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Summer 1992

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Get Ready to Go Scuba Diving • Reduce Your Lawn's Water Demand
Catch the Excitement of Bluefishing • Discover Ocean Grove's Colorful History
Tour the Many Theme Gardens at Leaning's Run

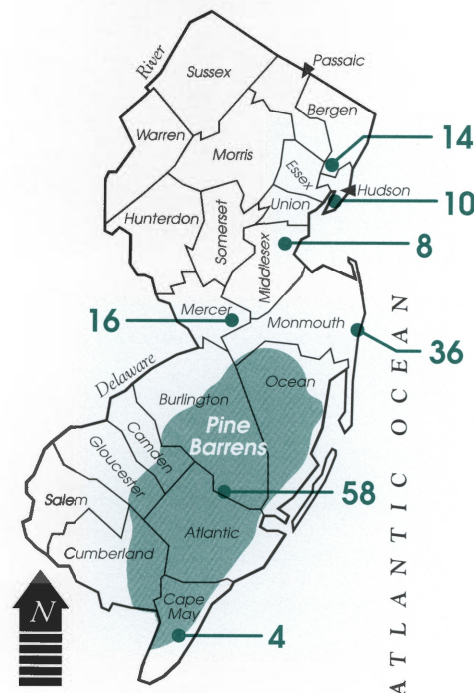
Salvia forms a blazing red path to the gazebo at Learning's Run Gardens and Colonial Farm in Swanton, Cape May County. For a tour of the gardens, see page 4.



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Photo by Rich A. King

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Tasha and Sara Binet play in the surf on a New Jersey beach. Shore protection has emerged as a major issue in New Jersey. See story on page 24.



WILLIAM W. HARTLEY



Jim Florio
Governor

Join the Effort to Preserve Our Shore

The protection of New Jersey's 127 miles of coastline is a top priority 365 days a year. But in the summer, there is a special opportunity to remind New Jerseyans how appealing, how important and how fragile our Jersey Shore is.

The Jersey Shore is our treasure. It is a treasure that our children will enjoy with their children, but only if we plan for the long term. The shore is too important to all of us to be left unprepared for major storms or unprotected against nature's steady wear and tear. The cost is too high.

Today, New Jersey has the toughest ocean water monitoring program anywhere on the eastern seaboard. Operation Clean Shores and Cooperative Coastal Monitoring are two highly successful programs that stop pollution from washing up on our beaches. And it shows. Sparkling water and long stretches of golden sand make a day at the shore a delightful experience for young and old.

We all must enlist in the effort to preserve the shore. At my request, the Department of Environmental Protection and Energy organized a shore summit to explore suggestions and ideas for ensuring shore protection. The shore summit brought local officials, business and community leaders and environmentalists together with state officials and the DEPE.

They shared practical experience and explored many sound ideas about how to best protect the shore. Equally important, the summit participants highlighted the growing understanding of the need to work together in a cooperative and non-partisan way to preserve this precious resource.

They will continue to work to help guide us in closing the major gaps remaining in our efforts to protect the Jersey Shore. We must have a tougher law to shield our coastline once and for all from unreasonable development. And we must find a secure funding source that is dedicated to the preservation of our coastline. I will continue to urge the Legislature to meet these goals.

The Jersey Shore can be protected and renewed, but it cannot be replaced. Please join me in the effort to keep our magnificent coastline a treasure for generations to come. Enjoy your summer at the Jersey Shore.



Scott Weiner
Commissioner

New Standards for 'Clean'

New Jersey's economy owes much to a century-old legacy of prodigious industrial output. Industrial activity is alive and well in New Jersey, but the legacy has produced an unfortunate byproduct — contaminated sites.

As these sites are cleaned up around the state, there is an overriding concern: How can we know for sure that our health and safety are protected from contamination in our neighborhoods, offices and schoolyards?

Up to now, answers were achieved through a painstaking, case-by-case manner usually involving lengthy negotiations with the party or parties responsible for the cleanup. This process has yielded many successful cleanups, but is too cumbersome for a state where sites awaiting action potentially number in the thousands.

In February, the Department of Environmental Protection and Energy formally proposed regulatory reforms designed to establish consistent standards for measuring the extent to which cleanups are required and the effectiveness of restoration work once completed.

For the first time anywhere, New Jersey will be able to answer a key question for cleanup projects — "How clean is clean?" — in a fair, predictable manner. The new regulations also set stringent standards for controlling exposure to hundreds of chemicals produced, used and stored in the state.

These new cleanup standards will apply to surface and subsurface soils and ground waters for areas in and around where we live and work. And, in concert with a separate effort designed to clear the way for companies that voluntarily want to clean up contaminated sites, the new standards will help efforts to restore contaminated sites more quickly.

I am proud of the work by dedicated DEPE staff — and members of the environmental, academic, industrial, legal and scientific communities — who helped develop these standards. With this renewed commitment to clean up contamination in New Jersey, we can create a new legacy for future generations.

State of New Jersey
Jim Florio
Governor



Department of Environmental Protection
and Energy

Scott Weiner
Commissioner

Becky Taylor
Director of Communications

Wendy Kaczinski
Administrator, Office of Publications

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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.

Editor

Hope Gruzlovic

Art Director

Dilip Kane

Design and Production

Paul J. Kraml

Design Assistant

Marvin B. Ross

Assistant to the Editor

Sandra Pearson

Circulation, Promotions, Finance

Dawn Blauth

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Mailbox

Pelicans Sighted

While on Long Beach Island in late September last year, we spotted three brown pelicans flying above the ocean shoreline. Were these birds lost or were they perhaps blown there by one of the summer storms?

Several people had spotted them earlier in the season. This was the first time I had ever heard or seen them this far north.

Baird C. Foster Jr.
Moorestown

Editor's Note: Brown pelicans have been reported off the coast of New Jersey as far north as Barnegat Inlet, but generally only during June or July, according to biologist Dave Jennings of the Division of Fish, Game and Wildlife's Bureau of Nongame and Endangered Species. These birds are mostly juveniles that have not developed their own territories and are too young to breed, along with adults that have bred unsuccessfully or do not have territories established. Brown pelicans mate in early spring in their nesting areas in the Carolinas. Following this, the juveniles and unsuccessful adults move northward. Usually, the onset of cold weather forces them southward. The sighting last September may have been caused by the mild autumn temperatures.

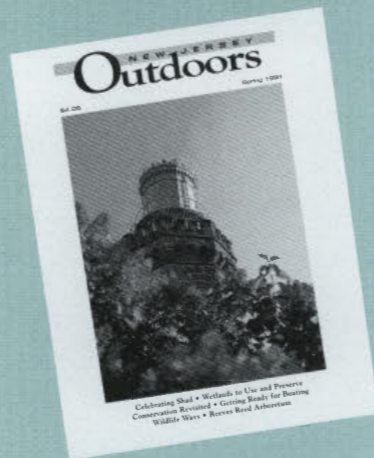
Price Increase

Due to production costs, **New Jersey Outdoors** has been forced to raise its subscription rates to continue bringing you the same high-quality magazine that you now enjoy. The price for a one-year subscription will increase from \$10 to \$15 as of July 1.

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.

Missing an Issue?

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



Correcting Limits

A picture in the Spring 1992 issue shows two people, one holding a saltwater spinning rod and the other holding three striped bass, each apparently 20 to 25 inches long. The caption says that in the 1950s, there were no limits on striped bass. This is not true. In the 1950s and the late 1940s, and I don't know for how long before that, New Jersey did have limits on striped bass.

Thomas W. Blair
Eatontown

Editor's Note: You're right. There was an 18-inch size limit for striped bass between 1938 and 1984, and a 10-fish possession limit from 1953 to 1985.

New Toll-Free Number

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

On the Name Game

Your article on place names in the Winter 1992 issue, "From Cow Tongue Point to Timbuctoo," was particularly enjoyable. However, I would like to correct one error. Shiloh, in Cumberland County, could not possibly have been derived from the Battle of Shiloh, as it predated the Civil War by more than a century.

The founding of the village is detailed in *History of the Counties of Gloucester, Salem and Cumberland*, published in 1883.

Penelope S. Watson
Greenwich

Editor's Note: Your letter points out the difficulty in separating folklore from fact when trying to determine the origins of place names. When there are conflicting historical accounts, however, local records such as the one you cite generally are more reliable than broader-ranged references such as those mentioned in the article.

He's Not Telling

I've just read your article, "Looking for Big Bass? Think Small," in the Spring 1992 issue. I'm 40 years old and have been fishing since I could figure out how to work the tackle as a youngster. I wholeheartedly agree with fishing in small lakes and waters and take great pride in catching fish where others don't or won't go. I've recently found a new pond in Deptford (no way will I tell you where it is) that has an excellent supply of big bass. The lake is probably only an acre or so and can be cast across easily, and no one fishes in it. I've caught 20 to 30 bass, all over four pounds, in the last couple of years.

Gary M. Goetchius
Deptford

Gardens

A Natural Treasure in South Jersey

A 20-acre showplace of more than two dozen interconnected gardens featuring more than 10,000 flowers would be enough to impress most garden enthusiasts. But add in the fact that the flowers are all annuals — which means the displays must be completely replanted each year — and that's enough to draw thousands of curious visitors from around the world.

Leaming's Run Gardens and Colonial Farm in Swainton, Cape May County, is the only public garden display featuring all annuals in the country, according to Jack Aprill, who started the gardens with his wife Emily 14 years ago. Located just off Route 9 in Swainton, Leaming's Run last year was rated one of the top 20 gardens in the East by *Great Gardens of America*.

Visitors follow a sandy path that takes them from garden to garden, each featuring a different theme. The first encountered is the Yellow Garden, which resembles a manicured suburban lawn and



DEREK FELL

Jack and Emily Aprill started Leaming's Run Gardens and Colonial Farm 14 years ago.

Summer Peaks Across New Jersey

❑ **Bamboo Brook and Willowwood Arboretum** Bamboo Brook, created by Martha Brookes Hutcheson, the second American woman to receive a degree in landscape architecture, features native trees and meadow and woodland paths.

Willowwood Arboretum consists of several gardens, including a cottage, pool and rose garden, and features a collection of exotic trees and shrubs. **Hours:** 8 a.m. to sunset **Admission:** Free **Phone:** (201) 326-7600 **Location:** Hacklebarney Road, Morris Township (Morris County)

❑ **Lewis W. Barton Arboretum at Medford Leas** Diversified campuses contain

wetlands, woodlands and meadow environments. Groves of flowering trees can be seen during the summer. Guided tours are available by advance reservation.

Hours: 9 a.m. to sunset **Admission:** Free **Phone:** (609) 654-3000 **Location:** Route 70, one-quarter mile east of the Medford Circle, Medford (Burlington County)

❑ **Deep Cut Park** Visitors can see water, shade, vegetable and butterfly/hummingbird gardens, as well as a rockery. **Hours:** 8 a.m. until dusk **Admission:** Free **Phone:** (908) 671-6050 **Location:** Red Hill Road, Middletown (Monmouth County)

❑ **Frelinghuysen Arboretum** Features include home demonstration gardens, annual and perennial gardens, shrubs in bloom, a rose garden, an All-American

selection annual garden and summer flowering trees. **Hours:** 8 a.m. to sunset **Admission:** Free **Phone:** (201) 326-7600 **Location:** 53 East Hanover Avenue, Morris Township (Morris County)

❑ **Edith Duff Gwinn Garden** Highlights include chrysanthemums, hydrangeas and honeysuckle. **Hours:** Dawn to dusk **Admission:** Free **Phone:** (609) 494-9196 **Location:** Grounds of the Barnegat Light Museum, southwest corner of Fifth and Central avenues (Ocean County)

❑ **Island Beach State Park** Interpretive tours are available through this natural area. Prickly pear cactuses and goldenrod are in bloom in June. Visitors can expect to see dwarfed or winged sumac, green plum and almond beach plum in July, and

is surrounded by more than 40 different types of yellow flowers, such as zinnias, calliopsis and celosia.

Farther along the path, past a stand of holly woods, is the second stop, the Blue and White Garden, which includes purple salvia, purple alyssum and cleome. The English Cottage Garden features 125 different annuals arranged to look like the average summer garden outside an English cottage, while the Serpentine Garden is ablaze with a collection of red salvia.

Elsewhere, visitors can spot elephant ear leaves that are sometimes six feet in diameter. Low-growing plants live lushly by a lily pond. Bright flower plots stand out in contrast to the surrounding 30 acres of forest that remain in their natural state.

The winding path takes visitors around bends, next to ponds and over rustic bridges, offering a variety of views of many of the plots. It takes at least two hours to see the entire gardens, says Aprill, who points out that people are encouraged to stop and rest in the gazebo and on benches along the way, or to leave the sandy path to take a closer look at the flowers.

"One of the things that makes our garden display different than most is that

it's designed more like a person's yard. It has a natural informality about it," Aprill says. "We would hope that people who come here would feel free to walk on the grass, relax and feel at home."

It takes Aprill and his son, Gregg, who now operates the gardens, two months to plant the displays. The gardens are in full bloom from June to October, setting them apart from perennial gardens, which usually are in full bloom only in May and June, says Aprill.

The tract of land originally was settled by a whaler named Thomas Leaming. In the colonial farm display, visitors will find the reconstructed 18th-century Leaming cabin, with sparse furnishings, dried flowers hanging from the rafters and a log fire smoldering in the open fireplace.

Tobacco, cotton, peanuts and a variety of vegetables are grown on the farm to show the typical crops produced during the whaling period. Domestic fowl wander contentedly about the premises.

