power of water!

Morris Canal boats spent so much time on rails, they were almost amphibious — like those World War II assault craft that crossed the water, mounted the beach and went riding up over the land. A canal boat approaching an inclined plane typically was

Inclined to Learn

Not long after exploring the Morris Canal, my little knowledge of inclined planes came in handy. I had come home with a boulder for the garden in the deep well of my automobile trunk. Never mind how the boulder got into the trunk; that's another story.

The problem now was how to get the boulder out. I had no block and tackle, and the boulder weighed 500 pounds. A neighbor said he would help me, but there were only two of us trying to reach down and pull 500 pounds of dead weight out of my trunk — at considerable peril to our backs.

Remembering the Morris, I got some boards, angled one up in my trunk, another down on the outside, and we inched the boulder up our little inclined plane and eased it down the other side and onto the ground.

Come to think of it, Egyptian slaves built pyramids the same way.

—M. A. R.

The Morris Canal and Banking Company was chartered in 1824 with both canal and banking privileges. This \$3 bill (below) was among the currency produced to pay tolls and buy goods at stores along the Morris Canal. The company, however, went into bankruptcy in 1844 and dropped its banking privileges.



FROM THE COLLECTION OF JIM LEE

floated onto a cradle with a wheeled undercarriage and winched by cable up or down the railway. It then entered the next watered section of the canal on a new level. With a total distance in inclined planes of more than five miles, the Morris was quite a little railroad on its own.

Sometimes a trip on an inclined plane was less than smooth. The heavily loaded boat Electa was making its maiden trip on the canal in the early 1830s. Just as it started down the inclined plane at Boonton, the chain to which the cradle was affixed snapped. A newspaper many years later described the boat with its tons of pig iron gathering momentum and "hurtling down the plane with the captain's wife and two children aboard. It hit the water just as a toboggan might and splashed water for hundreds of feet.

"Not only that," the account continued, "but its momentum was so great it skittered along the surface like a modern hydroplane, then lifted its bow at a crazy angle and finally hurdled over an embankment twenty feet high and landed with a crash in some trees."

When the shaken and worried bystanders rushed to rescue the captain's wife and family, who were fortunately uninjured, they explained that the breaking of the chain had caused the accident.

RATES OF TOLL ON THE MORRIS CANAL; ESTABLISHED MARCH 8th, 1854.									
ARTICLES.		Toll per ton of 2000 lbs. (See per ton) when 1000 lbs.		ARTICLES.		Toll per ton of 2000 lbs. (See per ton) when 1000 lbs.		List of the quantities of various Articles, which are to be estimated as a ton, in Collecting Tolls, subject to correction by actual weight.	
		cwt.	cwt.			cwt.	cwt.		
Apples, Quinces, and like green fruit,	1	90		Iron Ore and Forge Castings,	1	50		Hark,	one cord
Bark, (ground)	14	100		Lath, Heading, Staves and Hoop Pole,	1	65		Brick, common,	400
Bark, (pressed)	1	90		Lumber,	1	40		Brick, fire and pressed,	800
Brick, (fire and pressed)	1	90		Lime, going East,	1	50		Brick,	47
Brick, (common)	1	45		Lime, going West,	1	55		Barley,	100 bushels
Burntwood,	1	40		Live Stock,	1	60		Charcoal, (Forge Measure)	100 "
Castings,	14	100		Lumber Oil,	1	50		Corn and Wheat,	38 "
Chair Stalk,	1	40		Lumber and Logs,	1	40		Flaxseed and Rye,	40 "
Charcoal,	14	70		Machine,	1	60		Flour and Meal,	10 barrels
Chest, Antislack, going East,	14	75		Marble,	1	65		Fish, Oil and Potatoes,	7 "
Chest, " " West,	14	80		Old Oak,	1	85		Firewood,	half a cord
Chest, Blankets,	1	50		Paving Stones,	1	40		Hay, split, for horses, 1000,	1000 lbs.
Cotton and Wool,	1	50		Plaster, going East,	1	30		Hay, split,	800 "
Dry Goods, Groceries and Outlay,	14	100		Plaster, going West,	1	45		Lime, unslaked,	80 bushels
Distilled and Fermented Liquors, going East,	1	60		Pitch, Tar and Resin,	1	65		Lime, slaked,	60 "
Distilled and Fermented Liquors, going West,	1	60		Pots and Bells,	1	60		Lumber, Pine and Hemlock,	700 feet, 4 in.
Earth and Manure,	1	45		Rail Road Tie,	1	60		other kinds,	800 feet, 4 in.
Flour, Feed, Meat, Grain and Seeds,	1	60		Salt,	1	50		Oysters and Clams,	4000
Furniture,	1	100		Sand and Clay,	1	45		Potatoes,	40 bushels
Fish and Provision, in barrels,	1	60		Ship Timber,	1	75		Pots and Bells, small size,	80
Glass, Crockery, Stoves and Earthenware,	14	100		Slate for Roofing,	1	75		Plastering Lath,	4000
Grain, Bones,	14	100		Soap Stoves,	14	100		Pitch, Tar and Resin,	8 barrels
Hardware,	1	80		Spikes of Turpentine, Camphor and Burning Fluid,	14	100		Shirts,	80 bushels
Hides,	1	60		Steel, Spikes, Nails and Rivets,	14	100		Shoes, of all kinds,	40 "
Hydraulic Cement,	14	75		Stave Flaggings and Curbing,	1	75		Salt,	80 "
Iron, in Box,	14	80		Stones, not before enumerated,	1	45		Staves and Heading, for barrels, 1000, 4 in.	700
Iron, in Bulk,	1	80		Timber, not before enumerated,	1	50		Staves and Heading, for pipes,	2000 feet
Iron, in Anvils, Hammers and Bells,	14	80		Wood,	1	40		Stones,	15 cubic feet
Iron, in Pigs and Bars,	1	80		Zinc Ore and Franklinite,	14	75		Shingles, (3 feet),	2000
				Unenumerated Articles,	14	100		" (8 feet),	8000
								" (12 feet),	8000
								Whiskey, and other spirits,	7 barrels
								Window Glass,	5000 feet

FROM THE COLLECTION OF JIM LEE

Morris Canal Restorations

Jersey City

The Big and Little Basins formed the eastern terminus of the Morris Canal. Shacks built along the banks of the Little Basin after the abandonment have been cleared, and the basin is now part of Liberty State Park. The southern bulkhead of the Big Basin is used for ferries to the Statue of Liberty and Ellis Island. **Location:** North end of Liberty State Park, off of the New Jersey Turnpike.

Clifton

This half-mile level section with a towpath had been used as a dumping ground before a restoration begun by Jack Kuepfer in the mid -1980s. The debris was removed, and the canal was re-dug by hand. Several Boy Scouts have earned service awards for their projects in the park, while local clubs maintain the gardens. Mr. Kuepfer received the Take Pride in America Award from President Reagan for establishing the Morris Canal Park and Nature Preserve. **Location:** Broad Street, between Allwood Road and Van Houten Avenue.

Montville

Adaptive reuse as part of a detention basin for a condominium complex has revived this one-mile level section of the Morris Canal. By restoring the canal, the developer was able to utilize more land for building and recreation. Dave Phraner worked with the township and developer to devise the restoration plan. Water control gates, however, are not part of the original canal design. **Location:** Main Street (Route 202), Towaco, at Change Bridge Road.

Boonton

This picturesque section with a towpath between the road and the Rockaway River is an old restoration. It was recently cleared of deadfalls and debris, making it more attractive to viewers. **Location:** North Main Street, access from Public Works yard.

Wharton

Restored in 1976, this half-mile piece with a towpath is the most striking of publicly-accessible, level sections. In places the canal was cut into a rock ledge above the Rockaway River, while along the hill is fine stonework. The remains of the locktender's house can be seen at the far end of the park. **Location:** Hugh Force Park, West Central Avenue, 1/2 mile west of Main Street.

Ledgewood

The Rotary Club of Roxbury is restoring Inclined Plane 2 East in Morris Canal Park, which is owned by the township. The inclined plane and turbine chamber have been cleared, with future plans to rebuild the powerhouse for use as a museum. King's Store, near the circle on Main Street, is a massive stone store where business flourished during the canal era. **Location:** Take Main Street west from Route 10/46 circle, following the large sign for Ledgewood and the small sign for Morris Canal Park. Make a left on Emmons Road and a quick right at Canal Street. Park at the gate and walk across the mill pond dam. The plane is straight ahead.

Lake Hopatcong

This Scotch turbine was salvaged by the state during the canal abandonment. While its location in a concrete en-

closure is not original, it is readily accessible and easily photographed. **Location:** Exit 28 off of Interstate 80. Northwest side of parking lot for Lake Hopatcong State Park.

Stanhope Reservoir and Lake

In periods of very low water, remnants of the dirt towpath that crossed this canal reservoir can be seen. The capstones for Lock 1 West are visible in the park adjacent to the Musconetcong Dam, while a short watered section of the canal is across the road. When the canal was abandoned, the current dam was designed by engineer Cornelius Vermeule. **Location:** Route 183 at the Netcong-Stanhope boundary. Accessed by Exit 27 off Interstate 80.

Waterloo

In less than a mile, Waterloo has most of the major engineering features of the Morris Canal. A full scale restoration of Inclined Plane 4 West is planned. The bridge brought the mules across the Musconetcong River to Guard Lock 3, which formed an aqueduct over a tail race. Along the tree-shaded, level section is Smith's Store, with loading doors on the canal side. **Location:** Waterloo Village, Waterloo Road (Route 604), Stanhope. Follow sign posts from Route 80, Exit 25.

Starport

This level section in the woods of Allamuchy State Park is easily accessible. **Location:** 8/10ths of a mile west of Waterloo, second parking lot at Musconetcong River.

Saxton Falls

The Morris Canal passed through a guard lock as it left the Musconetcong River and resumed its path in a cut prism. The capstones of Guard Lock 5 West, with gate recesses, can be seen in the parking lot. Rope cuts can also be seen in the stonework. **Location:** Waterloo Road (Route 604) halfway between Hackettstown and Waterloo.

Rockport

This canal basin is used as a breeding pond for many waterfowl in the State Game Farm. **Location:** Across from State Game Farm office on Rockport Road. Rockport Road parallels State Highway 57 between Hackettstown and Port Murray.

Port Murray

A canal store and lime kiln can still be found at this location. **Location:** Turn right off Rt. 57 at Mansfield Township Elementary School three miles before Washington.

Phillipsburg

The Delaware River Park was once a large basin with loading docks for coal. Interpretive signage aids the visitor in understanding the importance of the western terminus of the Morris Canal. The best view of the western portal, a large arch that once held a drop gate, is from the Hugh Moore Canal Park across the Delaware River in Easton. **Location:** From Main Street (Route 22 Alt), go south on Stockton Street, then right on Howard Street, and under the bridge. Stone arch entrance to the Morris Canal can be viewed from Pennsylvania side of the Delaware River near confluence with Lehigh River at Easton.