At the end of the walk is the Cooperage, a charming gift shop in an antique barn, featuring dried flowers, baskets and gifts.

The gardens are well known for their hummingbirds, and August especially is a

bird lover's delight when the migrating hummingbirds arrive in droves. The tiny, ruby-throated birds, en route to South America, come in vast numbers to feed. The Cape May Audubon Society gives daily tours, which always result in the sightings of at least 25 hummingbirds an outing, says Aprill.

To schedule a tour to see the hummingbirds, contact the Audubon Society at (609) 884-2736. Early reservations are encouraged since the tours fill up quickly, says Aprill.

Leaming's Run is open daily from 9:30 a.m. to 5 p.m., May 15 to October 20. Admission is \$4.25 for adults, \$1 for children 6 to 12 and free for children under 6. The Cooperage is open daily from 10 a.m. to 5 p.m. until Christmas. Leaming's Run is located on Route 9 between Sea Isle and Avalon boulevards, and can be reached by taking Exits 13 or 17 off the Garden State Parkway. For more information, call (609) 465-5871.

By Claire Gerber, a freelance writer who lives in Port Republic

white thoroughworts and daisies in August. **Hours:** 8 a.m. to 8 p.m. weekdays; 7 a.m. to 8 p.m. weekends **Admission:** \$6 on weekdays, except Tuesdays, when admission is free; \$7 on weekends **Phone:** (908) 793-0506 **Location:** Route 35, south of Seaside Park (Ocean County)

❑ **Leonard J. Buck Garden** This woodland garden with natural rock outcroppings provides excellent overall scenery. Summer visitors also can see a fern garden and blooming perennials. **Hours:** 10 a.m. to 4 p.m. Monday through Saturday; noon to 5 p.m. Sunday **Admission:** \$1 per person donation requested **Phone:** (908) 234-2677 **Location:** 11 Layton Road, Far Hills (Somerset County)

❑ **Rutgers Display Gardens** A variety of shrubs will be in bloom, and an annual garden consisting of red flowers will be displayed in honor of the 225th anniversary of Rutgers University. **Hours:** Sunrise to sunset **Admission:** Free **Phone:** (908) 932-9271 **Location:** Ryder's Lane and U.S. Route 1, Cook College, Rutgers University, New Brunswick (Middlesex County)

❑ **Skylands Botanical Garden** Features include the annual and perennial gardens, a wildflower area and pools behind the manor house with goldfish and water lilies. **Hours:** Sunrise to sunset **Admission:** \$4 parking fee on weekends, free on weekdays **Phone:** (201) 962-7527 **Location:** Ringwood State Park, off Route 511, Ringwood (Passaic County)

❑ **South Branch Arboretum** Visitors can see a formal garden consisting of annual and perennial flowers, as well as several deer-resistant varieties. There also is a large variety of ornamental trees and shrubs. **Hours:** Sunrise to sunset **Admission:** Free **Phone:** (908) 782-1158 **Location:** Route 31 in Clinton Township (Hunterdon County)

❑ **Thompson Park** The garden here consists of 50 varieties of award-winning All-American roses. **Hours:** 8 a.m. to 8 p.m. **Admission:** Free **Phone:** (908) 842-4000 **Location:** Newman Springs Road, Lincroft (Monmouth County)



ANDY CALONE

Bear on the Line

The first call of the morning rang into my office to signal what I thought would be the beginning of a typical workweek. "New Jersey Division of Fish, Game and Wildlife," I said routinely into the phone.

The caller identified herself as Marie, a resident of Sussex County. "We see bears quite often on our property," she said. "Yesterday, a bear came in with a wire caught around its front foot. The wire keeps catching on the brush every time the bear moves. Can you do something?"

The thought of a typical week vanished quickly from my mind. I had captured dozens of black bears over the past two years as leader of the division's Black Bear

Research Program. What was the chance of catching an injured bear that had been spotted only once? "One thousand to one," I muttered to myself as I considered that a black bear wanders over 10 to 50 square miles in its overall range.

I told Marie to place food in her yard to encourage the bear to return to her property. This was a real contradiction for me since I spend a lot of my time warning people that they should never feed a black bear. Marie called back on Wednesday morning. The bear had returned and feasted on a turkey carcass, double-fudge cake and chocolate chip cookies. There was little doubt in my mind that it would be back again.

That afternoon, Jon Rosenberg, a volunteer with the division's Wildlife

Conservation Corps, helped me load a huge barrel trap on the truck and we made the nearly two-hour trip to Marie's house. On arrival, it was easy to see why bears moved through her property. The house was centered between two extensive state forests that contained acre after acre of impenetrable rhododendron swamps. Our research had shown this type of habitat to be very important to black bears. We placed the barrel trap about 100 feet from Marie's picture window and went into the house to prepare the bait bag that would be attached to a trip wire inside the trap.

We started with fresh cream-filled donuts we had brought with us, then added some crumbled bacon and grease that Marie cooked up. I raided her kitchen cabinets for pancake syrup, vanilla, honey

and molasses. About \$15 worth of ingredients and a half-hour later, we had a concoction that we were sure no black bear could resist. I set the barrel trap and instructed Marie to call me as soon as the bear was caught.

"He won't go into the trap." Half asleep, I was having difficulty comprehending what Marie was saying on the phone that night. "The bear goes to the door of the trap, he wants to go in, but he won't go." Like a repeat of a bad dream, her message was the same on Thursday night. "The bear comes in the yard at exactly 8 p.m., he goes right to the trap, he doesn't fit!"

"The bear has to fit," I assured her. "Jon will come up tomorrow night and see what's wrong."

The phone rang at 8:30 the next night. "The bear can't get into the trap," Jon announced.

"What are you talking about?" I asked in disbelief. The barrel trap, which is a seven-foot long pipe, has a 3-foot wide opening with a door that slams shut once the bear pulls on the bait. It was more than large enough.

"It holds its paw up to keep the wire around its foot from snagging, and hops," he explained. "When it tries to hop into the trap, it whacks its head on the door frame." So much for Plan A.

On Saturday, Plan B was in progress. I had hesitated to try to get the bear with a tranquilizer gun because of the possibility that it might run into the nearby road. Tracking the bear into the dry woods at night without the benefit of a radio collar also would be very difficult. But we had to take the chance. I arrived at Marie's at 7 p.m. Saturday. I was joined by my husband Ed, who would be the marksman; veterinarian John Bridenbaugh; conservation officer Joe Meyer; and Jon. I decided to attach tracking string to the tranquilizer dart, employing a technique that has been used successfully by bow and arrow hunters. The dart Ed would be firing had a small barb on the needle that would lodge under the bear's skin. With one end of the string

attached under the needle barb, the bear would leave a trail of 1,000 feet of string. If the string didn't break in the dense underbrush, we could find our bear, or at least that was the theory.

We quickly set up barricades alongside the house to try to block the bear from running toward the road. We took our positions at the open picture window at 7:30 p.m. The ticking of Marie's clock, the only sound in the room, was much louder than it should have been.

"He comes at eight o'clock. He'll be here," Marie assured everyone. At precisely 8:02 p.m., Jon, who was scanning the edges of the property with binoculars, was the first to spot him. "Here he comes, up by the Volkswagen!"

A very large bear was coming down the hill. Holding its front paw up close to his body, the bear walked with an odd hopping gait, appearing more like a miscolored kangaroo. It limped past the old blue Volkswagen, past the rusted-out bus and around the pool. Ed brought the gun up to the open window. The bear had to be facing away from the road when hit with the dart. The bear began turning. As the shot rang out, the dart hit over its left hip.

The bear's gait was no longer impaired. The animal left the yard at full throttle, all four feet in contact with the ground. The tracking string was unraveling rapidly from the cylinder in Joe's hand. A knot appeared and frantic hands worked to keep it flowing. There was 1,000 feet of line. With a snap, the end of the line spit out of the cylinder and disappeared out the window. A chair crashed to the floor as Joe leaped over it and ran out the door, following the string, our only link with the bear, up through the underbrush of the hillside. After another 50 feet, the string finally stopped its forward motion.

Daylight was fading rapidly, but we had to wait another six to seven minutes to be sure that, 1,000 feet away, the tranquilizer had taken effect and the bear was going to stay put. I grabbed my 10-foot long jab pole and, taking hold of the string, we began following the trail. Down the hill,

Report Bear Sightings

Black bears, whose numbers in New Jersey have steadily increased since the late 1970s, often are spotted in June as the males roam in search of a breeding partner.

Anyone who sees a bear should remain calm, stay clear of it and allow it to pass. Do not feed it.

The Division of Fish, Game and Wildlife, which tracks the movement and numbers of bears, urges anyone who has spotted one to notify its Black Bear Research Program at (908) 735-7040.

around the rock formations and through the underbrush we marched, clinging carefully to our frail connection. In the dim light, a menacing shadow appeared before us. Having lost control of its hind legs, the big bear still had mobility in front. I rushed forward and injected more drug with the jab pole. Five minutes later, the bear's head slumped to the ground and we cautiously approached.

Dr. Bridenbaugh examined the bear thoroughly. "He's got a tattoo, N2829," he announced. A quick review of the records determined the bear was a male that we had relocated from this same area nearly two years before. Like so many males, he had successfully navigated his way from the relocation site, 38 miles away, right back to what he considered his home turf. Dr. Bridenbaugh deftly removed the tangled mass of wire and treated him with antibiotics. New tags were placed in his ears and with a concerted effort, we hoisted him on the block and tackle scale. He weighed in at 392 pounds.

Marie and her husband produced a bottle of sparkling water and glasses and we toasted each other in the moonlight on our hard-won success. We remained with the bear until he regained his mobility. As we watched the bear move off into the swamp, I knew why I love workweeks that are far from typical.

By Patty McConnell, leader of the Division of Fish, Game and Wildlife's Black Bear Research Program

Volunteers

Keeping Watch on Waterways

Over the course of some 30 years, the Woodbridge River became a dumping ground for everything from refrigerators and automobile engines to industrial discharges of acids and other pollutants. Fill dirt dumped at the river's headwaters reduced the flow to a trickle in some places, while buildup of contaminated silt from runoff caused flooding in others. Mosquito and erosion problems resulted.

Ernie Oros, a Woodbridge Township councilman at the time the fill dirt was illegally dumped, remembers being shown pictures of the choked-off waterway. "That was the final blow," he says. Oros worked with the local environmental commission to press for cleanup of the river, and in 1988 was approached by the New Jersey Department of Environmental Protection and Energy to participate in its new Water Watch Program designed to increase public awareness of water pollution. A

handful of other residents joined with Oros to form the Woodbridge River Watch, a group dedicated to cleaning up and restoring all of the waterways in the urban Middlesex County community.

The Woodbridge River Watch now numbers more than 150 members, who range from schoolchildren to senior citizens. One of their most significant accomplishments came in 1990 with the establishment of the Woodbridge River Watch Wildlife Sanctuary, a 40-acre tract of Green Acres land. More than 100 species of birds have been spotted in this sanctuary, which serves as an area where these birds are able to feed and nest. Children visit the sanctuary as part of their school curriculum, and both young and old alike are welcome to tour the area. Nature walks are scheduled year-round.

The group also plants trees on Earth Day and distributes environmental literature at fairs and festivals in town. At the St. Patrick's Day Parade last year, members handed out nearly 4,000 coloring books featuring a history of the Woodbridge River and simple tips to help the environment. In

addition to sponsoring cleanups and monitoring the water quality of the Woodbridge River and its tributaries, the group organized a cleanup of the Rahway River as well, prompting residents of that community to start their own water watch.

To keep its own members and community informed of its activities, the Woodbridge River Watch publishes a newsletter two or three times a year. Its meetings and cleanups have been televised on a local cable television station, and two educational videos produced by the group have been aired as well.

Industry in the area also has pitched in. Two fishing boats were donated by Royal Petroleum of Sewaren to assist in cleaning up portions of the river. When members of the river watch were unable to remove several wooden timbers from a river bed, they contacted Public Service Electric & Gas, which immediately sent out a crew with a crane to help.

"Industry now gets upset if we don't call them," says Oros, who notes that the group now relies heavily on these local industries for financial support.

Members of the Woodbridge River Watch pulled a pole (below) and wooden timbers (at right) from the river during their cleanup efforts.



Life in the river is beginning to make a slow recovery, and fishermen and crabbers are taking advantage of this. "Close to a mile up the river, we've had bluefish. And a lot of people are eating these crabs once again," says Oros.

The group's work is far from over. Mosquitoes remain a problem, and muskrats forced from the banks of the river by flooding have damaged some back yards. The Woodbridge River was the site of the nation's first grist mill, and plans are in the works to build a replica for educational purposes. The group hopes to construct an environmental education center just outside the sanctuary and establish two nature trails through it for educational tours. The river watch also is getting help from the Association of New Jersey Environmental Commissions and the New Jersey Conservation Foundation in working with the township to increase the size of the sanctuary.

"We would like to have somewhat of a greenbelt right in the middle of an industrial area," says Oros, who currently serves as a state assemblyman. "We're going to push more for open spaces and land preservation."

The Woodbridge River Watch is one of more than 100 groups taking part in the DEPE's Water Watch Program. Organizations are initiated by "adopting" the waterway of their choice and take part in a number of activities, including cleanups, water quality monitoring

and educational programs. Several of these organizations have come up with some innovative ideas:

❑ The Brick Water Watch in Ocean County gave 3,000 book covers with the water watch slogan, "Clean Water Begins With YOU!" to local schools.

❑ In Union County, members of the Cranford Rod and Gun Club have reconstructed several dams along the Rahway River to provide a better habitat for trout.

❑ The Wanaque Watch in Passaic County built a small waterfall in the Wanaque River to add oxygen to the water to provide a better habitat for fish.

❑ H.O.P.E. (Help Our Planet Earth), a high school group in Hackettstown, Warren County; Clean Ocean Action in Sandy Hook, Monmouth County; and Alliance for a Living Ocean in Long Beach Island, Ocean County, are taking part in programs to increase public awareness of nonpoint source pollution through the stenciling of fish on storm drains.

"A lot of the groups have worked to help clean their waterways, and by doing that they've helped increase awareness

Life in the river is beginning to make a slow recovery.

about the value of their waterways as a resource to the community," says Kyra Hoffmann, coordinator of the DEPE's Water Watch Program. The groups also are important because they act as the "eyes and ears" of the program, keeping the department informed about the condition of New Jersey's waterways and helping to spread the word about water pollution.

Individuals or groups wishing to find out more about New Jersey's Water Watch Program should contact the DEPE's Office of Regulatory Policy at (609) 633-7021.

By James Grubic, a Rutgers University journalism intern

This pickup truck was filled with tires and other debris from the Woodbridge River.



Strollers Can Enjoy Urban, Nature Mix

New York City can be a hectic place, but from a distance the city of skyscrapers takes on a look of majestic serenity.

That's the view from Weehawken Township where visitors can take in a sweeping view of the Manhattan skyline while strolling along the reconstructed Boulevard East Promenade, a one-mile walkway that connects a series of four parks.

Its home county, Hudson, is New Jersey's most densely populated. But along the Palisades cliffs overlooking the Hudson River, visitors can take a break from the surrounding urban setting to enjoy a bit of the natural environment as well.

"It's really the only open area in Hudson County, so for many people, it's their only outlet," says Marie Alberian, a member of the Weehawken Environmental Commission.

The promenade and parks have been the target of an extensive renovation project to restore them to their 1920s glory. Ornate Victorian light fixtures, cast iron and wooden benches, and a variety of ornamental paving materials have replaced a rundown concrete sidewalk and modern-day benches and light fixtures.

The project, approved by the Weehawken City Council in 1984 and expected to be completed this fall, was financed with \$2.8 million in state Green Acres funds, as well as \$800,000 from Hartz Mountain Industries, Inc., in exchange for private development rights elsewhere in the township. The Weehawken Environmental Commission consulted the Metropolitan Museum of Art in its search for designers for the project and chose Bruce Kelly and David Varnell of Manhattan. Specializing in historic restoration, the landscape architecture firm also is known for



designing Strawberry Fields, the 2.5-acre area in Manhattan's Central Park West that features plants from around the world and is dedicated to John Lennon.

Walking north along the promenade, the first two parks encountered are Hamilton Plaza Park and Hamilton Monument, the site of the July 7, 1804, duel between Aaron Burr and Alexander Hamilton that cost Hamilton his life. Next is Soldiers and Sailors Monument Park, where the memorials honor

Weehawken war veterans. The final park along the promenade is Old Glory Park, a handsome paved plaza featuring sycamore trees dating from the 1920s.

Along the promenade, visitors also can take in the picturesque view of Manhattan and Brooklyn from the George Washington Bridge to the Verrazano Narrows Bridge. This view is so striking that it often has been used as a backdrop for television commercials.

Because of the success of this project,



two neighboring towns, West New York and North Bergen, are undertaking similar projects, using the same materials, to create virtually two miles of continuous park. North Hudson Park in North Bergen, at the northernmost point of the promenade, features a bird sanctuary with a wood chip trail down to the cliffs, offering a unique opportunity to see hawks, owls and other wildlife in this urban environment.

The Boulevard East Promenade is a designated alternate route in the New

Jersey Department of Environmental Protection and Energy's Hudson River Walkway Plan, which provides for continuous public waterfront access from the Bayonne Bridge to the George Washington Bridge.

A dedication ceremony for the newly renovated parks and promenade is planned for November 1.

By Michelle Anthony, a Trenton State College journalism intern

“It’s really the only open area in Hudson County, so for many people, it’s their only outlet.”

— Marie Alberian,
member of the Weehawken
Environmental Commission

Cast iron and wooden benches, ornamental paving materials and Victorian light fixtures have given a new look to Old Glory Park.

Pesticides: Handle With Care

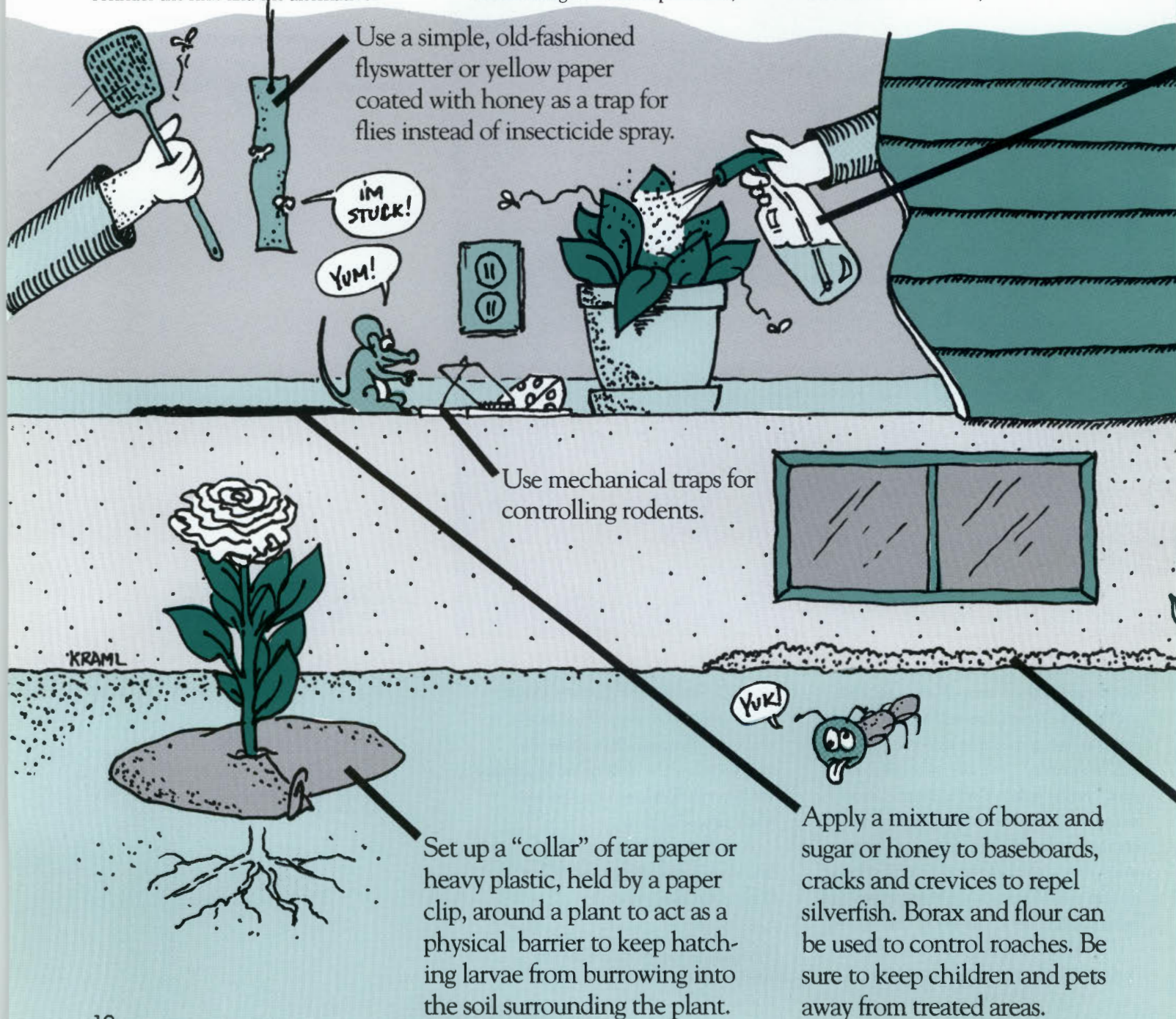
Just as unsightly weeds and bothersome mosquitoes are sure signs of summer, so are the cans of pesticides and lawn sprays that are meant to control them and allow you to enjoy the outdoors. But before you reach for a chemical line of defense, consider the risks and the alternatives.

Pesticides play an important role in maintaining our quality of life, but to be effective they have to be toxic to some degree. The improper use of pesticides can result in contamination of ground water, the killing of wildlife and potential harm to humans, such as neurological disorders and respiratory impairment. Animal studies also have shown that some pesticides may be linked to the development of cancer and birth defects.

Before using that can of pesticides,

weigh the benefits of using it against the risks to your health and the environment. Consider alternatives first, such as the ones illustrated on these pages.

If you decide to use a pesticide, remember that there is no such thing as a "safe" one. Read the label thoroughly and follow the directions exactly to reduce risk. It is illegal to use a pesticide in a way that is not specified on the label. Make sure the pest you want to eliminate is identified on the label, and choose the



one that will do the job with the least toxicity. Beware of advertising that claims a product is "organic" or "natural." These terms are not synonymous with safe or non-toxic.

Repellents frequently are used in the summer to keep mosquitoes and ticks away, but some are labeled for use only on clothing and are not to be sprayed directly on skin. Be aware that children and pets are especially susceptible to the harmful effects of pesticides. Do not spray more

Use hot-pepper spray to control pests on leaves of house plants. Plain soap and water also can be used, but be sure to rinse the plant thoroughly with fresh water afterward.

than the amount specified on the label. With pesticides, less is better.

There are more than 10,000 pesticide products registered for use in the state. The New Jersey Department of Environmental Protection and Energy's Pesticide Control Program is charged with regulating their use, sale, manufacture, storage and disposal. Anyone who applies pesticides on someone else's property or who uses the more toxic agricultural pesticides is required to be licensed with the program. Lawn maintenance personnel, building superintendents, janitors and restaurant managers who use pesticides, as well as pet groomers who apply flea and tick repellents to pets, must be licensed. Applicators are required to post signs on lawns and buildings warning of pesticide use. They also must provide consumer information sheets to customers prior to applying pesticides.

The program administers and develops certification exams to determine a prospective applicator's scope of knowl-

edge of pesticides, pesticide safety and regulations. It also conducts ongoing research on pesticide use and maintains a cooperative sampling effort with the federal Food and Drug Administration. Fruits and vegetables such as apples, pears, peaches, potatoes, sweet corn and green peppers are collected from farms throughout New Jersey and sent to the FDA for pesticide residue analysis. Samples with residues exceeding federal tolerance levels trigger further action, including an embargo of the crop and an investigation to determine if pesticides were applied properly.

Summer usually results in a high number of complaints about pesticide misuse, such as those prompted by pesticide drift onto ponds or backyard vegetable gardens. A homeowner might call the program out of concern that an exterminator had overapplied a pesticide for roaches in his or her home. In such cases, the Pesticide Control Program notifies local health departments and dispatches an inspector, who takes air and surface samples that will be analyzed. The applicator's statements and records of how the pesticide was applied are compared to the manufacturer's directions for safe application. If it is determined the pesticide was improperly applied, the applicator will be ordered to clean up the contamination and will be issued a notice of prosecution, which can result in fines of up to \$3,000 per offense.

For more information on pesticides, call the Pesticide Control Program at (609) 530-5199. To file a complaint about pesticide misuse, call (609) 530-4132.



Physically remove pests and pull out weeds.

Apply common household staples, such as coffee grounds, talcum powder, cayenne pepper or lemon juice and rinds, to areas where ants enter.

Grow plants such as spearmint, garlic, marigolds and tansy, which naturally repel ants and aphids, in your yard.

By Carmen Valentin, public outreach representative for the Department of Environmental Protection and Energy's Pesticide Control Program

Profile

Her Back Yard's a Butterfly Haven

What do you do with an injured butterfly? I hadn't really thought about it until I found a Monarch butterfly in a parking lot in Belleville. Its wing was partly bent and the most it could do was flap weakly about a curbstone. Moved by the butterfly's plight and fearing that it would get crushed by a car, I picked it up with a piece of paper and drove home with it. There, I placed it in a jar and called the Hackensack Meadowlands Environmental Center in Lyndhurst, Bergen County.

A staffer there suggested I call "the butterfly lady," Marion Hill, a self-taught lepidopterist. From a screened hut in the back yard of her home in Lyndhurst, Hill raises injured butterflies, and breeds and studies butterflies and moths. She also lectures at camps, environmental centers and garden clubs on topics such as the life cycle of butterflies, insect anatomy and how to attract butterflies to home gardens. From April to June and September to October, she brings her caterpillars, slides and lectures to schools throughout northern and central New Jersey.

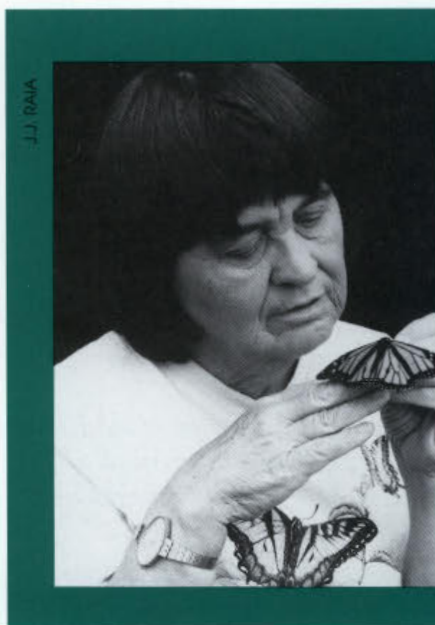
Over the phone, Hill patiently explained how to feed and care for my injured butterfly. But I needed to find a good place elsewhere for it to recover, so she suggested I bring it to her home. When I checked in later with her, she told me that my butterfly had been able to fly again after only a week.