Ice was often cut from the frozen Morris Canal in the days before refrigerators.

“‘Why,’ the captain’s wife said,” according to the newspaper, “‘it was a mighty fast trip, I’ll allow, but I thought that was the way the thing worked.’”

The Morris Canal, through the sheer audacity of its engineering, reminds one that the people who design rides at Disneyland are not called engineers but “imagineers.” The Morris must have been built by imagineers. Better still, by Rube Goldberg. The Morris was a Rube Goldberg drawing that worked. It was made up of as many parts — inclined planes, locks, sources of waters, pieces of canal — as any Rube Goldberg contraption.

The Morris Canal also reminds one of the Toonerville trolley from the old “Toonerville Folks” comic strip. Like the Toonerville trolley, the Morris headed through the most unlikely of terrains, over hill and dale, mission and destination seemingly known only to itself.

Also like the Toonerville trolley, the Morris Canal fascinates us because its technology is on a scale large enough and simple enough to understand, a welcome relief from the unfathomable mysteries of computers.

I recently watched breathlessly as a technician worked on my word processor. I thought I was about to know, firsthand, the meaning of life.

There was nothing inside the computer but a fan, some chips lined up in a row, and a bit of circuitry. The meaning of life, if my computer held the answer, is that there isn’t any.

In contrast, the Morris offers the surety, in the words of the old spiritual, that the “hip bone [is definitely] connected to the thighbone.” The Morris Canal is heavy, a cast-iron thing in an increasingly miniaturized, automatized, lightweight, plastic world. And while the canal is virtually gone, its sparse remains evoke a reassuring solidity, suggesting that oft-repeated phrase. “They don’t make ‘em like they used to.”

Michael Aaron Rockland is professor and chair of the American Studies Department at Rutgers University and author of six books. His new book, Urban Adventure, will be published this year.

For More Information on New Jersey Canals

Canal Society of New Jersey

P.O. Box 737
Morristown, NJ 07963-0737
908-722-9556

Meetings held in Morris Plains.
Slide presentations. Canal
Society Museum is located at
Waterloo Village, Stanhope,
NJ. Take I-80 to Exit 25, follow
signs to Waterloo.

Lake Hopatcong Historical Society

P.O. Box 668
Landing, NJ 07850
201-398-2616

Museum open Saturdays and
Sundays in Spring and Fall. Call
for directions and visiting hours.

Hugh Moore Historical Park and Museum, Inc.

P.O. Box 877
Easton, PA 18044-0877
215-250-6700

Canal Museum and mule-
towed boat ride. Exhibits of
Morris and Delaware canals at
museum. Take U. S. 22 to
Easton, Pa. Museum located
1/4 mile south of Easton, on
U.S. 611. Call for directions
to boat ride and archives center.

Friends of the Morris Canal in Warren County

205 West Moore St.
Hackettstown, NJ 07840
908-852-0597

Delaware and Raritan State Park

643 Canal Road
Somerset, NJ 08873
908-873-3050

Watered canal and towpath.
Opportunities for hiking, jog-
ging, bicycling, skiing, and ca-
noeing. Historic tours avail-
able. Call for directions.

New Jersey Historical Society

230 Broadway
Newark, N.J. 07104
201-483-3939

Books on New Jersey's Canals

James and Margaret Cawley,
*Along the Delaware and Raritan
Canal* (A. S. Barnes, 1970)

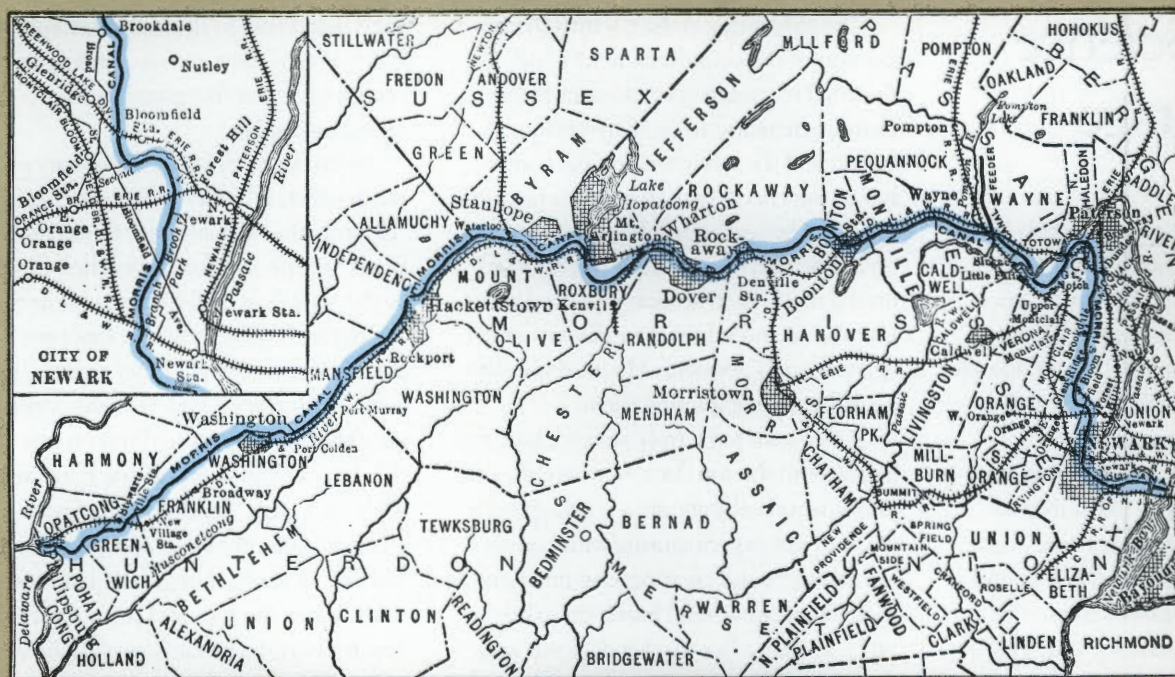
Barbara N. Kalata, *A Hundred
Years, A Hundred Miles —
New Jersey's Morris Canal*
(Morris County Historical
Society, 1983)

James Lee, *The Morris Canal:
A Photographic History*
(Delaware Press, 1979)

James Lee, *Tales the Boatmen
Told* (Canal Press, 1977)

William J. McKelvey, Jr.,
*The Delaware and Raritan
Canal: A Pictorial History*
(Canal Press, 1975)

Richard F. Veit, *The Old
Canals of New Jersey* (N.J.
Geographical Press, 1963)



This is the route of
the Morris Canal
that the mountain
sailors took on
the way from
Phillipsburg to
Jersey City
and back.

Outings



BARD MARTIN

Putting Science Center Stage

Want to take a magic carpet ride? A ride that will instruct and delight? Head on up, over, or down to Liberty Science Center, New Jersey's newest and most spectacular "edu-tainment" center, located in Liberty State Park just off exit 14B of the New Jersey Turnpike.

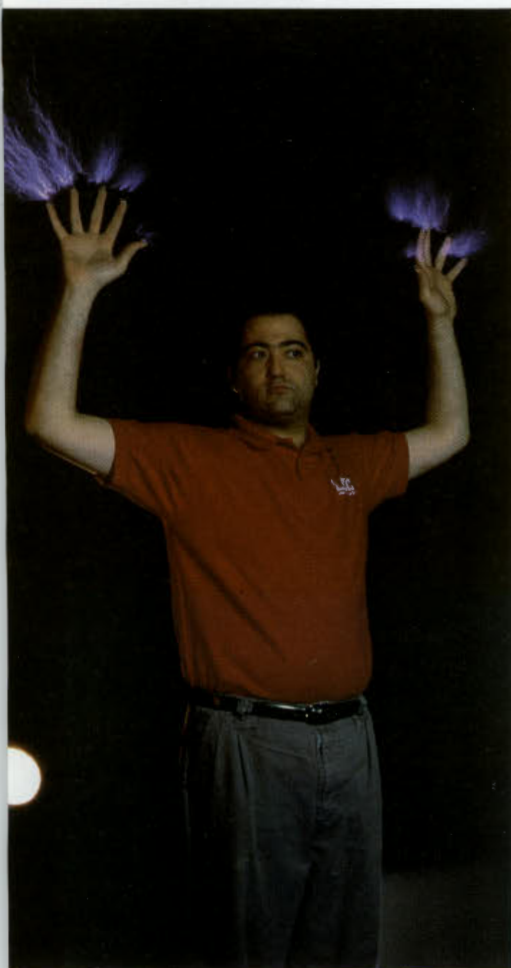
The center is a four-level building housing more than 250 exhibits plus theaters of varying types and sizes. Right in the lobby is a 1,700-piece, 700-pound aluminum geodesic globe, created by inventor Chuck Hoberman, which continuously expands and shrinks from 18 feet to 4-1/2 feet in diameter.

The expanding globe is a fitting introduction to the center's exhibits which are designed to stretch your mind and senses in three thematic areas — inventions, health and the environment. Each area has its own floor, with inventions featured one level beneath the lobby floor, health on the second floor and the environment on the third. Each section is packed with interesting and informative displays and "please touch" exhibits. Hours, if not days, could be spent exploring them.

If you want to be truly amazed, take the escalator to the top floor — where the environmental exhibits are — and spend a few minutes experimenting with convection currents and creating soap film paintings. There are several hands-on exhibits on air currents, but the hands-down winner is the Kalliroscope. A twist of the wrist, and the blue-green particles swirl in

their liquid base to illustrate atmospheric flow patterns. Beware, you can lose track of time gazing at this gorgeous, ever-changing display.

Swim downstream to the estuary exhibit, which is bordered by tanks housing fish and other inhabitants of fresh and salt water marshes and sandy beaches. Listen to the squeals of delight from children handling — possibly for the first time in their lives — fish and other aquatic life forms kept in the "Touch Tanks," which are opened periodically. Turn on one of the faucets that opens into the stream table — a giant "sandbox" filled with ground walnut shells — and watch how the flow of water changes the land contours. Learn the pros and cons of various beach-saving techniques as you cast your video vote to select your choice for a shore protection strategy.



ANDREW SCHWARTZ



ZICKI & BUTCHER

A rock climbing wall (opposite page) features fossils and fissures.

One million volts flow over Liberty Science Center's Dante Centori (left).

A camera shooting against a blank screen (right) puts participants in the middle of a virtual reality basketball game (above).



An interactive film about egrets and estuaries also involves you in making a decision. As you sit at a table equipped with selection buttons, you not only register your views on conservation and environmental protection, but make feeding choices for "your" egret which influences the outcome of the interactive film.

The environment floor also features several videos, including a computer-generated model simulating flight around the earth's surface and an informative look at boulder climbing. Tempted by the latter? The rock-climbing wall, studded with "fossils" and fissures, offers a safe opportunity to experience a short climb.