Her healing technique is simple and she shares it with the many people who ask her what to do with an injured butterfly. "Give it some sugar water, keep it very quiet for two or three days and then let it go. Injured butterflies can fly even with only half a wing," she says.

Caring for butterflies was the last thing on Hill's mind 10 years ago when

youngsters in her 4-H Club decided they wanted to devote their time to something new. One boy showed her a caterpillar and asked her to raise it.

"No way, I don't even like insects," was her first thought, she says. But she raised the caterpillar, learned about breeding butterflies and now, she says, "that boy's married with kids and I'm still raising butterflies."



Hill collects butterfly eggs from the leaves of cherry trees and milk weeds found in nearby fields. She examines the eggs under a microscope to ensure that they're healthy and free of parasites. The caterpillars are about 1/16-inch long when they hatch. Anywhere from 10 days to a month later, depending on the species, they go into the chrysalis, or the dormant, sleeping stage. Weeks to months later, they emerge as butterflies. Of the 600 caterpillars she breeds per year, most become butterflies. If left in the wild, the survival rate of these eggs is extremely low — only six butterflies from 300 eggs.

Hill breeds butterflies common to northern New Jersey, mostly the orange-and-black monarchs, black swallowtails, which are black with purple and yellow spots, and viceroys, which look

similar to monarchs, but are smaller.

Each September, she runs a program at the James A. McFaul Environmental Center in Wyckoff to teach people how to tag butterflies. Identified by numbered, thumbnail-sized, paper stickers on their wings, the butterflies are tracked for insect migration studies conducted by the University of Toronto, Canada. Butterflies migrate as

From a screened hut
in the back yard of
her home in
Lyndhurst, Marion
Hill raises injured
butterflies, and breeds
and studies butterflies
and moths.

far south as Mexico. For more information on the tagging program, call the center at (201) 891-5571.

Hill also will conduct butterfly programs and nature walks this summer at the Flat Rock Brook Nature Center in Englewood and at the Hackensack Meadowlands Development Commission Environment Center in Lyndhurst. For dates and times, call Flat Rock Brook at (201) 567-1265, or the Hackensack center at (201) 460-8300.

To contact Marion Hill for other educational presentations, call (201) 438-5638, or write to her at 440 Riverside Avenue, Lyndhurst 07071.

By Catherine Greenfeder, a freelance writer who lives in Nutley

Dye is Cast for Pollution Model

A loose rail on a railroad bridge causes five tank cars containing agricultural pesticides to tumble into the Delaware River. Two of the cars break open and 20,000 gallons of the pesticides enter the water. Emergency response teams are summoned. Knowing how quickly the spill is likely to travel and how widely it will disperse will help the workers contain the spill and minimize environmental damage.

This imaginary scenario is one type of potential emergency that prompted the Delaware River Basin Commission, a regulatory agency that oversees water quality and quantity in the Delaware River Basin, to undertake studies last summer to determine how pollution behaves in the Delaware River. Although similar studies had been conducted in other waterways, the Delaware has many pooled areas and reservoir inputs and releases that could affect the movement of a spill.

The final results from the studies will result in two models. One is a toxic spill

model that will help to predict the location and significance of spilled materials, which will be useful to emergency response agencies and river managers. The other is a water quality and planning model, which will be used in making future management decisions affecting the Delaware and to determine the need for pollution control.

"There is tremendous growth and development occurring along the river, which will provide new sources of pollution, including stormwater runoff," says Richard C. Albert, supervising engineer for the Delaware River Basin Commission. Albert also points out that the river is crossed and paralleled by many major highways and train freight lines, increasing the risk of toxic spills.

The study was conducted in the 120-mile reach from Hancock, New York, south to the Delaware Water Gap. Nontoxic, fluorescent red dye was dropped into the river under four different conditions.

During the first phase, the dye was released upstream of the 114-foot deep Narrowsburg pool in New York to determine what would happen to a spill when it reached the deepest point in the river. In the other phases, the researchers

tested the dispersal pattern of the dye at different river flow stages. The second phase was a medium-flow study showing behavior of pollution when the river flow was at 5,000 cubic feet per second, while the third phase was a low-flow study with the flow at approximately 2,000 feet per second. The final phase was a surge-wave study to determine what happens to pollution when subjected to reservoir releases.

Preliminary results from the Narrowsburg pool study show that a spill travels through a pooled area in the Delaware River more readily than was predicted. However, results from the other studies indicate that pollution would move more slowly than was predicted elsewhere in the river. In the low-flow study, the dye cloud arrived a full 24 hours later than expected. This type of information would be useful in determining how to thoroughly and efficiently contain and clean up a spill.

More than 100 people took part in the research, including participants from such New Jersey-based groups as the Upper Delaware Council, Rutgers University, the Watershed Association of the Delaware River and the Office of the Delaware River Keeper. The study was funded by the Delaware River Basin Commission, the U.S. Geological Survey, the National Park Service and the Upper Delaware Council.

The results currently are being analyzed by the U.S. Geological Survey. A report of the complete findings is scheduled to be available by September 1993.

By Michelle Anthony, a Trenton State College journalism intern



Clearing the Way for Cleanups

The three dots on the University Square property indicate the location of contaminants.

Officials with Matrix Development Group, a real estate investment firm, just wanted "to do the right thing" when contaminants were found on the West Windsor site they were developing as an office park, says Joseph Taylor, its president and chief executive officer.

It wasn't even as if Matrix, manager of the University Square project, or its partners were to blame. When the 43-acre property was purchased in 1983, the buyers had no idea that a one-acre portion was tainted. But as the second phase of development was about to begin, water and soil samples revealed the presence of hazardous compounds in one corner of the property. An investigation by the state Department of Environmental Protection and Energy found that former operators were responsible for the contamination.

That was small consolation for Matrix, which would be unable to further develop or sell the property until it was investigated and cleaned up. Matrix wanted DEPE's oversight prior to proceeding, but the site was considered a low priority since the contamination was limited and posed no risk to area residents or tenants of the existing or nearby buildings. And even if the DEPE had been able to handle the case immediately, Matrix would have had to enter into a legally binding and potentially time-consuming process and post a substantial economic bond to get the cleanup under way.

So Taylor approached DEPE Commissioner Scott Weiner with a proposal: Allow Matrix, which couldn't afford to put up a bond and pay for a cleanup, to put its limited money into continued testing. The investigation would proceed far faster and the tests would reveal the extent of the contamination. In addition, Matrix would pay for DEPE supervision of all work.

His offer not only was accepted, but opened the door for a new voluntary program that is expected to increase significantly the number and speed of cleanups throughout the state.

Under the pilot program, the DEPE signs a memorandum of understanding with a property owner who wants to investigate or clean up a contaminated site. The agreement stipulates state requirements and expectations for the testing or cleanup and eliminates the need for an administrative consent order.

The administrative consent order, still required for severely contaminated properties, requires responsible parties to provide financial assurance — sometimes amounting to millions of dollars — that the cleanup will be completed. Companies often must pay penalties before actual work can begin and are liable for additional

penalties if they do not perform according to the terms of the agreements. The consent-order process also requires departmental review of each step in the cleanup, which is appropriate for high-priority cases, but could delay the redevelopment of lesser-contaminated areas in the state, DEPE officials say.

"The new voluntary program will eliminate the regulatory roadblocks for many companies that want to clean up contaminated sites," says Weiner. "At the same time, it will also clearly benefit New Jersey's citizens by more quickly eliminating potential health and environmental risks associated with these sites."

The state has identified more than 600 major contaminated sites that need to be cleaned up over the next several years and thousands of other sites in need of limited cleanup. In the past, the DEPE responded by tackling the worst environmental cases first. As a result, it sometimes took years before the state was able to address sites with limited contamination. Delays, however, can prove costly, according to Lance R. Miller, assistant commissioner of the DEPE's Site Remediation Program.

"The contamination continues to move," Miller explains. "The quicker you get in and clean it up, the more you reduce the extent of the problem and the cleanup costs."

The voluntary program will not only accelerate cleanups, but will allow DEPE staff to devote more time to the most troublesome contaminated sites around the state, he says.

Five other property owners entered into voluntary agreements for limited work in the first few months of the pilot program:

- ☐ Mercer County Improvement Authority, Duck Island site, Hamilton Township, Mercer County
- ☐ United Jersey Bank, Tomasella Construction site, Mountainside Township, Union County
- ☐ Hoffmann-LaRoche Inc., Belvidere site, Warren County
- ☐ DB Realty I (an affiliate of DKM Properties Inc.), the former Roebling Wire Works site, Trenton, Mercer County
- ☐ West Grove Associates, SLM II site, Neptune Township, Monmouth County

In deciding whether to enter into a voluntary agreement, the DEPE reviews each application and weighs criteria such as the extent of contamination at the site, the potential impact on public health and environmental resources and whether the party seeking to participate has a history of working cooperatively with the department.



Under the voluntary program, there are no penalties for not completing the cleanup and no financial assurances required. A property owner can do the work a step at a time without making a commitment to complete the entire project. If cleanup efforts are halted and further work is required, the site remains on DEPE's list. When the site becomes a priority, the responsible party will be required to sign an administrative consent order and put forth financial guarantees that the work will be completed.

All sites under the voluntary program must meet the same cleanup standards that apply to other contaminated tracts in New Jersey. The state this fall is expected to adopt new standards that set acceptable cleanup levels for 130 contaminants in soil, water and buildings, and that outline procedures for determining the best method to remove contaminants from various types of sites. These standards are expected to speed the cleanup process and act as an incentive for parties to undertake voluntary projects because they will know at the outset what they will have to achieve, according to DEPE officials.

Taylor says the new voluntary program has accelerated the cleanup at the University Square site by years. "It's saving us

money, if nothing else just because the cleanup process is going faster. It's also a significant savings to the DEPE. We're doing all the work and paying them to review it, versus the DEPE having to spend the money to chase a landowner."

DEPE officials confirm the savings to the state. Contaminated sites often become the focus of lengthy and costly legal battles when owners or responsible parties can't or won't do cleanups. The state must use public funds to pay for the cleanups and then try to recover the costs.

Matrix has completed the final round of testing at the University Square site and submitted a preliminary cleanup plan, which was approved by the DEPE. Under an addendum to the memorandum of understanding, the company was immediately able to begin developing a work plan detailing how the cleanup will be implemented. Pleased with the accelerated pace of the cleanup, Taylor says he would recommend the voluntary program to other businesses as a way to "save a lot of time and money."

"It's not a program for people who are looking to short-circuit the cleanup process," Taylor says. "But it's a great way to get there sooner rather than later."

Hundreds of Contaminated Sites Restored

As New Jersey's population increased and its industrial base expanded following the late 1800s, the state was left with a legacy of contaminated properties. During the past 20 years, the state has identified, studied and cleaned up hundreds of these sites.

The GEMS (Gloucester Environmental Management Services) Landfill in Camden County is one such example. A former sand and gravel pit, the landfill was the dumping ground for municipal and industrial waste from the late 1950s until state environmental officials ordered it closed in 1980. During this time, as the county's population increased and more homes were built closer to the landfill, it became obvious that something was wrong. Residents detected odors from the landfill and noticed that nearby water bodies appeared contaminated.

The federal government designated the landfill a Superfund site in 1982. Under the Superfund law enacted by Congress in 1980, the most serious, and usually abandoned, sites are targeted for joint federal and state cleanup efforts. Investigations of the GEMS site resulted in a public water supply for nearby residents with private wells and the installation of a collection and treatment system for methane gas formed by decomposing debris. Efforts are nearly

complete to cap the landfill and control storm water runoff, while the collection and treatment of contaminated ground water is scheduled to begin in 1994.

Other state cleanup efforts have resulted in the deletion of five former Superfund sites from the National Priorities List.

"Because of its progressive efforts, New Jersey has received

DEPE has secured \$580 million in commitments from responsible parties to restore Superfund and other contaminated sites.

The state Legislature established another important component in New Jersey's cleanup efforts in 1983 when it enacted the Environmental Cleanup Responsibility Act (ECRA), which requires a



Campbell's Soup Company demolished several buildings during its cleanup in Camden.

far more federal dollars from Superfund to clean up hazardous waste sites than any other state in the nation — \$570 million," says Lance R. Miller, assistant commissioner of the Department of Environmental Protection and Energy's Site Remediation Program.

More than \$35 million has been spent on cleanup of the GEMS Landfill to date. About \$10 million in public funds initially was spent until the state was able to reach a settlement with more than 100 responsible parties to pay for the cleanup.

In New Jersey, the vast majority of contaminated sites are being cleaned up by those responsible for the contamination. Since the mid-1980s, the

review of certain types of industrial properties before the land is sold, transferred or closed. The most comprehensive such statute in the country, ECRA has resulted in the identification and cleanup of sites that otherwise might not have been detected. Since 1984, 1,528 sites have been cleaned up under the program at a cost of \$188 million. Currently, an additional 381 sites have active cleanups under way at an estimated cost of nearly \$420 million.

The Campbell's Soup Company on the Delaware River in Camden completed an ECRA-sponsored cleanup in 1989. Campbell's processed fresh tomatoes and manufac-

tured cans for its soup at its sprawling 22-acre site from the early 1900s until five years ago. In the company's \$2.5 million cleanup, about 10 of the structures were gutted, cleaned of hazardous debris and demolished. Underground tanks were removed from the site, along with nearly 2,000 tons of contaminated soil.

This cleanup was one of the first steps in Camden's ambitious revitalization efforts, which included the opening earlier this year of the new state aquarium. Officials hope the aquarium will spark as much as \$500 million in waterfront development during the next 10 years. Construction already is under way for a new \$40 million waterfront office tower into which Campbell's will expand its world headquarters, and a \$65 million General Electric Aerospace complex that will keep 2,000 jobs in the city. Projects expected to begin later this year include a hotel-conference center.

Requiring those responsible to take remedial action at thousands of industrial facilities under ECRA, and at other contaminated sites under several other statutes, has brought national recognition to the state. The General Accounting Office, a watchdog arm of Congress, recognized New Jersey in 1990 for conducting more cleanups at non-Superfund sites than any other state in the nation.

By Fred Mumford, a community relations coordinator for the DEPE's Site Remediation Program



Day lilies (*Hemerocallis*) are drought-tolerant and add color to a low-water landscape.

Design Your Yard for Water Savings

By Jim Morris

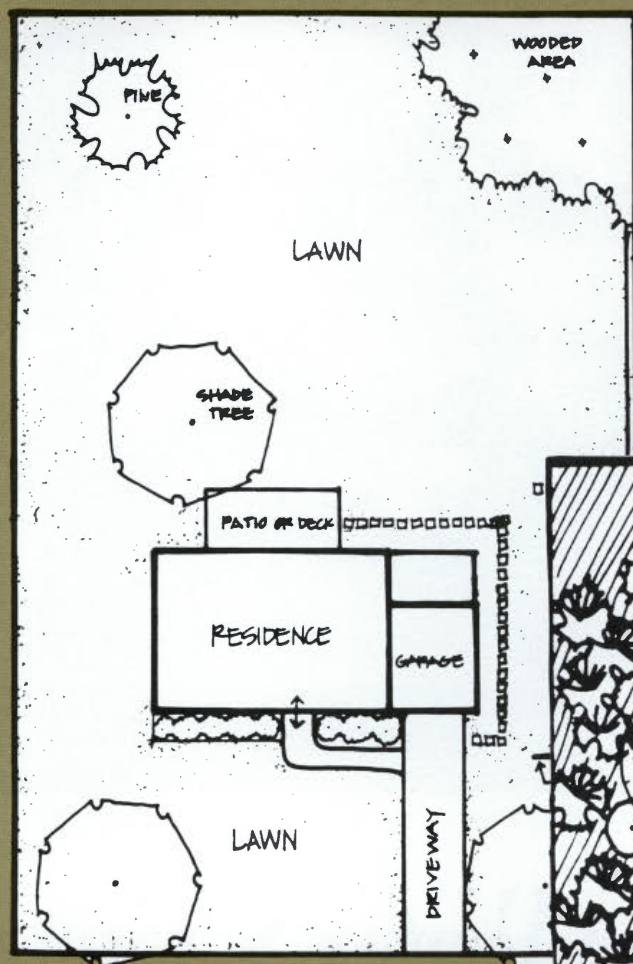
For generations, home gardeners have competed against nature and neighbors to produce ever richer, ever greener lawns. Success was measured in shades of emerald. But as many communities around New Jersey faced droughts and water restrictions in recent years, home gardeners and horticulturalists turned naturally to low-water landscaping. Today, the concern is not only that landscapes be attractive, but also that they grow in harmony with their environment.

Low-water landscaping combines simple landscape design principles with common-sense planting and maintenance programs. These strategies can reduce water demand by as much as 50 percent, according to garden experts. Although it is often called "xeriscaping," from "xeric," the Greek word for dry, low-water landscaping does not mean enduring brown lawns and wilting gardens.

In fact, more than 50 colorful, drought-tolerant species — from the raspberry-colored flowers of the Anthony water spirea, an evergreen shrub, to the spikes of blue-violet flowers on the Chaste tree, which is also a shrub — are featured in *Landscaping for Water Conservation — a Guide for New Jersey*, written by two Cook College professors for the New Jersey Department of Environmental Protection and Energy.

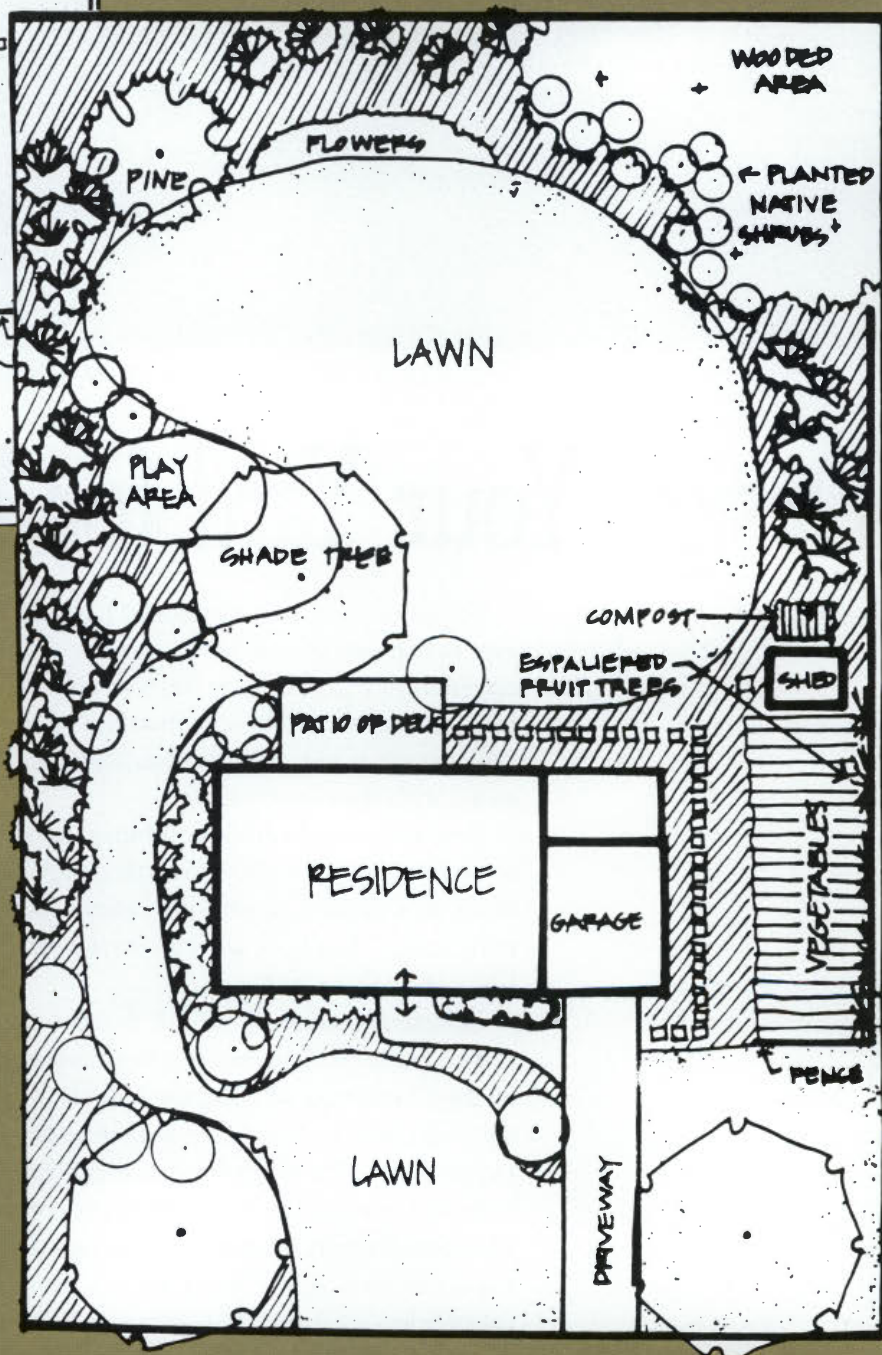
In that manual, Dr. Bruce Hamilton, a specialist in ornamental horticulture, and Dr. Theodore Shelton, a water resources expert, note that nature serves as an effective guide for low-water landscaping. "Studying how plants react to droughts in the wild teaches us valuable lessons about which plants and combinations of plants will be both aesthetic and

Less Lawn is More



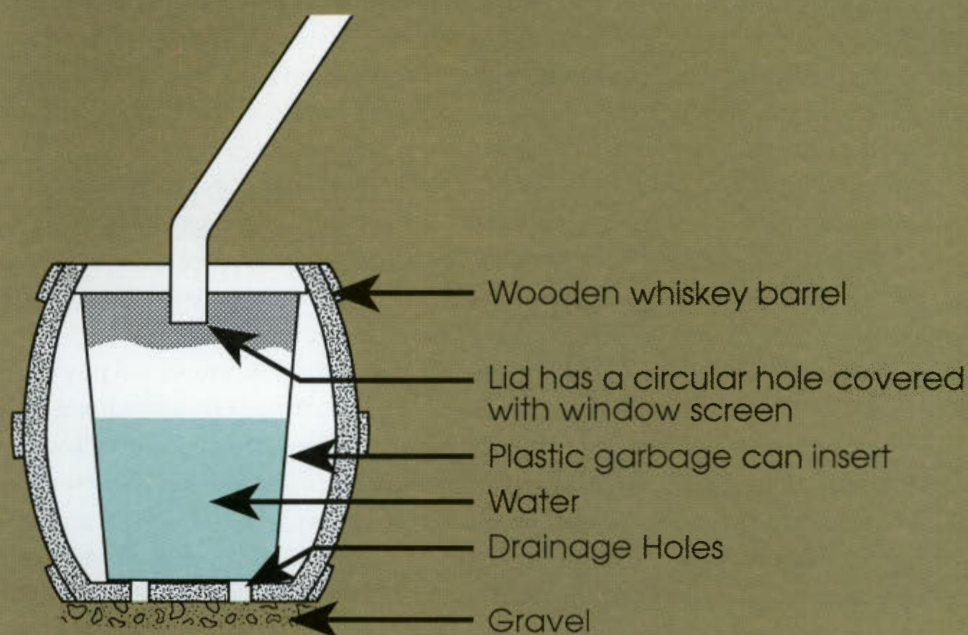
In the "before" plan, nearly all of the the ground surface is grass. The homeowner must cut around the lower branches of the evergreens and the base of the fence. Grass won't grow under the shade tree.

In the "after" plan, the lawn is confined to an easy-to-mow panel that "disappears" around the rear of the shade tree. Although the lawn is smaller in this plan, it gives the impression of being larger than it really is. The shade tree with its shallow roots is no longer competing with the lawn. An organic mulch (wood chips or bark), alone or in combination with an alternative ground cover such as English ivy, is a more successful and water-saving solution. Drought-tolerant ornamental trees create a view from the deck or patio, and their trunks are protected from the lawn mower by a bed of mulch or ground cover. The fence can be used as a growing surface for vines or espalier. A vegetable or flower garden and storage shed have been added. The garden can provide a practical, productive alternative to turf.



From "Landscaping for Water Conservation — A Guide for New Jersey"

Use Rain Barrel to Store Water



A mosquito-proof rain barrel allows a home gardener to collect rain water for use in the garden. This homemade device consists of a plastic garbage can inserted into a wooden barrel that has drainage holes at the bottom and sits on a bed of gravel. A drainpipe from the roof directs runoff into the barrel. When the garbage can overflows, water runs out slowly onto the gravel, reducing runoff and retaining more water on the site. To prevent mosquitoes from breeding, the garbage can should be topped with a lid made of window screen.

practical in landscaping," they write. The bayberry that is found growing among dunes at the beach is one example of such a native drought-tolerant plant.

With nature as a guide, low-water landscapes can be built with intelligent planning decisions. In many water-conservation landscapes, that may mean reducing the size of the lawn. Turf has become the dominant vegetation in suburban neighborhoods for good reason. Besides its visual appeal, it provides effective erosion control, heat absorption and areas for active and passive recreation.

But on the other hand, "formally maintained, highly manicured areas of turf are the most water- and maintenance-demanding elements of any landscape," according to Ken Ball and Gary Robinette, coauthors of *Taylor's Guide to Water-Saving Gardening*.

Hamilton has observed that many homeowners plant vast expanses of turf simply because they have not considered any alternatives. Specifically, Hamilton suggests reducing lawn area if you answer "yes" to any of the following questions:

- ☐ Are you trying to grow grass under the dense shade of shallow-rooted trees, such as the Norway maple?
- ☐ Are you trying to grow grass where maintenance is very difficult, such as on steep slopes, among rock outcrops or in narrow spaces?
- ☐ Are you trying to grow grass where active play tramples all vegetation?

Around shade trees, turf can be replaced with organic mulch, either by itself or combined with a ground cover, such as English ivy. Other turf areas may be replaced by vegetable or flower gardens or by drought-tolerant ornamentals surrounded by ground covers.

To achieve maximum water savings, homeowners must consider not only how much, but also what kind of turf to maintain. Home lawns traditionally have been dominated by bluegrass and ryegrass, which generally demand more water than tall fescue or fine fescue grasses, says Marie Pompei, an agronomist with Loft's Seed Company in Martinsville, Somerset County.

Mulches are
important
because they
reduce water
evaporation from
the soil.

Tall fescues have long offered good heat and drought tolerance, but for many years they were shunned because of their coarse, clumpy appearance, Pompei says. Recent breeding improvements have produced new, tall fescue varieties with finer blades, finer texture and improved color. They also require less fertilizing, and they produce less mulch than other varieties, which is important in communities that encourage residents not to bag their grass clippings, Pompei says. These new varieties include the names Rebel, Rebel 2, Tribute and Bonanza, which can be found on the analysis labels on grass seed bags.