In addition, if you've ever wanted to get "up close and personal" with a giant rain forest tarantula, emperor scorpion or a Central American cave cockroach, the open exhibit area is the place to go. En-

closed in free-standing columnar habitats, these gigantic exotic insects are a budding entomologist's delight. Preserved examples of other insects, slides of their various parts, and 3-D images of bugs can be viewed by the more faint-hearted.

As you descend to the second floor's health exhibits, enjoy the laser images of fish, faces, bugs, birds and abstract geometric designs modulated by original synthesized music and reflected on the hand-woven wire screens hung at various levels throughout the atrium. Once on the second level, try your hand at one of the brain-teasers scattered along the walkway before crawling through the pitch black, 100-foot Touch Tunnel or wandering through the 1,000-square-foot maze of mirrors known as the Illusion Labyrinth. Learn more about your body as you view displays about the heart and some of the equipment used to moni-

tor it, and interact with exhibits which test balance, center-of-gravity, endurance and flexibility.

Dropping in on the lower level, home of the inventions floor, you can cavort in the Chromakey exhibit, where video technology places you in unexpected locales, and find out what you'd look like with Sophia Loren's eyes or Paul McCartney's smile by visiting the About Faces exhibit, where a computer will transform your facial features.

An Indy racecar, encircled by a remote-controlled racetrack is the centerpiece of a group of exhibits exploring aerodynamics and topics associated with machines and motion. If you're a wannabe engineer or architect, you'll thrill to the interactive displays which allow you to test a structure for earthquake resistance, use a boom crane to build block



A working mechanical clock sculpture (above) is one of the exhibits at the center.

An Indy race track (right) helps students explore aerodynamics.



BARD MARTIN

structures and experience how arches and bridges work. And in "The Workshop," "kids" of all ages work with invention kits and structural materials to build "a better mousetrap" — or any other invention their heart's desire.

As if these permanent exhibits weren't enough, the center also features temporary exhibits and seasonal activities, such as last summer's "virtual reality" basketball shoot, the fall's "About Faces" series of 14 interactive exhibits, and "Art Machines: The Sculpture of Norman Tuck," the artist's first major retrospective, which will be on view through mid-February 1994.

No visit to the Center is complete without the experience of the 400-seat Kodak OMNI Theater, the world's largest OMNIMAX® theater. The 88-foot wide, eight-story-high domed screen fills your vision, making you feel as if you're part of

the action. The center's signature film, "Welcome to the Max," makes the center's metaphoric magic carpet ride all too breathtakingly real as it takes you over and through the sights of New York and New Jersey. This is followed by the feature film, which changes periodically.

Of course, you wouldn't want to leave without visiting the Tools & Toys shop. It's crammed full of gifts and gadgetry, science kits and books, and souvenirs ranging from laser magnets to chirping bug key rings.

Liberty Science Center, which also offers innovative experiences such as group "camp-ins," is open from 9:30 a.m. to 5:30 p.m., seven days a week through June 20. Adult admission to the exhibits is \$9 and to the OMNI Theater is \$7; a combined ticket costs \$13. Students and seniors save \$1 on the exhibits and theater tickets and \$2 on the combined ticket, while tickets

for children (ages 2 to 12) are priced at \$6, \$5 and \$9 (exhibits, theater and combined, respectively). The first Wednesday of every month, admission to exhibit areas is on a "pay as you wish" basis from 1 p.m. to closing. There's a \$4 parking fee, and some shows may require a fee. For more information, call (201) 200-1000.

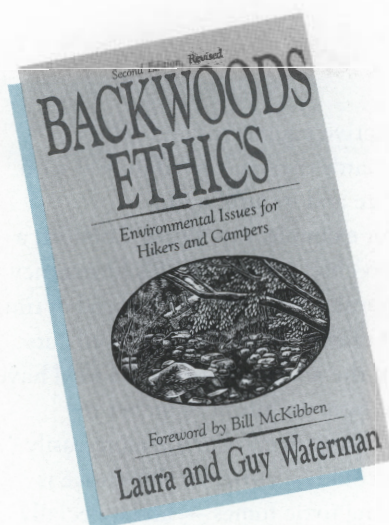
by Denise Mikics of the DEPE's
Office of Communications

Bookshelf

Backwoods Ethics, by Laura and Guy Waterman, published by Countryman Press, is a revised second edition of their popular "new ethics" book for the backwoods. It provides fresh ways to look at protecting the physical environment of our mountains and forests from overuse. It focuses on low-impact camping and alpine management. Also by the Watermans and from Countryman Press is **Wilderness Ethics**, a new guide to preserving the spirit of the wilderness. With sound logic, humor and many years of experience, the authors explore wilderness accessibility and use. *Cost of each book is \$13. Available in bookstores. For more information call Countryman Press at (800) 245-4151.*

The Best of Blueberries, by R. Marilyn Schmidt, published by Barnegat Light Press, is an update of Schmidt's out-of-print *All About Blueberries*. The book offers many ideas about how to harness the virtues of one of New Jersey's major crops. The new edition includes enticing new recipes as well as information about growing blueberries and using them in landscaping. *Cost is \$7.95. To order send a check for \$7.95 plus \$2 shipping and handling (New Jersey residents add 6% sales tax) to: Barnegat Light Press, P.O. Box 305, 26 W. Third St., Barnegat Light, NJ 08006. For more information, call (609) 494-3154.*

Down the Jersey Shore, by Russell Roberts and Rich Youmans, published by Rutgers University Press, is a chronicle of the events and geology that have molded and continue to shape the folklore and history of New Jersey's famous coastline. Ghost stories, Miss America Pageants, sunken Nazi submarines, boardwalks and even Ulysses S. Grant show up in this entertaining and informative account. *Cost is \$27.95 hardcover, \$12.95 paperback. Available in bookstores. For more information, call Rutgers University Press at (800) 446-9323.*



Exploring the Little Rivers of New Jersey, by James and Margaret Cawley, from Rutgers University Press, was first published in 1941. Since then it has become a New Jersey classic, a canoeist's travel companion and a delight to all who enjoy the outdoors. This guide to navigating the state's rivers has been revised by the Little Rivers Club, with new maps, pictures, a directory of canoe liveries and more. *Cost is \$29.95 hardcover, \$12.95 paperback. Available in bookstores. For more information call Rutgers University Press at (800) 446-9323.*

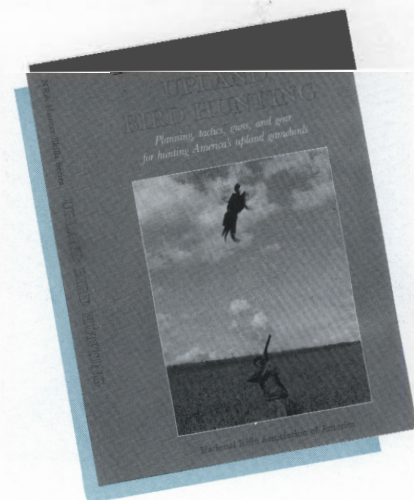
The Green PC, by Steven Anzovin, published by Windcrest/ McGraw-Hill, is the eco-smart computer programmer's guide to environmental computing. It explains how to compute sensibly using less power, less waste, less paper. You also can learn which computer companies are environmentally sensitive and how to contact environmental on-line networks. *Cost \$9.95. Available in bookstores. For more information, call Windcrest at (800) 822-8138.*

The New Jersey Coast, published by the Department of Environmental Protection and Energy's Office of Land and Water Planning, is a semi-annual newsletter available to all citizens concerned about statewide coastal planning, regulatory and enforcement initiatives that affect local governments and the public. *For more information, or to order your free copy, call the DEPE's Office of Land and Water Planning at (609) 292-2113.*

To Tell Me Terrible Lies, by Katherine St. Clare, published by Wainwright Press, is a historical romance novel set in New Jersey's Pine Barrens. Its tale wraps around the coming of age of Serena Wainwright during the Revolutionary War. One dollar from the sale of each book is donated to the Pinelands Preservation Alliance. *Cost is \$24.95, hardcover. Available at bookstores. For more information, call Wainwright Press at (215) 966-4762.*

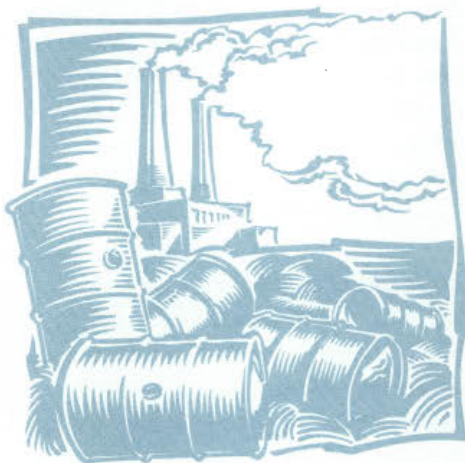
Toxic Circles, edited by Helen E. Sheehan and Richard P. Wedeen, published by Rutgers University Press, is a collection of compelling essays that focus on the terrible legacy of industrial disease in New Jersey. Among topics discussed are the discovery of the link between cancer and industrial by-products and how corporations, government, workers, and citizens reacted. *Cost is \$45, hardcover. Available in bookstores. For more information, call Rutgers University Press at (800) 446-9323.*

Upland Bird Hunting, published by the National Rifle Association of America, is the seventh book in the NRA's Hunter Skills Series. The book is a thorough guide to planning a hunt. It includes tips on gear, hunting dogs, shotguns, and extensive biological information on upland bird species. *For more information on the Hunter Skills Series and about how to order Upland Bird Hunting, call (800) 336-7402. Or write: NRA Sales Department, P.O. Box 5000, Kearneysville, WV 25430-5000.*



Inside DEPE

It's Your Right to Know!



Flames are leaping out of the front of a chemical manufacturing plant located near a residential community. Black smoke belches out the rear of the building while local firefighters, the local "haz-mat" unit and the Department of Environmental Protection and Energy's (DEPE's) Emergency Response Unit race to the site.

Using a new computerized system, these agencies can gain instant access to information about the types, amounts and locations of possible chemical hazards at the fire site. This allows them to make critical decisions about special health hazards or safety concerns, and to select whatever special personal



protective equipment and other safeguards they may need to deal with the fire and its aftermath.

For example, says Bruce Comfort, a region chief for the DEPE's Emergency Response Unit, "Knowing ahead of time what chemicals may be involved cuts down the air monitoring tests we'd have to do from an infinite number to something we can handle more easily." This could be critical if the smoke is carrying toxic fumes — and especially carrying them toward local residents.

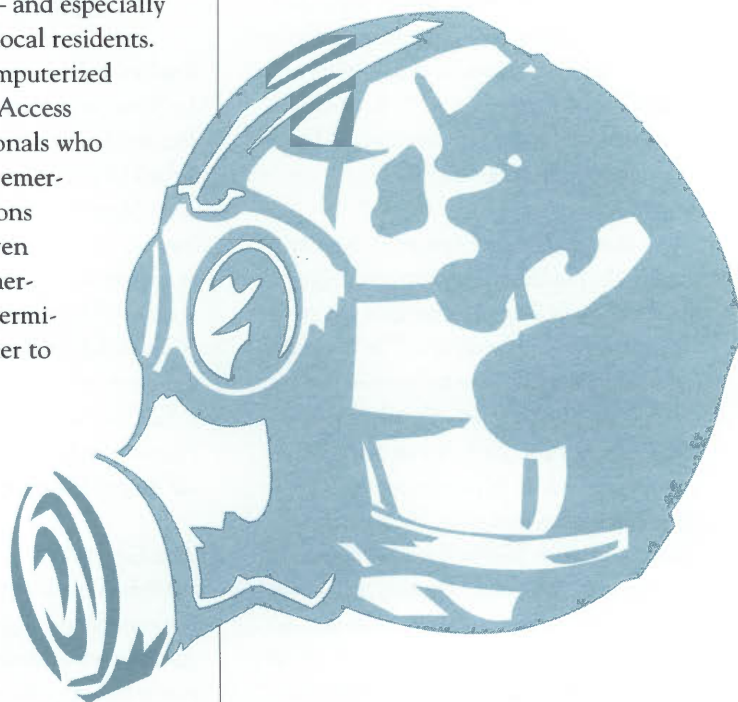
Indeed, the new computerized Right to Know Public Access System allows professionals who respond to all kinds of emergencies to make decisions much more quickly, even before reaching the emergency site. Critical determinations, such as whether to enter a facility, or evacuate surrounding populations in order to protect lives can be made rapidly. In addition, those responding to emergencies can also make use on-line of the New Jersey Department of Health's (DOH's) Hazardous Substance Fact Sheets, which list more than 1,000 chemicals and identify their specific safety hazards and special cleanup procedures.

By comparison, in the past, when emergency workers responded to a call involving a crisis at a facility that stores, uses or manufactures hazardous substances, a search of the pertinent paperwork or several phone calls might be necessary before the facility's emergency response coordinator could be located and contacted. Now, with the data computerized and on-line, this information can move as fast as computer data can be transmitted by phone line.

Everyone's Right to Know

The Right to Know Public Access System is not just intended for use in emergencies. The computerized access system is available to all New Jerseyans.

If you have ever wondered what hazardous substances might be used, manufactured or stored in your community or have ever wondered how these substances might affect your health and



safety, the computerized Right to Know Access System can provide you almost instant access to this vital information.

This is a state-of-the art improvement on the past, when this information could only be obtained in a sometimes unwieldy and time-consuming way by requesting copies of surveys or computer reports submitted to the DEPE or DOH.

Getting Connected

Anyone with a personal computer and a modem can tap into to the Right to Know Public Access System's comprehensive database. Data about hazardous chemicals that could be in your community are collected from private employers for the DEPE's Community Right to Know Survey and from public employers

for the DOH's Right to Know Survey. You also have access to the information contained in the DOH's Hazardous Substance Fact Sheets on the potential health effects of hazardous materials and on how these materials can be safely handled and stored.

Getting on the public access system is easy, as long as you have one of the following communication software packages: PC Anywhere (preferred), ProComm, Carbon Copy, Terminal Applet, or Cross Talk for Windows.

To get started, set up your computer and modem to dial (609) 633-6099. First-time users will be prompted for name, affiliation and address and will be greeted with a brief overview of the system.

The system is designed to be "user friendly" and provides on-line help messages. Several menu choices are available, such as files which provide summaries of the requirements and responsibilities under specified federal and state regulations. In addition, you may elect to download entire files of reported chemical inventories to your computer to print out at home. You can also leave a message for the system administrator. In fact, comments or suggestions are encouraged. Telephone numbers and addresses of agencies to contact for further information are also listed.



New Jersey State Library



Strong Laws + Communication = Protection

Supported by a grant from the United States Environmental Protection Agency and developed cooperatively by the DEPE, DOH and the New Jersey State Police's Office of Emergency Management, the Right to Know Public Access System is a logical outgrowth of New Jersey's strong laws that require companies using, manufacturing or storing hazardous substances to report these activities to the state.

All three agencies that collaborated in developing the system play important roles in implementing the state — and federal — laws that govern the collection of chemical inventory data. The New Jersey Worker and Community Right to Know Act, which dates to 1984, covers both private and public employers and provides the public and emergency response personnel with "the right to

know" what hazardous chemicals are present in their immediate environment. It is complemented by Title III of the federal Superfund Amendments and Reauthorization Act of 1986.

The New Jersey Right to Know Public Access System is administered by the DEPE's Bureau of Hazardous Substances Information, CN 405, Trenton, NJ 08625-0405, telephone (609) 292-6714, with assistance from the DOH's Right to Know Program, CN 368, Trenton, NJ 08625-0368, telephone (609) 984-2202.

For a brochure containing more information about the system, contact the DEPE or the DOH at the numbers above.

by Noel Clark, an executive assistant in the DEPE's Division of Environmental Safety, Health and Analytical Programs



AL HICKS

A "handsome" family of woodrats.

Researching Rats, Racoons and Roundworms

The eastern woodrat (*Neotoma floridiana*) is one of only two rat species native to New Jersey, and it is in danger of disappearing from the state. The Endangered and Nongame Species Program (ENSP) in the Department of Environmental Protection and Energy's Division of Fish, Game and Wildlife is researching ways to protect this species. (The other rat native to the state is the marsh rice rat — *Oryzomys palustris* — which is a resident of South Jersey tidal marshes and is neither threatened nor endangered.)

The woodrat, which resides only in the mountainous regions of the northern part of the state, has acquired numerous names including cave rat, trade rat, Allegheny

woodrat, mountain rat, cliff rat and brush rat. Several of these names — such as cave rat, mountain rat and cliff rat — can be attributed to the habitats it chooses in the northern part of its range. As the names imply, it is found in caves and among boulder piles that accumulate at the base of sheer rock cliffs and rock outcroppings.

This animal has also been called a pack rat because of its seemingly odd propensity to collect a wide assortment of objects at its den site. Bottle caps, silverware, keys, watches, coins, shotgun shells, belt buckles, buttons and spectacles are just some of the items found in woodrat dens.

The woodrat is similar in size to the non-native Norway rat and, at a quick

glance, may seem similar in appearance. But closer examination reveals several striking differences. The most noticeable difference is the woodrat's tail, which is covered with hair and is sometimes bushy in comparison to the sparsely haired tail of the Norway rat. The woodrat also has large naked ears, large bright eyes and very long whiskers that reach to its shoulders. The coat of the woodrat is buff gray above and on the sides and the underparts and its feet are white. If you can get past the aversion many people have to "rats," you might actually find the woodrat a handsome creature.

Unfortunately, over the past two decades in the region, eastern woodrat populations have declined dramatically. New York State, which once had more than 40 populations, no longer has any. Pennsylvania's populations have also declined, with most active colonies

occurring in the western half of the state. New Jersey now has only one remaining woodrat population.

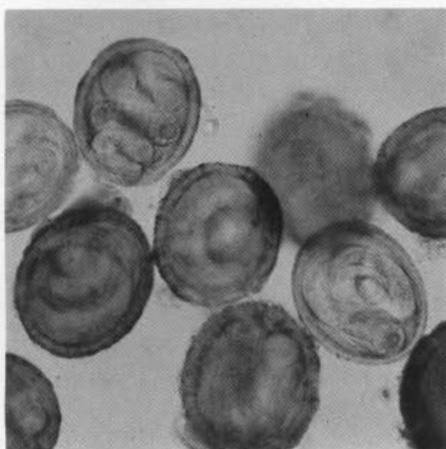
The Endangered and Nongame Species Program has been keeping close tabs on the woodrat for the past 10 years. Surveys have confirmed the woodrat's historical existence in three mountainous formations of New Jersey's northern tier: the Kittatinny range in western New Jersey, the Green Pond Mountain range in north central New Jersey and the Palisades at the eastern edge of the state.

During the past 10 years, woodrat populations have disappeared except at the base of the Palisade Cliffs in Bergen County. This last population in New Jersey also defines the northern and eastern limits of the species' North American range.

Several hypotheses exist as to why the woodrat has declined so precipitously. One blames the species' decline on the loss of acorns — an important winter food source for the woodrat — resulting from gypsy moth defoliation of oak trees.

Another hypothesis proposes that the woodrats' decline can be attributed to a parasitic infection by the larvae of the raccoon roundworm (*Baylisascaris procyonis*). Results of a recent study by the New York State Department of Environmental Conservation seem to support this hypothesis. The New York study documented significant woodrat mortalities in

Roundworm eggs containing infective larvae.



an experimental population of woodrats that were exposed to the parasite.

The roundworm parasite occurs naturally in raccoons and is usually not debilitating to them. However, when the eggs of the parasite are passed in the raccoon's feces and picked up by other mammals, they can be fatal to the new host. Once the eggs are passed in the feces, the larvae develop in the egg case. When the eggs are ingested by other mammals, such as the woodrat, the larvae emerge from the egg and migrate into the blood stream of the new host. The larvae eventually end up in muscle tissue, the central nervous system and brain of the new host and, in adequate numbers, can cause significant neurological damage and eventual death. A long list of bird and mammal species mortalities — including those of humans — have been documented as a result of raccoon roundworm larval infections.

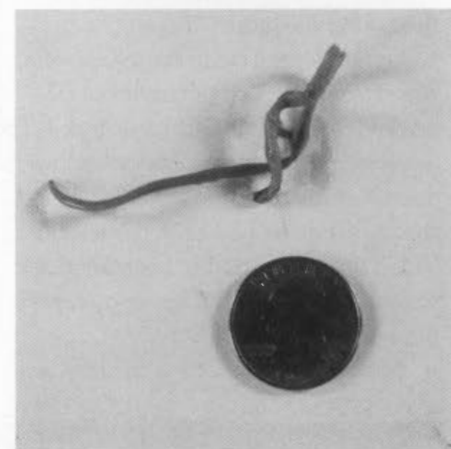
When woodrats — in their "pack rat" mode — round up objects to bring back to their dens, raccoon feces are often among them. Woodrats also have the habit of storing food for the winter. Since raccoon feces often have a high seed content, woodrats may stow the feces away as a food source for the lean times of winter. Thus, the woodrats can be exposed to the parasite when handling or ingesting the feces.

Upon ingestion, the parasite rapidly migrates through the wall of the gut and into the blood stream of its host. Protecting woodrats through preventive medication would be extremely difficult or impossible. However, the ENSP, in cooperation with the division's Office of Laboratory Services and East Stroudsburg State University, is investigating the feasibility of reducing the infestation of the parasite among the raccoon population by using the anti-parasite drug Piperazine. The theory is that eliminating the parasite in the local raccoon population would decrease the risk of exposure to woodrats.