Residents also can reduce their lawns' water demands by reducing spring fertilization, says Jon Forsell, Essex County extension agent. Forsell recommends a light application with a low-nitrogen fertilizer in late April or early May. Low-nitrogen fertilizers cause the root system to grow, enabling the roots to absorb more water. High-nitrogen fertilizers encourage a plant's top growth to increase, which boosts demand for maintenance and watering.

Three other keys to low-water landscaping are efficient irrigation, proper soil preparation and use of mulches, such as compost or wood chips, says Dan Strombom, agricultural resource management agent for Cape May County. Strombom has helped design and install low-water demonstration gardens in several communities that have faced severe water restrictions.

Efficient irrigation requires knowing how much water to use, where to apply it and when it will help most. The easiest way to assess current irrigation practices is to look for signs of water deficiency, such as drooping or falling leaves or lack of new growth. Home gardeners also can use a screwdriver or dig a small hole to check if the soil is moist near the plant roots.

To use water efficiently, residents can group plants into zones based on their water needs and water each zone accordingly, Strombom says. Spot watering, soaker hoses and trickle or mist watering systems can deliver water only to the areas of highest need. Watering is best done in the cool of the morning or when the lawn is shaded. On windy, sunny days, as much as 40 percent of sprinkler water may evaporate before reaching the plants, according to *Landscaping for Water Conservation*.

Hamilton also encourages home gardeners to build mosquito-proof rain collection barrels to help conserve water (see diagram on page 21). These barrels collect rainwater during storms for use around the garden.

Proper soil preparation often requires tilling to the depth of the root zone and adding organic material, such as compost or peat moss. Organic matter helps break up heavy or compacted soil and increases the soil's water-holding capacity.

"Soil preparation is extremely important," says Forsell. "The key is to get good root penetration, so the plant can tolerate both wet and dry conditions." For turf, the soil should be tilled about 6 to 8 inches down; for annuals, about 8 to 10 inches; and for shrubs, about 18 to 24 inches, according to *Taylor's Guide to Water-Saving Gardening*.

Finally, mulches are an important part of low-water landscapes because they reduce water evaporation from the soil. They also help prevent growth of weeds and can enhance the aesthetics of a landscape design. Organic mulches, such as composted leaves, wood chips or bark mulches, should be 3 to 4 inches thick to help reduce weeds. Inorganic mulches range from pea-sized gravel to boulders, and black plastic may be laid underneath 3 to 4 inches of gravel to help control weeds and retain water in the soil.

Home gardeners who adopt these methods will find their low-water landscapes also are low-maintenance landscapes, Strombom says. The key is to better understand what you want from your landscape and what plant materials and design best fit within that landscape. "You don't have to turn your lawn into a field," he says. "Low-water landscaping really is adaptable to individual tastes."

Water Conservation a Statewide Goal

Low-water landscaping is a natural part of New Jersey's long-term strategic plan to meet the state's water needs well into the 21st century.

Water conservation strategies will be integral to a revised statewide Water Supply Master Plan expected to be completed in 1994, says John Malleck, chief of the New Jersey Department of Environmental Protection and Energy's Bureau of Water Supply Planning and Policy. The master plan revision divides the state into 23 hydrologic basins and examines projected water supply sources and uses.

"For each basin, we're doing a miniature water budget, asking where all the water goes," says Malleck.

The answer varies widely by region. Overall, New Jersey is a "water rich" state, but these riches are not evenly distributed, Malleck says. In particular, the DEPE has identified "water supply critical areas," where ground water is being pumped out faster than nature can replenish it. In 1985, the first critical area was declared in sections of Monmouth, Ocean and Middlesex counties. A second critical area has been designated in parts of Burlington, Camden and Gloucester counties.



Workers plant a low-water demonstration garden in Cape May Courthouse.

New projects, such as the Manasquan Reservoir in Monmouth County, which was completed last year, and the Wanaque South Project in Passaic County, which includes the Monksville Reservoir completed in 1987, have added important new capacity to the state's water supply. However, problem areas remain and water conservation must be part of the solution, according to state officials. A recent U.S. Geological Survey report found that ground water supplies in Cape May County are being contaminated by salt water intrusion much faster than originally projected, Malleck says.

"The salt water is moving landward. We recognize it's just a matter of time before more wells show increased levels of chloride," he says.

With this long-term challenge to the county's water supply, Cape May officials have turned to low-water landscaping, says Dan Strombom, the county's

agricultural resource management agent. DEPE officials also have embraced low-water landscaping because it reduces peak water demand, says Joe Miri, chief of the DEPE's Office of Water Policy Analysis.

"That peak — that maximum quantity — usually comes in summertime, and it usually comes from outdoor use," says Miri. "Low-water landscaping is an important way to reduce demand for outdoor water use."

Reducing peak summer demand saves more than just water, says Dr. Theodore B. Shelton, extension specialist in water resources at Rutgers University. Accommodating peak summer water demands can cost millions of dollars in storage, treatment, pipeline and pumping capacities, Shelton says.

"Landscaping for water conservation is a means of creating capacity without costly expenditures," Shelton says. "Without these huge capital expenditures to meet peak water demand, millions

of dollars can be saved."

Low-water landscaping also offers a relatively painless way to achieve significant reductions in residential water use, Miri says. Efficient irrigation techniques alone can reduce landscape water demand by as much as 30 percent, and combining all facets of low-water landscaping can reduce water use by more than 50 percent in some areas, according to *Taylor's Guide to Water-Saving Gardening*.

In fact, public education remains one of the biggest challenges of landscaping for the water conservation movement. For instance, Strombom discourages use of the word "xeriscape" because the term may conjure up images of sagebrush rolling across parched plains.

"A lot of people are misinformed about the topic," Miri agrees. "They think of cactus and desert landscapes. But you don't have to sacrifice aesthetics and you can cut down on maintenance."

Saving Our Beaches:



HERB SEGARS



PETER ACKERMAN/ASBURY PARK PRESS

Waves pound the seawall between Belmar and Spring Lake (left) during January's destructive storm.

Millions of people will visit the nation's beaches this summer to take in the natural sights, such as this sunrise (far left) over the Belmar Fishing Club's pier in Monmouth County.

By Dory Devlin

As sure as the tides roll in and out, millions of tourists will flock to the nation's beaches this summer. They will bask under the hot sun, seek refuge in the cool, salty ocean and take in beautiful sunrises and sunsets. But most won't notice that the sand beneath them is moving, and in some places, disappearing.

Beaches, by nature's design, are constantly on the move. They are the coast's shock absorbers, taking the blows of a changeable surf like a boxer's punching bag. But in some states, New Jersey among them, the beaches are losing more sand and sediment than they are taking in, causing a retreat that threatens expensive property and a multi-billion-dollar tourist industry.

"What people have to realize is the beach is there to be eroded," says Michael Bruno, director of Davidson Laboratory, Stevens Institute of Technology's ocean engineering lab. "That's what it's there for. While it's being eroded, waves doing the eroding would otherwise be pounding houses."

Beaches may exist to erode, but for decades a debate has been waged on how to slow, or even stop, the process. On one side of the discussion are those who say do nothing: Let nature take its course, no matter what the loss. On the other side are those who say there are ways to slow the inevitable retreat through sand replenishment, dune maintenance and the careful placement of engineering structures. Finding the right combination at a cost society can bear is the real debate, they say.

The economic reality in many coastal areas is that shore erosion cannot be ignored. In New Jersey, where the 127-mile shoreline has been built up with housing even after devastating storms, this is most apparent.

"The reality is that the highest property values in the state are most likely to be along the coast," says Robert Forenson, a Lehigh University civil engineering professor whose work includes shore stabilization. "The population density is such that it's closest to the coast. And, if anything, there's pressure to increase that."

Nationwide, the numbers prove his point. Fifty percent of the population lives within 50 miles of an ocean, while 75 percent lives within 100 miles, notes Bruno. "Those are astounding kinds of numbers," he says.

Protection advocates and critics agree that where coasts are built up, a vicious cycle exists:

*Editor's Note: This article reflects the kind of debate that led to Governor Jim Florio's call for a shore summit, which took place in February. A summary of the summit participants' preliminary recommendations on shore protection can be found on pages 26 and 27. The summit process will be ongoing, and **New Jersey Outdoors** will continue to report future developments on this important issue.*

the more development, the higher the investment, the greater the demand for shore protection.

People like Dery Bennett, executive director of the Sandy Hook-based American Littoral Society, believe the cycle should stop.

"The longer one makes the decision to replenish beaches and try to hold a line where humans have decided the shoreline should be, the more you're likely to lose the natural function of barrier islands over time," says Bennett. "You kind of have decided that you're going to live within an artificial situation with all that connotes. It's going to be very expensive and it's going to be unnatural."

Since it is politically impossible to let the shoreline fend for itself, Bennett says, it may come down to determining which beaches can be financially maintained while turning others over to nature.

"Shore protection is a real misnomer," he says. "The best way to have a nice ocean shore is to not do anything and let the ocean wash the buildings away. But it would be very difficult for real estate interests to make a few bucks. The economic system is what got us into this and continues to keep us there."

This theory of doing nothing is nice if we were starting from scratch with wide open beaches, says the Stevens Institute's Bruno.

"In some areas of the United States, like New Jersey, we developed areas before we knew

The economic reality in many coastal areas is that shore erosion cannot be ignored.

Stable Funding Source Urged for Jersey Beaches

By Dory Devlin

Since two destructive storms that pummeled the New Jersey coast in October and January, the call for a stable source of funding for shore protection has grown louder and gained broad-based support from a variety of interests in the state, including conservationists, the business community and political leaders.

"Nature doesn't know anything about the economy or politics," Governor Jim Florio said at a February shore summit in Long Branch. "We can't wait another four years. We can't wait another year."

His comments were echoed by the more than 100 summit participants in their March report to the governor. Their recommendations included a virtually unanimous call for the development of a stable source of funding for shore protection projects such as beach replenishment, dune creation and groin construction. The summit group identified a wide variety of funding options, including an increase in the realty transfer tax, a dedicated fund of 1 percent from the hotel and motel room tax, a voluntary tax checkoff on income tax forms, an increase in beach fees and special assessments on properties in the shore region.

In the past, the state has depended largely on bond issues to fund such projects. Since 1983, about \$112 million in state and federal funds has been spent or committed for beach projects. Forty-million dollars of that came from a 1983 bond issue, the

most recent. Last fall, the Florio administration proposed a \$325 million clean water and natural resources bond issue that would have included \$25 million for shore protection. But it never made it onto the November ballot because the Legislature failed to act on it.

Former state Senator Thomas Gagliano, head of the Jersey Shore Partnership, a public/private enterprise that promotes shore protection, recommends a Jersey shore trust fund, which would dedicate funds to shore projects. A trust fund, Gagliano said, would provide matching monies for federally sponsored projects; allocate funds for state and local projects, including repairs to sand dunes, boardwalks and bulkheads; provide immediate funds for storm damage; and support educational programs about the shore and tourism.

A great egret waits for lunch on a sea jetty at Barnegat Inlet. Jetties can help prevent beach erosion.



CORNELIUS HOGENBIRK


what we were getting into," Bruno says. "It's easy when you're in the (North Carolina) Outerbanks and there's no development there; it's easy to say we shouldn't develop. When you're in New Jersey and you have homes that date back to the 1800s, you can't bulldoze a home that's been there 100 years."

Retreating from barrier islands like Long Beach Island may have been feasible decades ago, around the time of the 1962 Northeaster that killed 14 people and caused \$100 million in damage, says Bernard Moore, administrator for the Department of Environmental Protection and Energy's Division of Engineering and Construction. Then, there were fewer, mostly summer homes. But now there is a year-round population, and breaking up an established society could cause other kinds of problems, he says.

The fact is, people want to be by the ocean.

"There is magnetism pulling people to the shore," says Moore.

In some places, such as Kiawah Island in South Carolina, development is being planned with a changing shoreline in mind. No houses are built on or in front of the first line of dunes. Still, there is no guarantee that the erosion patterns of a dynamic coast will not change to make these efforts futile, says Bruno. It's not unusual to see a fluctuation of 300 to 500 feet of shoreline within a few years, he adds.



"There is
magnetism
pulling people
to the shore,"
says Moore.

Monmouth County Senator Joseph M. Kyrillos Jr., chairman of the state Senate Coastal Resources and Tourism Committee, said his committee intends to hold hearings on a variety of options. Kyrillos, who took part in the summit and a special working group that focused on shore protection funding, called the report helpful, but said he expects "the answers are going to have to emerge from the Legislature."

The summit process, which will be ongoing, will help frame debate not only in the Legislature, but in a variety of other forums, including community organizations and public-private partnerships such as the Jersey Shore Partnership, said Scott Weiner, commissioner of the Department of Environmental Protection and Energy.

"The shore summit will unquestionably continue to contribute to those discussions and, ultimately, to the development of successful strategies to protect the shore," he said, adding that the preliminary summit report reflects a new sense of optimism among the participants. "The storms seem to have galvanized a new willingness among people of varying views to put their differences aside and work together to protect our great coastline," he said.

The summit participants also called for the closing of loopholes in the law designed to regulate development at the shore, continuing efforts to maintain and enhance ocean water quality and developing comprehensive shore protection strategies.