In preliminary lab tests, parasite-infected raccoons will be treated with varying doses of Piperazine before expos-

ing lab rats to their feces. These tests will help determine the required dosage and the efficacy of the drug in protecting the lab rats from parasitic infection. Simultaneously, samples will be taken from the Palisades raccoon population to determine the rate of roundworm infection. If the Palisades raccoons are found to be infected and if the lab tests are successful, Piperazine-treated raccoon baits will be dispensed in the field. The wild raccoon

The adult roundworm, which is slightly larger than a quarter.



population will be tested again after baiting to determine the efficacy of the medication in controlling the roundworm in the local population. The ENSP also plans to continue monitoring the woodrat population to determine the effect of reducing its exposure to raccoon feces infected with the roundworm.

Many states with surviving woodrat populations plan to survey the prevalence of infective raccoon feces in habitats used by the woodrats. If the Division of Fish, Game and Wildlife is successful in developing a protocol for controlling the parasite in the raccoon population, it will have great value to other states where woodrats are being threatened by the raccoon roundworm.

by Jim Sciascia, a principal nongame zoologist with the Division of Fish, Game and Wildlife's Endangered and Nongame Species Program

Early Season No Wild Goose Chase

The special early season for Canadian geese was successful in harvesting about 10 percent of the resident geese population, the Division of Fish, Game and Wildlife reports.

The special season, held in September, was aimed at reducing the number of geese from its present population of 50,000. Some of these geese have become a nuisance, fouling many corporate headquarters, golf courses and public parks with their noise and droppings.

Permits for the eight-day season were issued to over 4,000 hunters, about 60 percent of whom actually participated. The division reports that a random survey conducted at the close of the season found that 5,001 geese had been harvested. The hunt is expected to decrease the number of birds in the future by reducing reproduction rates.

Because of the success of the early sea-



son, the division is considering holding another special season in 1995 when the migratory population will not be affected. Migratory Canadian geese begin arriving in New Jersey in late September, and some

spend the winter here. Others migrate further south to Maryland. The migratory geese then begin their journey back north in February, heading for their breeding grounds on the tundra.

Follow-Up

Jersey Coastal Heritage Trail Opens

The New Jersey Coastal Heritage Trail opened this fall. It uses existing public roads to take visitors on thematic journeys along the state coastline.

The trail, a 300-mile tour featuring the history, economy, ecology, and leisure aspects of the Jersey shoreline, stretches from Salem County on the Delaware River, around the southern tip of the state and up the Atlantic coast as far north as Perth Amboy in Middlesex County. The trail is a cooperative partnership among the National Park Service, the state of New Jersey and numerous other public and private organizations.

The first of five regional welcome centers to guide visitors on their way opened in the fall at Fort Mott State

Park in Salem. It features literature, graphics and audio visual aids on the Delsea Region, a historic maritime area which includes western Cape May, Cumberland and Salem counties. Two other interim welcome centers are located at the Ocean View area at Milepost 18.3 on the Garden State Parkway in Cape May County and at Cheesequake State Park in Middlesex County.

In addition to the trail sites and welcome centers, 14 Coastal Heritage Trail Information Centers will provide the public with brochures on the trail and its many regions.

The Coastal Heritage Trail focuses on:

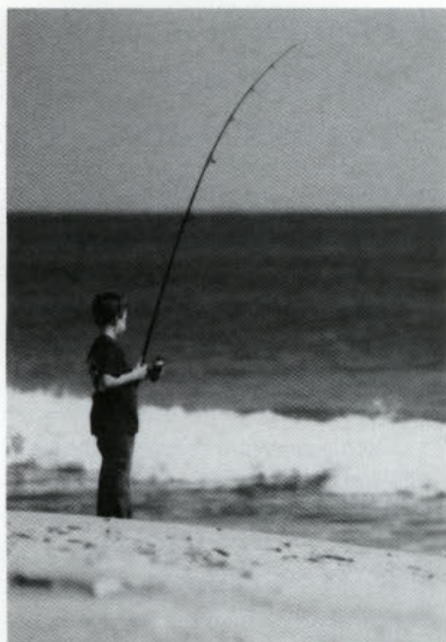
- ❑ The special industries and unique crops of coastal New Jersey and how they have shaped each community's economy;
- ❑ The amusement parks, boardwalks, historic hotels, religious retreats, and coastal rivers, bays and marshes frequented by vacationers and sportsmen;

❑ The many birds and sea mammals that can be found along the coast and the sites that serve as seasonal refuges for a variety of threatened species;

❑ The boundary habitats — from sandy beaches to salt marshes to maritime forests — that support a rich diversity of plant and animal life; and

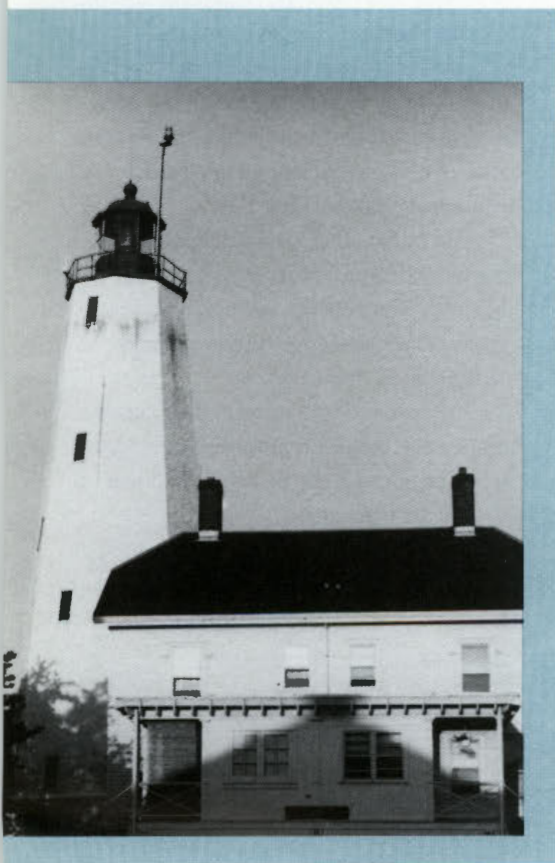
❑ The lighthouses, life saving stations, forts and fishing villages that have served as navigational aids and for coastal defense.

The first trail theme to open to the public is Maritime History. The other themes of Coastal Communities, Recreation and Inspiration, Coastal Habitats and Wildlife Migration will be developed over the next several years. For more information, call the New Jersey Coastal Heritage Trail office at (609) 785-0676 or the Division of Travel and Tourism at (800) JERSEY - 7.



This young participant in the Governor's Surf Fishing Tournament (above) was one of many who helped this event raise money to buy surf chairs.

The Sandy Hook Lighthouse (below) in Monmouth County.



Anglers Reel in Awards at 1993 Surf Fishing Contest

Despite early morning rain, 750 anglers lined the shore at Island Beach State Park this fall for the second annual Governor's Surf Fishing Tournament. Together they cast their lures for albacore, blackfish, bluefish, fluke, kingfish, red drum, striped bass and weakfish.

But the event promoted more than just the joys of fishing. This year's contest netted \$6,500, which will be used to buy surf chairs for the handicapped and elderly as well as for the construction of a saltwater fishing ramp at Island Beach State Park. The surf chairs, used for fishing, are equipped with large tires which make it easier to traverse the beach. Last year's event raised enough money to buy and equip two surf chairs.

The winner of the 1993 Governor's Cup was Denis Granville of Robbinsville with his striped bass measuring 34 3/16". Other winners included:

Striped bass

First	Denis Granville	34 3/16"
Second	Shawn Lemarie of Toms River	33 12/16"
Third	Steven Wacker of Dumont	31 12/16"

Blackfish

First	Claus Faller of Beachwood	15"
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Bluefish - Age 12 and under

First	Ryan McPhillips (11) of Trenton	18 12/16"
Second	Carly Schafle (11) of Ocean Grove	17 4/16"
Third	Stephanie Krukovsky (10) of Toms River	17 1/16"

Bluefish - Age 13-18

First	Mary Kathrin Dyczko (15) of Whiting	22 6/16"
Second	Alex Dyczko (13) of Whiting	17 4/16"
Third	Kevin Fabricatore (14) of Nutley	16 8/16"

Bluefish - Adult

First	Butch Milligan of Beachwood	28 12/16"
Second	Thomas Semler of Trenton	28 5/16"
Third	Bud Wright of Cinnaminson	27 10/16"

Weakfish

First	Tim Warhol of Fallington, PA	19 10/16"
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Fluke - Age 12 and Under

First	Michael Federici (8) of Somerset	16 2/16"
Second	April Jankowski (6) of South Toms River	15 14/16"
Third	John Lembo (10) of Pennsauken	15"

Fluke - Age 13 to 18

First	Chris Breil (16) of Keyport	16 4/16"
Second	Chris Krukovsky (14) of Toms River	15 2/16"
Third	Frank Ebbinghouser (15) of Toms River	14 9/16"

Fluke - Adult

First	Ken Welshman of Toms River	18 12/16"
Second	Kevin Cook of Brick	17 12/16"
Third	Margie Fumosa of Brick	17 1/16"



Follow-Up

Boats Find New Life as Reefs

A 40-year old Coast Guard cutter, whose service included a stint in Florida during the 1963 Cuban Missile Crisis, was assigned to its last mission in New Jersey this fall — as part of an artificial reef 70 feet down on the ocean floor.

It took four rounds of explosives to sink the 95-foot *Cape Strait* nine miles off Cape May. *Cape Strait*, along with a 46-foot Coast Guard buoy tender, became the latest additions to the Division of Fish, Game and Wildlife's artificial reef program.

The purpose of the program, which began in 1984, is to create a breeding habitat for marine life along often barren stretches of ocean floor. Marine organisms begin living on the reefs, composed of sunken vessels, rocks and tires, within two years after placement. The reefs help to purify the water and provide a food source for the fish and shellfish that make their home there.

The Artificial Reef Association (ARA), a group consisting of party and charter boat captains, marina owners and fishing tackle distributors, helps raise funds for the construction of artificial reefs through the sale of decals, reef charts and T-shirts. The shirts feature an underwater scene designed by artist Kathy Johnson.

For more information on the program or available fundraising items, contact the ARA at P.O. Box 16, Oceanville, NJ 08231.



H. CHRISTOPHER BOGGS

Premier Marine Sciences Lab Opens at Sandy Hook

A new marine sciences laboratory, which will enable researchers to examine ecological problems which occur in the bays and coastal waters from the Long Island Sound to Cape May, opened this fall at Sandy Hook.

The James J. Howard Marine Sciences Laboratory, named in honor of the late New Jersey congressman, is a state-of-the-art facility which features a 32,000 gallon aquarium. The \$19 million facility, funded by direct state grants, state bonds and contributions from the Port Authority of New York and New Jersey, will be shared by the National Oceanic and Atmospheric Administration and the New Jersey Department of Environmental Protection and Energy.

The new laboratory will conduct research leading to an understanding of the ecology of coastal and estuarine organisms and the effects of human activities on marine populations. A key element in the lab will be the aquarium, which can simulate environmental conditions by regulating temperature and light. The aquarium will be fed by water from Sandy Hook Bay.

The tank will also be equipped with computers to provide researchers with instant assessment of data and television monitors to view experiments without disruption in the aquarium.

The new facility, located in the Gateway National Recreation Area at Sandy Hook, replaces a laboratory that burned down on the site in 1985.

The U.S.S. *Algol*, the largest ship in the state's artificial reef program, just before it was sunk in the Shark River in 1991.

Roundup by Denise Mikics
of the DEPE's Office
of Communications.



It's Keeping New Jersey Green

Key sites in the Highlands, a series of mountains, forests and lakes that stretch from the Hudson to the Delaware rivers in northern New Jersey, are among the 22,300 acres of open space that could be preserved under this year's \$75 million Green Acres program.

A total of 135 projects — from a "Fisherman's Cove" in Manasquan to a new park in Trenton to a boat ramp in Brigantine — are expected to be funded through \$31 million in grants and \$44 million in loans. The proposal, which must be approved by the New Jersey Legislature, would dedicate \$6 million to save 2,870 acres in the Highlands including woodlands in Morris County and a stream and wooded ridge in Passaic County.

Half of this year's funding will go to sites in urban areas. A total of 310,000 acres, including 750 recreational sites, have been preserved as open space since the program debuted in 1961.

Driving Home an Environmental Message

New Jersey recently unveiled two new license plates aimed at helping the environment.

The Jersey Shore plate, featuring a picturesque scene of a red and white lighthouse, sea gulls and beaches bordered by splashes of blue ocean, is being sold for the benefit of coastal protection. The first \$1 million raised each year through these plates will fund Department of Environmental Protection and Energy programs including debris pickup by state prisoners, aircraft surveillance of coastal waters, boat sewage pump-out stations and the Adopt a Beach program. Revenues over \$1 million will be placed into a trust to be used for various emergency situations.

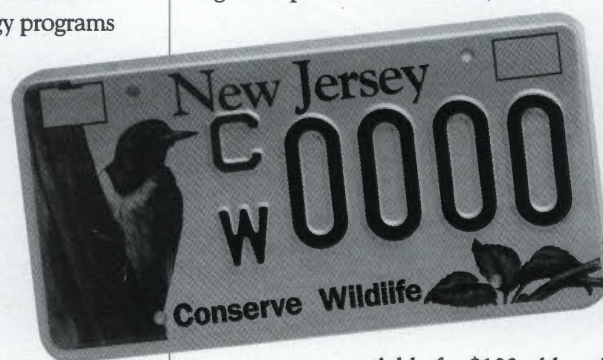
The wildlife plate features a vibrant, red-headed woodpecker perched on a tree. Profits from the sale of the woodpecker plate will be used for wildlife protection efforts by the DEPE's Endangered and Nongame Species Program, supplementing funding from the

state income tax's Wildlife Check-Off.

The Jersey Shore plate was designed by Brian Talty, a 21-year old Toms River native. It carries the message "Shore to Please," a slogan contributed by Terri Fotti, a 28-year old Berkeley Township homemaker.

The woodpecker, a threatened species, was illustrated by wildlife artist Doreen Curtin of Hunterdon County. Sprigs of leaves in the lower corners draw attention to the "Conserve Wildlife" message.

The initial costs of both plates will be \$50, but the Jersey Shore plate carries an additional \$10 annual renewal charge. Vanity wildlife plates, which allow messages of up to five characters,



are available for \$100, although existing vanity designations can be transferred at a cost of only \$60.

The Jersey Shore licence plate will be available through state motor vehicle agencies or by mail. The wildlife plate can be ordered by calling 1-800-W-PLATES.

Plant a Tree — State Style

Just in time for Arbor Day on April 29, the state's Forest Tree Nursery is accepting orders for shrubs and tree seedlings.

The nursery, located in Jackson Township, grows genetically superior seedlings for reforestation efforts in New Jersey. It provides up to 100,000 trees and shrubs a year for state parks and sells up to 300,000 seedlings annually to public and private landowners.

Environmental improvement packets, which contain 50 seedlings ranging in size

from six to 12 inches, are available to the general public for \$20. A typical packet may include white pine, Norway spruce, northern red oak, chestnut oak, sweet gum, persimmon, gray dogwood, hackberry or button bush seedlings.

The nursery also has a reforestation program package for owners of public or private land who plant at least 750 seedlings as part of conservation efforts. The major species available through this program are white pine, Norway spruce, pitch pine, shortleaf pine, loblolly pine, Virginia pine, Japanese larch, Japanese black pine, autumn olive, northern red oak, chestnut oak, white ash, tulip poplar, sweet gum, persimmon,

black locust and hybrid poplar.

The reforestation package is available at a cost of 10 to 14 cents a seedling, depending on the species selected. There is a limit of 125 plants for some species. Participants are also prohibited from reselling the mature trees or shrubs as Christmas trees or ornamental nursery stock.

The deadline for ordering is April 1. Seedlings will be delivered to participating pick-up points at state parks and forests in Franklin, Lebanon, Matawan, Titusville, Jackson, New Lisbon, Elmer and Mays Landing between March 22 and April 22. For order forms and information, call the tree nursery office at (908) 928-0029.

Events

January

8, 15 WEEKEND WINTER DAY

CAMP Fourth and fifth graders who love the outdoors will spend the morning looking for signs of wildlife, hiking through the woods, learning about winter survival and participating in environmentally oriented games. **Hours:** 9:30 a.m. to noon **Admission:** \$9 (prepaid registration by mail required) **Phone:** (201) 835-2160 **Location:** Weis Ecology Center, Snake Den Road, Ringwood



9 OWL PROWL Learn about these mysterious birds as you meet Otus and Tess, two screech owls being cared for at the Weis Ecology Center. The program also includes a slide show on New Jersey owls and a hike to listen for the calls of screech owls and great horned owls, which are very active in winter. **Hours:** 6:30 to 7:45 p.m. **Admission:** Members \$2, non-members \$3 (prepaid registration by mail required) **Phone:** (201) 835-2160 **Location:** Weis Ecology Center, Snake Den Road, Ringwood

9 SPRING HILL HIKE Enjoy an unobstructed, 360-degree panoramic view of the Pinelands when you hike nine miles from the Hawkin Lowland area to the heights overlooking the pygmy pine forest. Sponsored by the West Jersey Group of the Sierra Club. Participants are encouraged to bring a lunch for a picnic at the crest. **Hours:** 10 a.m. **Admission:** Free **Phone:** (609) 267-7052 **Location:** Lake Oswego, Penn Forest Road, Burlington

15, 29 OWL PACKAGE SPECIAL

(Also Feb. 26) Sign up for this one-day course designed to acquaint you with the habits and habitats of New Jersey's nocturnal predators. A multi-media presentation at Cape May Point State Park will be followed by an afternoon field trip along the Delaware Bayshore in search of various species of owls. **Hours:** 1 to 6 p.m. **Admission:** \$15 **Phone:** (609) 884-2736 **Location:** Cape May Bird Observatory, E. Lake Drive, Cape May Point

22, 23 SUPER SCIENCE WEEKEND

1994 Be a part of the State Museum's 13th annual celebration of science and technology. View individual and group demonstrations and an array of science programs, attend special shows in the planetarium and listen to the museum's own scientists describe their work. **Hours:** 9 a.m. to 5 p.m. (Jan. 22), 11 a.m. to 5 p.m. (Jan. 23) **Admission:** \$1 **Phone:** (609) 292-6308 **Location:** New Jersey State Museum, West State Street, Trenton

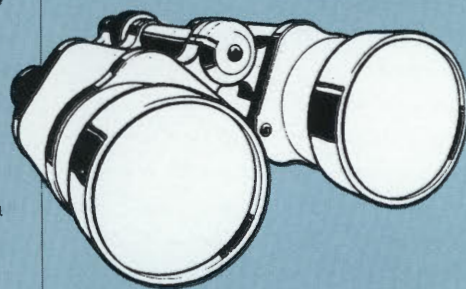


22, 23 BEGINNER CROSS COUNTRY SKI CLINIC

(Also Feb. 5, 6) Learn the basics of cross country skiing through lecture, outdoor demonstration, practice and constructive evaluation. Two sessions will be offered daily, snow or shine. Participants must be at least five feet tall. **Hours:** 9:30 to noon or 1:30 to 4 p.m. **Admission:** \$19 (prepaid registration by mail required) **Phone:** (201) 835-2160 **Location:** Weis Ecology Center, Snake Den Road, Ringwood

January 27 through March 31 EAT

AND LEARN The Wetlands Institute is sponsoring a lunchtime lecture series to be held each Thursday from Jan. 27 through March. The program includes various lectures, workshops and demonstrations focusing on the environment. Participants should bring their lunch; beverage and dessert will be provided. **Hours:** noon **Admission:** \$2 donation **Phone:** (609) 368-1211 **Location:** Wetlands Institute, Stone Harbor Boulevard, Stone Harbor



29, 30 BIRD WATCHING FOR BEGINNERS

(Also Feb. 26, 27 and March 26, 27) A course for anyone interested in learning the skills of bird watching, this two-day program covers all aspects of bird identification, bird watching, equipment and attracting birds to your backyard. Offered at North America's premier bird watching spot, the course culminates in a field trip that will put new found skills to use. **Hours:** 7 to 10 p.m. (Jan. 29), 8 to 10 a.m. (Jan. 30) **Admission:** \$15 **Phone:** (609) 884-2736 **Location:** Cape May Bird Observatory, E. Lake Drive, Cape May Point





Discovering the Birds of Winter

If you have ever considered giving bird watching a try, winter is just the season to pick up those binoculars and head south to catch "Bird Watching for Beginners," a course offered each month by the Cape May Bird Observatory.

Winter might not sound like an ideal time to start bird watching in New Jersey, but this season offers excellent opportunities to watch the large variety of birds that have migrated from their summer homes to the southern portion of the state.

"In winter you see birds that you don't see at any other time of the year," says Patricia Sutton, a naturalist with the observatory.

According to Sutton, every season is fun for watching birds because each has a "unique" agenda. In spring, birds are in their colorful breeding plumage, and summer marks the start of the breeding and nesting season. Fall is the time the birds begin to molt into their winter

plumage and migrate south to warmer areas, especially places like Cape May.

During the two-day course, there is an indoor session to cover all the basics of bird identification, bird watching, local hotspots, equipment such as books, binoculars, telescopes and tripods, and how to attract birds to your backyard. An outdoor session will follow the next day with a field trip to try out these new found skills.

There are many types of feathered friends to see in South Jersey. Huge concentrations of waterfowl and raptors are two of the winter highlights. Oldsquaw, one of the most ornate ducks, ride the waves just off the beach. Thousands of sanderlings dart back and forth in the tide line. The water is filled with American widgeons, loons, horned grebes, black ducks, canvasbacks, scaups, buffleheads, red-breasted mergansers, coots, brants and ruddy ducks.

Grab your binoculars and go to the Cape May Bird Observatory to catch the bird species that winter in southern New Jersey.