The importance of such strategies and a stable source of funding was demonstrated by the October and January storms, which caused more than \$100 million in damage at the shore. Florio has committed \$4.3 million in state funds and the state is eligible for at least \$4.2 million in federal aid. Other shore protection projects, however, await funding. Some of the federally sponsored projects in need of a state match are under way and

more are planned along the 127-mile coast. Over the next three years, the Army Corps of Engineers is bringing 7.1 million cubic yards of sand from offshore points to Sea Bright and Monmouth Beach, where the beach has all but disappeared because of a massive seawall designed to protect coastal property. The cost of the project is \$103 million. The first \$40 million will be provided by the federal government, since the state already has undertaken \$12 million in repairs to the seawall. The balance of the \$103 million — \$63 million — will be split among the federal government and the state, with the state responsible for \$22 million. Of that, the local municipalities will pay about \$6 million.

Also under way is a \$36 million, two-year project to restore 4 million cubic yards of sand on Ocean City beaches. The state and local share is \$13 million, with the state slated to pay \$10 million. In the planning stages are beach fill projects for Long Branch, Deal, Allenhurst and the stretch from Asbury Park to Manasquan.

Meanwhile, the state has agreed with the Army Corps of Engineers to maintain a \$10 million beach replenishment project completed in June 1991 in Cape May City. Although New Jersey coastal experts have determined that beach replenishment is the best way to protect the shore, it's a fact of nature that the sand will wash away naturally or in storms. To be effective, beach fill projects must be repeated at least every five years, experts say.

DEPE officials would like to see an annual shore protection fund of \$15 million to \$27 million at first while beach replenishment is in high gear. Once the beaches are installed, the fund could drop back to as low as \$12 million for maintenance costs.

In a state with its beaches at the heart of a \$13 billion tourism industry, drawing seven million visitors last summer, coastal experts say the millions spent on beach protection would be well worth it.

"Any kind of long-range planning requires the ability to move the lines," says Norbert Psuty, associate director of the Institute of Marine and Coastal Sciences at Rutgers University. He advocates development in "zones" that would move over time with the forecasted shift in the coast.

"If all you're doing is drawing a line on the map, it's OK for the short term. It still doesn't attack the long-term problem. You have to be able to move zones," he warns.

Where the line already is drawn, coastal experts and government officials are left to choose between "soft" and "hard" solutions to beach erosion. Beach replenishment — filling beaches with sand pumped from offshore points and navigation channels — and building up dunes with sand, grass and fences are the soft, or more gentle, approaches. But Psuty warns that since beach replenishment is so expensive and is not a cure-all, it must be done on a site-specific basis in areas where a good return on the investment is most likely.

Groins, which are walls built perpendicular to the shoreline, and jetties, their counterparts in ship channels and inlets, are the "hard" engineering answers to erosion, along with bulkheads and seawalls. The problem with these is they often do more harm than good, experts say.

If not placed properly, groins can trap sand for one beach, but starve other beaches further down the coast. They only do their job if there is a sufficient amount of sand. Bulkheads, usually built to protect property from waves, eventually will be undermined by waves and a seawall will have to be built to replace them.

Seawalls, coastal experts note, are built to protect property, not beaches. In the end, their impact will be to further erode the beaches in front of them. The wall prevents the exchange of sand between the dunes, the beach and the ocean. As a result, erosion is hastened, until the beach disappears. When that occurs, a bigger seawall must be built to beat back the ocean.

That's what happened in Sea Bright, New Jersey. The wall, which dates to the 1800s as a timber bulkhead, now runs four miles along Monmouth Beach and Sea Bright. There is virtually no beach in front of it, but the communities depend on it for their survival. This year, the state has spent \$12 million on repairs to the wall. And the U.S. Army Corps of Engineers has begun a \$103 million beach fill project that will dump 7.1 million cubic yards of sand along Sea Bright and Monmouth Beach.

Some, like Rutgers' Psuty, think the money would be better spent elsewhere because it will prove too costly to artificially maintain a beach there. But, notes Bruno, with no sand beneath it the wall could fall over. "If it were to fail, it would fail as one," he says. "It would just fall over as one because the structure is very sound."

For most beaches, the consensus among coastal experts is a combination of beach fill and well-placed, well-designed groins to hold the sand there longer.

Even under the best circumstances, however, the new sand is not forever. Experts say beach replenishment must recur about every five years to be effective.

"With beach fill, people see it erode and think you're throwing money away," says Moore, noting a groin doesn't move, giving the appearance of constant usefulness. Recent storms proved that even though much of the new sand washed away, the damage would have been greater if it hadn't been there, he says.

Last June, a \$10 million beach fill project was completed in Cape May City. The state and local community paid \$1 million of the tab to drop 1.5 million to 2 million cubic yards of sand on the beaches.

"During the October storm, there was some erosion, but if the beach fill in the Poverty Beach area hadn't been there, Cape May City would have been flooded," says Moore. "The townsfolk said that was the first time in many years that they had a coastal storm and didn't

Experts say
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effective.

WILLIAM H. HARTLEY



A sign warns visitors away from the dunes at Point Pleasant. Dunes provide the shore with a natural buffer from storms.

have to turn on the stormwater pumps and pump out the town.” For three days in late October, a storm pummeled the coast, eroding dunes and beaches and forcing evacuations.

Since the late 1970s, the technology and equipment for offshore mining for beach fill has improved, lowering the costs, Moore says. Still, it is expensive. And taking sand from one place and moving it to another can affect shellfish and other species found in the disturbed sand.

In New Jersey, the U.S. Army Corps of Engineers and the state are working together on several large-scale beach fill projects this year. In addition to the \$103 million Sea Bright/Monmouth Beach venture, a two-year, \$36 million plan to place four million cubic yards of sand on Ocean City beaches is under way. Others are in the planning stages for Long Branch, Deal and Allenhurst, as well as the stretch between Asbury Park and Manasquan.

In the case of the Cape May City fill, the state has committed with the Army Corps to maintain those beaches for 50 years. That means a stable funding source will be needed in a state that has depended on sporadic bond issues to fund shore protection projects. (See sidebar on pages 26 and 27.)

As the American Littoral Society’s Bennett sees it, shore protection is not so much an environmental question, but an economic and political one.

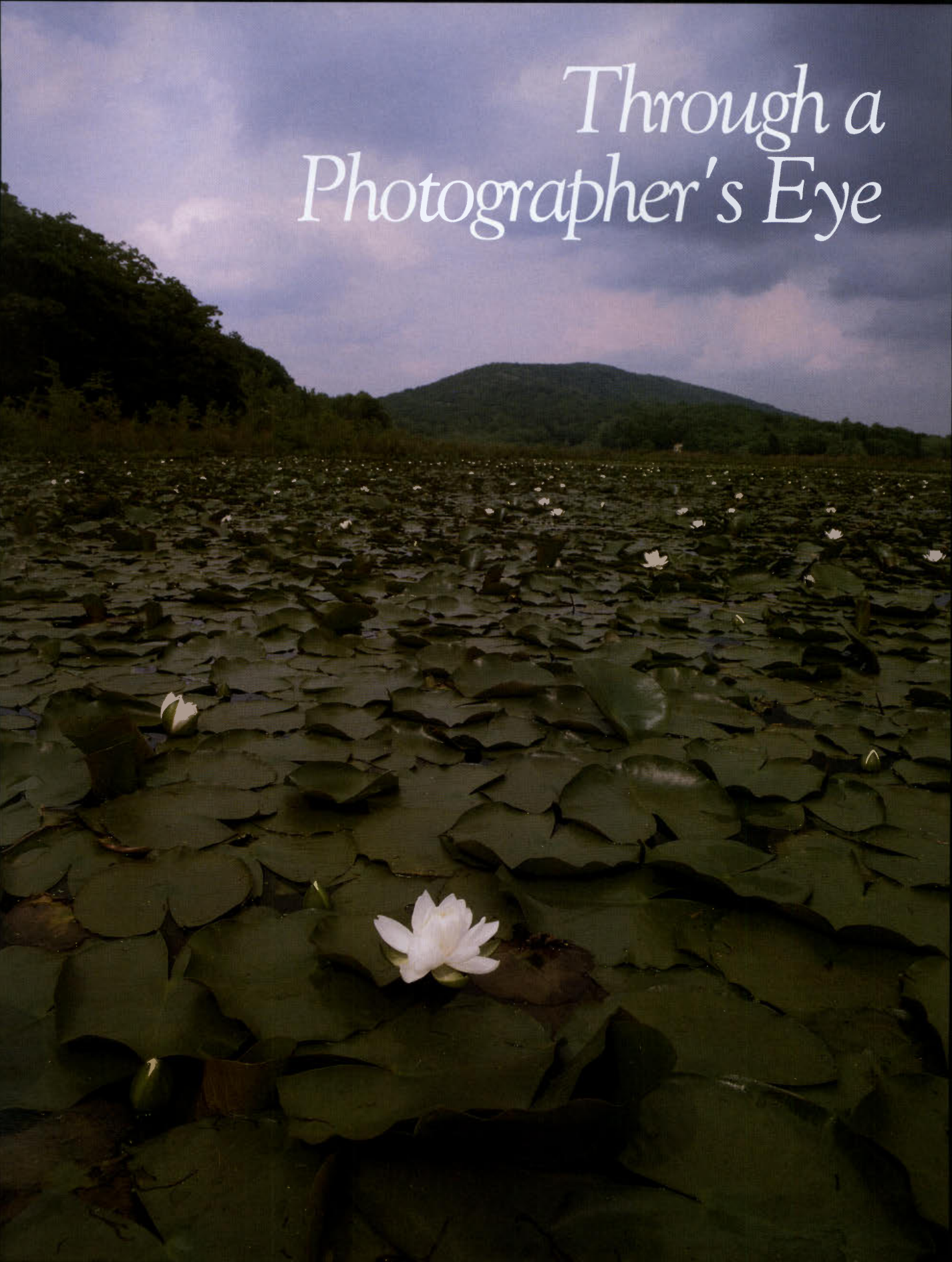
“I think the question really becomes who pays or who loses money?” says Bennett. Real estate owners and users should pay the cost of shore protection, he argues. That’s a belief held by many who say all taxpayers should not have to pay for something that mostly benefits a wealthy few.

Whether through user fees or other sources, a dedicated fund for shore protection projects must be established, says Moore. Various sources of funding have been proposed over the years, including a tax on hotel/motel rooms and an increase in the real estate transfer fee. Governor Jim Florio has called upon the Legislature to choose the best form of funding.

Moore and others disagree that only shore property owners benefit from beach replenishment. Better beaches serve the many day, weekend and vacation visitors from throughout New Jersey, and every state resident benefits from the revenues generated by shore tourism, he argues.

“If we could get to the point where we have the resources to keep up on the maintenance of beaches to make sure they are wide enough to protect against storms, there is no reason to think we can’t keep up,” adds Bruno.

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

A photograph of a pond filled with lily pads and white flowers. The lily pads are dark green and cover most of the water's surface. Several white flowers are in bloom, with one prominent flower in the lower center. In the background, there is a dark, forested hill and a cloudy sky with some light breaking through. The overall mood is serene and natural.

Through a Photographer's Eye



Weathered barn, Delaware Water Gap National Recreation Area (left)
 This beautiful barn stands below the Appalachian Mountains in the Delaware Water Gap country. I photographed it on a misty summer afternoon while my daughter chased butterflies in the field nearby.

Water lilies, Stokes State Forest (far left)
 I used a small boat to carry my equipment a short distance from shore to get this photograph. I was able to submerge my tripod and view the scene at eye level as I sat in the boat.

*Photos and text
 by Tom Till*

Exploring a forest trail in the Delaware Water Gap, I glimpsed a flash of brilliant colors through the thick woods. A short walk brought me to a stony wall adorned with columbine and trillium. High above me, the profusion and color of the flowers reached even greater glories, with gigantic clumps of pinks and reds blanketing the cliff face. Though I spent all morning climbing from above and below, I could find no way to approach the flowers with a camera. Slippery rock faces and the precipitous cliffs kept me away, able to admire the displays only from a distance. Perhaps that's why the garden had thrived. It had been forever safe from the intrusion of flower pickers and photographers.

There are plenty of other opportunities, however, to photograph New Jersey's hidden treasures. In one of the world's most densely populated regions, the state's remaining natural areas take on a great value and significance. With fewer and fewer places to retreat from civilization, our remaining pristine lands stand like endangered species. I hope, through my photographs, to speak for these places and to be an advocate for their care and preservation.



**Buttermilk Falls,
Delaware Water Gap
National Recreation Area**
After several days of rain,
Buttermilk Falls flowed briskly
down a ferny glen. I spent
several hours waiting for the
ferns to stop moving from the
force of the wind and spray
coming from the falls.



**Morning fog, Delaware
Water Gap National
Recreation Area**

*These fog-piercing rays lasted
just seconds before being
vanquished by the rising sun.
Part of my job is to be ready to
capture these beautiful, but
fleeting gestures of nature.*





**Cape May Lighthouse,
Cape May State Park (left)**

Although I like to keep photographs as simple as possible, I also like to combine more than one element for visual interest. After spending an hour trying to get the right angle, I was able to use these roses as a foreground for the old lighthouse.

**Dawn redwood and
sword fern, Leonard J.
Buck Garden, Morris
County (far left)**

This garden is among the finest in the country. I spent many days there, in all seasons, working quietly with my camera as the rumble from nearby I-287 kept me company.

More of Tom Till's photos are featured in his book, **"New Jersey, Images of Wildness,"** published by Westcliffe Publishers, Inc., of Englewood, Colorado, and available at local bookstores. Till lives in Moab, Utah, with his wife Marcy, a native of New Jersey who first suggested the idea of a book spotlighting the state's natural beauty.