Winter is also the time of year when the state's earliest nesting bird, the great horned owl, begins courting. Females lay their eggs in late December and early January, and the young owlets hatch in late January and early February. In early March, male American woodcock begin to sky dance each evening to attract a mate. By mid-March, ospreys return to the marshes to set up nest sites.

Bird Watching for Beginners courses will be held Jan. 29 to 30, Feb. 26 to 27 and March 26 to 27. Indoor sessions will be conducted on the first day from 7 to 10 p.m., and outdoor sessions will be held from 8 to 10 a.m. the second day. Pre-registration with a \$15 fee is required, and space is limited.

All courses are held at the Cape May Bird Observatory located at 707 E. Lake Drive in Cape May Point. The nonprofit membership organization was founded in 1976 as the southernmost New Jersey Audubon Society center. Since then, it has become a leader in research, conservation, education and recreational bird watching for visitors from all 50 states, Canada and Europe. The observatory is working to preserve and protect the birds, butterflies and dragonflies of southern New Jersey and their habitats as well as those species that migrate through the peninsula.

The work of the observatory has also led to the preservation of important tracts of land that now serve as resting and feeding areas for migrants and breeding birds. The observatory is open to visitors Tuesdays through Saturdays from 9 a.m. to 5 p.m., and Sundays from 9 a.m. to 2 p.m.

To register for the beginners bird watching course or to obtain more information about the Cape May Bird Observatory, call (609) 884-2736 or write P.O. Box 3, Cape May Point, NJ 08212.

Events

30 MINIATURE DOLL SHOW

WINTER EXPO The World of Mini Mania is holding a show featuring various miniatures and dolls for the collector and the whole family. Enjoy handcrafted miniatures and dolls on display as well as demonstrations and special door prizes. **Hours:** 10 a.m. to 4:30 p.m. **Admission:** Adults \$5, children \$2.50; seniors \$4.50 **Phone:** (908) 382-2135 **Location:** The Holiday Inn Jetport, Newark Airport, Newark



February

5, 6 WILDFOWL ART & DECOY SHOW

More than 100 artists and carvers from Vermont to the Carolinas will feature prints, photography, paintings, decoys and carved birds and fish in this 10th anniversary event. Competitions for carving and flat artwork are open to all. Also, attend seminars on carving and painting and participate in the Paint-A-Decoy-Over-the-Weekend contest. **Hours:** 10 to 6 p.m. (Feb. 5), 10 to 4 p.m. (Feb. 6) **Admission:** Adults \$3, children free **Phone:** (908) 341-9622 **Location:** Toms River Intermediate School East, Hooper Avenue, Toms River



6 SUNDAY FAMILY DAY — BLACK HISTORY MONTH

Through hands-on workshops for families with children ages 6 to 12, African-American scientists and engineers introduce young people to a variety of high-tech industries in New Jersey. Come celebrate Black History Month in this educational way. **Hours:** noon to 4 p.m. **Admission:** Free (registration on a first come, first serve basis) **Phone:** (609) 292-6308 **Location:** New Jersey State Museum, West State Street, Trenton

10 FLY TYING FOR TROUT (also March 1) A comprehensive course for those wishing to learn how to tie flies that mimick insects found on trout streams, this twelve-week program is designed for beginners and gives step-by-step instructions by experienced fly fishermen. The course consists of twelve in-class tying sessions and culminates in a guided fly fishing trip to Pennsylvania's Pocono Mountains. **Hours:** 7:30 to 9:30 p.m. **Admission:** \$100 including course manual (registration required) **Phone:** (609) 882-9087 **Location:** Bucks County Community College, Newtown, PA



18-25 FEBRUARY FESTIVITIES

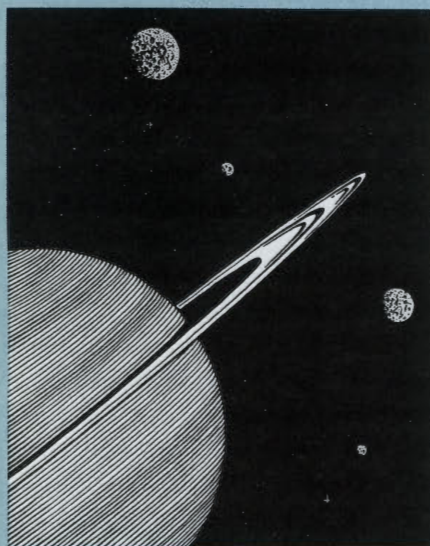
The Trailside Nature and Science Center is sponsoring a wide variety of science and nature activities and workshops to keep children and their families amused and entertained during school vacation week. Events are varied and include nature programs, lessons and planetarium shows. Call for visiting hours and admission rates. **Phone:** (908) 789-3670 **Location:** Trailside Nature and Science Center, Coles Avenue and New Providence Road, Mountainside



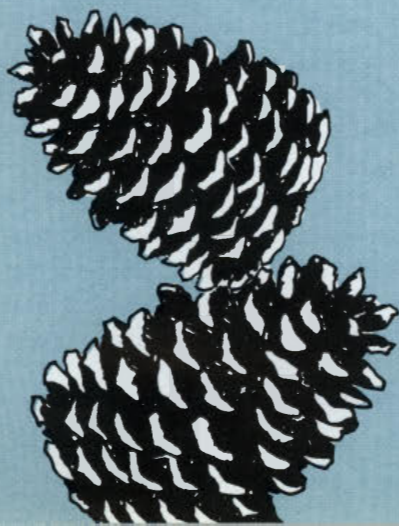
19, 20 GEORGE WASHINGTON'S BIRTHDAY CELEBRATION

Celebrate Washington's Birthday at the historic Johnson Ferry House. Listen to live music of the period while you enjoy punch and hearth-baked gingerbread and cookies. Game masters and tavern keepers in 18th century attire will assist children and adults with period games, toys and quill pen writing. **Hours:** 1 to 4 p.m. **Admission:** Free **Phone:** (609) 737-2515 **Location:** Washington Crossing State Park, Route 546, Titusville

26 HIKE THE HILLS Explore the great outdoors during a hike through Matarazzo Farms, home of the Four Sisters Winery. Afterwards, return to the winery for a hot lunch and wine tasting. **Admission:** \$20 (call for reservations) **Phone:** (908) 475-3671 **Location:** Four Sisters Winery, Route 519, Belvidere



27 ASTRONOMY SUNDAY Rocket launches, solar viewing, planetarium shows and much more are all part of Astronomy Sunday at the Trailside Nature and Science Center. Enjoy space and astronomy demonstrations, workshops, displays and vendors during this educational event. **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.



March

1-19 PRESCHOOL SCIENCE FAIR

Take the opportunity to explore science with your preschooler (ages 4 to 6 years) at this hands-on interactive event. Parents and kids work as a team at six different discovery stations, each with its own theme. **Hours:** 9:30 to 10:30 a.m., 11 a.m. to noon and 1 to 2 p.m. each day.

Admission: \$3 per person (pre-registration required) **Phone:** (980) 789-3670

Location: Trailside Nature and Science Center, Coles Avenue and New Providence Road, Mountainside



5 PINELANDS SHORT COURSE

Register now to be a part of the fifth annual Pinelands Short Course and expand your knowledge of the state's Pinelands. Workshops ranging from the animals, plants and people of the Pinelands to historic fires and the Batsto mansion will be presented.

Attended by over 400 people last year, this day is an exciting blend of science, history and folklore. **Hours:** 8 a.m. to 3:30 p.m. **Admission:** \$25 (registration required) **Phone:** (908) 932-9271

Location: Cook-Douglas Campus, Rutgers University, New Brunswick

5 MAPLE SUGARING You don't have to travel to Vermont for real maple syrup. Right here in New Jersey the folks at Kateri Center will show you how to make it yourself. Join them as they act out legends, build-a-tree, tap a sugar maple and take the "Kateri Taste Test." **Hours:** 10 a.m. and 1 p.m.

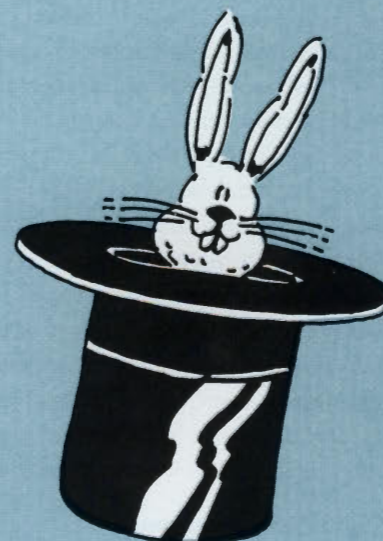
Admission: \$5 **Phone:** (908) 946-9694 **Location:** Kateri Environmental Center, Conover Road, Wickatunk

6 E. MURRAY TODD HALF-

MARATHON Join hundreds of other runners for the 18th annual E. Murray Todd race, sponsored by Monmouth County Parks. The 13.1 mile course covers scenic rolling hills, taking participants through rural and residential areas of Lincroft, Holmdel and Colts Neck. **Hours:** 9 a.m. **Admission:** \$10 pre-registration, \$12 post-registration **Phone:** (908) 542-1642 **Location:** Brookdale Community College, Newman Springs Road, Lincroft

12 MAGIC IN THE ENVIRON-

MENT Visit the Hackensack Meadows Development Commission Environment Center and enjoy magic and humor by magician Ron Owens in this special show for children ages 4 to 8. **Hours:** 11 a.m. to noon **Admission:** \$4 (registration required) **Phone:** (201) 460-8300 **Location:** HMDC Environment Center, DeKorte Park, Lyndhurst.





Explorer

Hey, Explorer!

Pathways to the Past

Hey Explorers! Imagine ice skating for miles on a winter's day through snow-covered countryside, gliding from town to town, pausing every little while to warm yourself by a fire. At one time you could have done this on New Jersey's Morris Canal. The canal is a waterway made by people that was used between the 1830s and early 1900s to transport goods on boats pulled by mules. Canal boats were later replaced by trains and trucks. But by preserving the canal and the historic sites along it today, you can have the opportunity to see how people lived in New Jersey more than 150 years ago.

Until the early 19th century, wood was the main source of energy used to heat homes and create power. At that time, most of New Jersey's forests had been cut down at least once and were not growing back fast enough. This created an "energy crisis." Coal, another type of fuel, was mined in northeastern Pennsylvania but could not be easily transported to New Jersey.

Creative minds went to work and came up with an idea for canals that could float boats loaded with coal from where it was mined to places where it was needed. In addition to coal, other goods shipped on the canal were iron ore, lumber, bricks, nails, corn, sugar, vinegar, lime, beer and hay.

Canal boats were long and narrow with ropes called towlines which ran from their

wooden sides and connected to mules in harnesses walking alongside the canal on the towpath. The mules pulled the boats through the water while the captain steered on board to keep the vessel on course. Young people would often walk the entire day's journey of 20 miles in order to encourage the mules to keep moving.

The Morris Canal wound 102 miles through fields, past tiny villages and bustling cities, alongside streams, and above rivers on flume-like bridges, and even up and over the tops of mountains. It connected Phillipsburg on the Delaware River across from Pennsylvania to Jersey City on the Hudson River, directly across from downtown Manhattan. Lakes and rivers across New Jersey supplied water to the Morris Canal. Lake Hopatcong, in north-central New Jersey, was the main water supplier for the Morris Canal and spilled its water in each direction from the canal's high point of 914 feet above sea level.

Since the pathway across the state is not flat, but rises and falls considerably with hills, mountains and valleys, locks were used to adjust to changes in elevation. Not to be confused with the mechanisms that keep doors from opening, a canal lock is a stone section of the waterway with gates on each end which either fills or empties its water to raise or lower a boat. In addition, the Morris Canal used inclined planes. An inclined plane allowed canal boats to climb over mountains. When a boat reached an inclined plane, it floated onto a plane car (a wide flat rail car with wooden sides) submerged on tracks in the water. The loaded boat was then hoisted up the steep railway by a thick steel cable before being placed in the

water at the top and sent on its way over the next section of canal. The total amount of weight pulled up an inclined plane was over 100 tons, the equivalent of two-and-one-half tractor-trailer truck-loads. This feat was accomplished with only the water power provided by the canal itself. The presence of inclined planes on the Morris Canal made it a unique transportation system.

The Morris Canal is one of two canals located in New Jersey. The other is the Delaware and Raritan Canal which receives water from the Delaware River at Bulls Island. This "feeder" canal merges at Trenton with another portion of the waterway from Bordentown. The Delaware and Raritan Canal stretches from Trenton 44 miles east across the narrow "waist" of New Jersey to New Brunswick on the Raritan River.

There are differences in the ways the Morris Canal and the Delaware and Raritan Canal operated and in the fate they each met after they closed. When the Morris Canal closed it was taken apart, partially drained, and — in many places — filled in. Much of the Morris Canal is now owned by private individuals and is threatened by development with no guarantee of preservation. The Delaware and Raritan Canal has been better preserved and is also used as a water supply for many towns along its route. The great majority of the Delaware and Raritan Canal is protected as a New Jersey state park.

Why is it important to preserve New Jersey's historic canals? In today's fast-paced world, canals are reminders of a more peaceful and slower way of life. Preserving pieces of the past helps to give

Morris Match-Up

See related story
on page 38.



What would you do? The majority of the Morris Canal is not protected. With thought and planning, people can balance the need for building and other activities with preserving the canal for all to learn from and enjoy.

Directions: After reading each example given in List 1, draw a line matching the item to the action that you would take in List 2. Finally continue your line to the description in List 3 that explains just how the action you've taken could help to preserve a canal.

List One

You have collected dead grass clippings and branches from your yard. You could dump the debris into the empty canal, but instead, you:

You have bought land to build offices or apartments on. You could fill in the canal and cover it up, but instead, you:

You must build a new road that intersects with the empty canal. You could fill in the canal to build the road, but instead you:

List Two

Explore ways to build around the canal and use its shoreline as a park or picnic area. Why?

Explore ways to reroute the road around the canal, or construct a bridge over the canal. Why?

Leave the grass on the lawn or start a small compost pile. Why?

List Three

Residents can use the shoreline for hiking and picnicking. Government and business programs may help to pay for this as well.

Keeping natural and human-made debris out of the canal discourages others from littering.

Protecting historical sites helps to develop pride among residents while the preservation of a natural area provides drivers with a scenic view.

each of us a sense of identity as a people. Historic sites also can make us proud of the surroundings we live in and encourage us to keep the area as beautiful as it was many years ago. Protecting New Jersey's canals — when possible — means protecting wildlife habitats for plants and animals, maintaining open space and greenery, and an assuring that New Jersey's scenic beauty will remain.

One place to start is to find out about your local history and recognize its importance to our state's heritage. The Morris Canal and the Delaware and Raritan Canal are wonderful places to visit and learn about. So, Explorers, why not make some of your own discoveries on New Jersey's canals?

by Anthony Pasquini, a environmental education intern from Cook College, Rutgers University

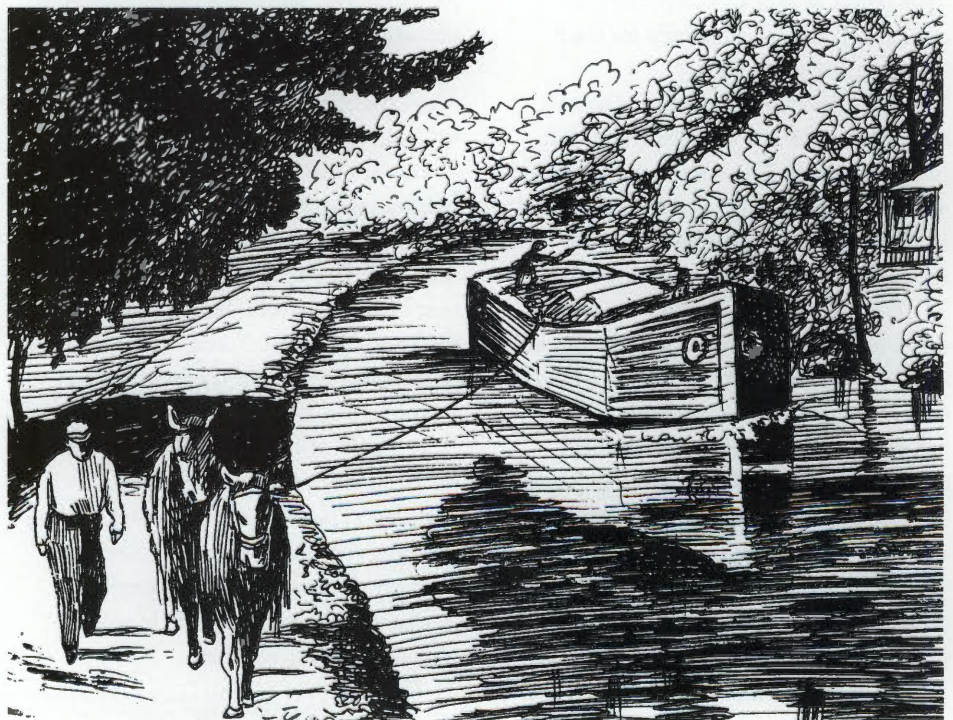


ILLUSTRATION BY LEE CRESSMAN

Wildlife in New Jersey

The Long-tailed Weasel

Curious, aggressive, fearless — the long-tailed weasel is all this and more in a tiny package less than one foot long and less than a pound in weight. It may be hard to believe, but what these fiery little whirlwinds lack in size, they more than make up for in disposition.

And don't let the animal's small size fool you. The weasel is a bold creature. A male will attack an animal much larger than itself. It is also curious and lacks the fear of people displayed by most wildlife. More than one hunter, sitting quietly afiel, has encountered the tiny showman. Standing on hind legs, the little dynamo appears to almost "challenge" the human intruder.

The long-tailed weasel (*Mustela frenata*) may be found in virtually all habitats in New Jersey — creeping along freshwater marshes, bogs, swamps, forests and open fields. It is not an endangered species in New Jersey and trapping surveys suggest that the long-tailed weasel can be found throughout the state.

Weasels are mammals belonging to the same family as skunks, otters, ferrets, minks and badgers, all known for their characteristic musk odor.

In addition to the long-tailed weasel, two other species of weasel are found in North America. These are the short-tailed and least weasels. Though all three can be found in neighboring Pennsylvania, New Jersey is home solely to the long-tailed weasel.

The long-tailed weasel is the largest of the three, and as the name suggests, sports a tail that accounts for more than 44 percent of its body. Males are larger than females, measuring between nine and 10.5 inches in length and weighing between seven and 12 ounces. Females are eight to nine inches long and weigh up to seven ounces.

The long-tailed weasel is usually a rich, dark brown color with a yellowish-white underside and black-tipped tail. The body is sleek with short legs, a long neck and a small head. But in areas of heavy snowfall (mainly northern U.S. and Canada), the

fur may turn white during the fall and winter. However, for the most part in New Jersey, the weasel retains its dark appearance.

The weasel usually makes its den in old woodchuck or chipmunk burrows, rock heaps, stone fences, wood piles or hollow logs. Not exactly industrious, it prefers to modify or enlarge an existing hole. Open woodlands and brushy fields and stubble are favorite hunting grounds.

Males will occupy the same area for an entire lifetime, while females will often leave the birthplace to establish new home ranges. Lined in grass and fur, the nest is located about six inches underground and two feet from the den entrance. Several burrows may radiate from the central chamber and may be used as latrines or food storage areas.

Female weasels breed at three to four months of age. One litter of four to five young is produced each year.

Though birth occurs in April or May, the young are conceived the previous July or August. The process is called delayed implantation. The egg is fertilized in summer and develops for about eight days. At this time, all growth stops until spring when the egg implants itself in the uterine wall and resumes growing.

Just prior to giving birth, the female becomes inactive. Though a pairing bond between the male and female generally does not exist, food may be brought to the nest by the male who leaves shortly after the young are born. Young weasels develop quickly and will leave the mother at 11 to 12 weeks of age.

A weasel is an efficient hunter. Graceful as a dancer, the weasel is agile, quick and alert. The senses of smell and hearing are especially well developed to benefit a mostly nocturnal, solitary existence. A weasel does not hibernate in winter, remaining active all year.

The staples of a weasel's diet are mice, chipmunks and other small rodents, although it will occasionally feast on snakes, frogs,

insects, small birds and berries. The weasel will often kill more than it can eat at one sitting and store the carcasses in burrows for later use.

The long-tailed weasel has two distinct hunting techniques. Above ground, a weasel will pounce on top of its prey, biting the animal on the back of the skull, severing the spinal cord and brainstem. Tunneling through the snow in winter, prey (primarily mice) are bitten in the throat causing suffocation.

Weasels, in turn, are hunted by owls, hawks, foxes, coyotes, domestic cats and man. Trapping season in New Jersey runs from Nov. 15 to March 15; in state wildlife management areas, the season is Jan. 1 to March 15.

The weasel uses a series of trills, screeches and squeals to communicate and to warn of danger. The trill is a low-pitched sound usually given when the animal is calm (e.g., during play or mating). The screech is a high-pitched tone and is given when the animal is suddenly disturbed. The squeal serves as a distress call.

Weasels have proven to be extremely beneficial to people because they help to control small rodent populations. It is especially important to recognize their value in the food chain and take steps to ensure them a stable existence. Fortunately, as more and more open space is secured through the Green Acres Program and other land preservation strategies, we can be sure that long-tailed weasels will have a home in the Garden State.

by Kathy Previte, a senior public information assistant with the Division of Fish, Game and Wildlife





See the spring issue for a close-up look at the fascinating insect world, including species such as this hover fly.

In Next Season's Issue

Afield in an Urban Oasis — the Hamilton Marsh
The "Living Fossils" of the Delaware Bay
Saving Hutcheson Forest