A Simpler Life in Ocean Grove

By Joan P. Capuzzi



PHOTOS BY GAIL GREIG

Many summer visitors stay in the more than 100 tents that remain in Ocean Grove.

The tiny town of Ocean Grove was founded in the summer of 1869 by 10 families who decided to establish a Methodist seaside community there because of its high beach, robust shade trees and rumors that it was free of mosquitoes.

That group, which formed the Ocean Grove Camp Meeting Association, established a colony that in its heyday from the late 1890s to 1910 consisted of more than 700 tents that housed the association's members. It was part of a revival that swept the country in the late 1800s, and though more camp meeting associations eventually dotted the East Coast, Ocean Grove's is the largest one that remains today.

Life in Ocean Grove, a square-mile nestled between Asbury Park and Bradley Beach, remains very simple. Although much of the tent space has given way to cottages, 114 tents remain, flanking the eastern side of The Great Auditorium. Built in 1894

to house Methodist worship services, the auditorium today is still the focal point of the town, which clings tightly to the religious foundations on which it was established.

"Enter into His Gates with Thanksgiving and into His Courts with Praise," proclaim the brass plaques that herald incoming cars through the gates that still stand at the town's entrance.

"It's a place for re-creation and recreation," says Philip C. Herr II, president of the Ocean Grove Camp Meeting Association.

As many as 5,000 Methodists and non-Methodists alike gather inside The Great Auditorium every Sunday morning to hear preachers of different Christian denominations. On Saturday nights, the 6,500-seat auditorium is packed for such attractions as performances by The Lettermen, The Drifters, Debbie Boone, barbershop quartets and The Philadelphia Mummies. Through the years, the auditorium has hosted speeches by seven presidents and

other notables, including Norman Vincent Peale, a noted preacher, author and lecturer, who has given sermons in Ocean Grove regularly for more than 50 years.

The streets of Ocean Grove, which bear such Puritan names as Mount Zion Way, Bethany Block and Pilgrim Pathway, are lined with hundreds of Victorian homes. One of the most impressive features of these three- and four-story gems is their porches. Nary a house is without a broad porch wrapping around one, two or three of its sides.

"It's our goal to preserve the quaint Victorian charm that Ocean Grove has always been known for," says Neptune Mayor James J. McGann, an attorney who was born in Ocean Grove. In 1980, by mutual consent of Ocean Grove and Neptune Township, the Grove, as residents call it, was placed under Neptune's governmental jurisdiction. But the camp meeting association maintains a stronghold on the town because it owns all the land, which it leases to residents on a 99-year perpetual, or renewable basis.

Most residents still pay the same rental fee that was charged for their land in the 1800s — \$10.50 per year. As leases pass the 99-year point, the camp meeting association adjusts the fee schedules for inflation. Still, according to Herr, no one pays more than \$150 per year to lease the ground below his or her house.

The houses are awash with shades of pink, yellow, purple and blue. Most of them are owned by year-round residents, who occupy primarily the southern portion of the island and leave the northeast corner to the tent dwellers, who are strictly summer visitors. Ocean Grove's summer guests, who come chiefly from northern New Jersey and eastern and central Pennsylvania, swell the town's population of 7,500 to 17,000 in the summer months, says Herr.

The many third- and fourth-generation tenters give one the impression that Ocean Grove tent life is somewhat of a birth rite. So fierce is the competition for the 100-plus tents that it takes several years to reach the top of the waiting list. Like the land, the tents are leased from the camp meeting association on a perpetual basis, according to Nancy Hoimark, who has had her own tent for more than 25 years. Her summer rental fee is \$2,000, including water and sewer. Relatives usually get the first chance to rent a tent that had been leased by a family member, she says. Her great-grandmother first started summering in the colony more than 75 years ago.

The camp meeting association maintains the tents, which are made of white canvas with striped awnings. The tents are erected over wooden platforms and the porches sit below the awnings. The main room, which for most serves as a den during the day and sleeping quarters at night, occupies the front half of each tent. The rear half of the abode is inside an attached wooden shed, in which the kitchen and bathroom are situated. Most allow room for extra sleeping space as well.

Tent life, Hoimark maintains, affords all the necessary conveniences — electricity, telephone and hot and cold water. But the rain is much louder from the tent perspective. "That's not fun, especially when there's a strong wind," she says.

A walk through the tent community reveals how a bit of imagination can solve the decorator's dilemma of setting one's own dwelling apart from that of a neighbor. Many tenters flood their porches with flower baskets, flags, wicker and porch furniture. All the trimmings, along with interior furniture and appliances, are packed up by September 15 and stored in the wooden sheds. As soon as May 15 rolls around again, the cycle repeats itself.

"You come back in May and you haven't seen the people since the summer before, but you see them and say, 'Hi, how are you,' and it's as though you never left," says Hoimark, whose mother's and sister's tents are only a short distance away.

"It's an escape from everything up here," says Hoimark from her home in Ridgewood. "You live in a tent, sit on your porch, walk to the beach, walk to the grocery store. It's such a simple existence."

Hoimark serves with the Ocean Grove Ladies' Auxiliary, which hosts a bazaar at the end of each summer that usually brings in about \$20,000, she says. Members vote on how the proceeds will

The residents of Ocean Grove take pride in their town's Victorian charm.



be used. A sizeable portion usually goes to a fund to maintain the auditorium.

Although Ocean Grove's half-mile beach is only a minute part of Jersey's more than 200 miles of shoreline, it is useless to try to find an Ocean Grove "lifer" who would trade their town for any of the other seashore resorts.

"I've never wanted to spend my summer vacation anyplace else," says Hoimark.

Herr credits religion as a force that brings people back each summer. "We see ourselves as part of a place where evangelistic preaching helps people get a hold on themselves and turn their lives around," he says.

J. Stuart Blair traveled with his family to Ocean Grove by horse and wagon in 1919 at the age of 7. As a teenager, he worked at the post office two doors away from the site of his current real estate firm, Bronson & Blair. Those were the days when Ocean Grove attained true resort status as 10,000 people visited The Great Auditorium each day. "We used to put out ten- to twelve-thousand postcards a day," he recalls.

One of his favorite postcards hangs on the cluttered wall above his desk. The photo shows the main gates to the town, with a chain strung across and an officer providing a second barrier to entry. Ocean Grove's settlers had carved out three entrances to the town and blocked them off with gates. "The idea was to keep people out," says Herr.

The introduction of automobiles gave rise to the town's strict blue laws. All automobiles had to be out of the town by 11:59 on Saturday evening. After that, the chains went across the gates and motorists could not return until 24 hours later. If you were fortunate enough to have a garage, you could park the car inside, but the garage door had to be closed and no part of the car could be visible to a passerby, according to Jim Lindemuth, executive director of the Ocean Grove Camp Meeting Association. To further ensure that residents spent the day in worship, the beaches were off limits on Sunday, he says.



Blue laws prohibiting gambling and the sale of liquor remain in effect today in Ocean Grove, where the brightly lit cross atop The Great Auditorium still dominates the town. Ocean Grove's summer evangelist program offers a teen fellowship program, gospel music ministry, daily Bible study for adults and ministry to the deaf. Perhaps most popular is the children's ministry program for ages 3 to 13, which begins in July and ends with a concert in August.

To further encourage residents to take part in prayer, Ocean Grove's two guarded bathing beaches and surfing beach do not open until 12:30 p.m. on Sundays. Besides enjoying the beach, visitors can stroll along Ocean Pathway, a wide, two-way road that runs between Auditorium Park and the ocean, and is bordered on both sides by towering Victorian mansions. They also can shop in the boutiques and eat at one of a handful of restaurants on Main Avenue.

And when visitors leave Ocean Grove, a sign at the gates bids a friendly farewell: "God be with you 'til we meet again."

For more information on Ocean Grove, call the Ocean Grove Camp Meeting Association at (908) 775-0035.



Summer visitors find attractions ranging from flea markets to concerts and beach games.

Joan Capuzzi is a freelance writer who lives in Rosemont, Pa.



Catch These Summer Attractions While You're There

Concerts and religious services make The Great Auditorium the focal point of summer life in Ocean Grove.

The following concerts are scheduled this summer at The Great Auditorium:

June 20	Tony Bennett with the Duke Ellington Orchestra
June 27	The Orchestra of St. Peter by the Sea
July 4	The Lettermen
July 11	The 5th Annual Great Sousa Concert, featuring the Allentown Band
July 18	The Shirelles and The Capris
July 25	The Glenn Miller Orchestra
July 31	Founder's Day Concert
August 1	The Preservation Hall Jazz Band
August 8	Big Splash, a day of beach events capped by an evening concert featuring Helen Baylor, Jon Gibson, Kathy Troccoli and Alvin Slaughter
August 15	Shirley Jones in concert
August 22	The Tommy Dorsey Orchestra
August 29	The 12th Annual Barbershop Festival of Champions
Sept. 5	Julius LaRosa and Carmel Quinn
Sept. 12	The Orchestra of St. Peter by the Sea

The following beach activities also are scheduled to take place:

July 4	Local bands (afternoon)
July 11	Sand sculpture contest (2 p.m. judging)
July 18	Beach games for children ages 5 to 11 (10 a.m. to noon)
July 25	Biathlon (9 a.m.) Water races (2 p.m.)
July 27	Lifeguard tournament (6 p.m.)
August 1	Kite-flying contest (noon)
August 15	Art show (10 a.m. to 5 p.m.; rain date August 22)
August 29	Scavenger hunt (2 p.m. judging)
Sept. 5	Craft show (9 a.m. to 5 p.m.; rain date September 7)

For concert ticket prices, more information on these events or a schedule of services at The Great Auditorium, call the Ocean Grove Camp Meeting Association at (908) 775-0035.

Catch the Jersey Blues

By Russ Wilson

Beads of sweat glistened on Joe Garneski's forehead as he bent to the task of slugging it out with a fish that just didn't know how to quit. Joe's friends were not at all interested in hearing his complaints for they, too, were hanging onto tightly bowed rods.

The "blitz" had begun more than two hours earlier when a school of bluefish cornered thousands of small bait fish and went on a killing rampage. The fishing was almost too easy. In less than an hour, the anglers had filled a giant cooler to capacity. With arms aching, they still were catching and releasing a greedy bluefish on virtually every cast.

Sound exciting? You bet. This is the kind of fast-paced bluefish action that is

available to every sportsman and woman who fishes New Jersey's inshore waters from mid-May until the waters cool early in December.

Jersey blues support a thriving party and charter boat business, hundreds of marinas, boat basins and bait and tackle shops, and many thousands of individual anglers who prefer to do their fishing from the surf or aboard privately owned boats. Fishing for bluefish along the Jersey coast is a big bucks business. Millions of dollars are added to the state's economy



RUSS WILSON

Teasers, normally used two feet in front of plugs or metals, should closely imitate bait fish being preyed upon by hungry blues.

each season, and that doesn't include money spent on tackle, boats, motors and accessories.

Why does this fish, often maligned because of its savage feeding habits, get so much attention from both sport and commercial fishermen? The reasons are many, but for openers, bluefish are reasonably easy to catch, fight hard, are excellent to eat and are plentiful enough to provide exciting fishing for more than six months of the year.

It is possible to enjoy fast-paced bluefishing almost anywhere from the tip of Cape May into Delaware Bay, and northward throughout inshore coastal waters to Sandy Hook and Raritan Bay and offshore to distances of more than 50 miles.

The first newsworthy bluefish catches usually are taken by sportsmen fishing Delaware Bay during the end of May or the first week of June. As a rule, schools of 2- to 6-pound blues move into the bay along with the spring run of giant weakfish. Although the bluefish is not the primary target among dedicated Delaware Bay weakfish experts, many of the smaller blues are caught by fishermen using leadhead jigs, strips of squid or metal casting lures. These early-run blues, lean and mean from the winter months, will attack almost any smaller fish that get in their way, at times being so aggressive that they get to the natural baits or artificial lures before the weakfish have a chance.

Look for Big Numbers Early in Season

Inshore waters also come to life during early June. Many experienced fishermen feel the early-season bluefishing is the best of the entire season in terms of numbers, with catches often totaling 100 or more. The half-starved bluefish that arrive along the Jersey coast in May are voracious and will hit bait or lures with a vengeance; sometimes two or three fish will frantically chase and bite at the same lure.

As ocean waters warm, small schools of 2- to 10-pound and larger blues drop off from the main migration to take up permanent residence along the Jersey coast. These are the fish that provide non-stop excitement throughout summer and early fall.

More often than not, the majority of bluefish inhabit inshore lumps and ridges throughout June and into mid- or late July. Some of the finest fishing of the season is on tap throughout this all too brief period. All party boat basins from Cape May to Raritan Bay operate around the clock by mid-June. Most captains who specialize in fishing for bluefish probe the middle-range lumps and ridges where small to mid-size choppers are waiting to attack diamond jigs or natural bait.

Until about 1980, most party boat skippers specializing in fishing for bluefish were content to run offshore to a lump or ridge, drop an anchor and set up a chum slick — cut or ground-up fish — to bring bluefish to the baits. Today, few if any skippers bother

to carry chum during the early season, but will use chum throughout July, August, September, October and November if that's what it takes to get the blues into a feeding frenzy. Most experienced captains agree that diamond jigging is a more effective way to catch bluefish of all sizes. Since diamond jigging is a less costly technique, few skippers want to go to the mess and bother of chumming.

Private boat owners fishing offshore waters for mako shark often run across acres of hungry blues, some weighing more than 20 pounds. These fish, although extremely plentiful throughout the summer and early fall, do not come inshore. Many of the principal shark areas located 15 to 30 miles offshore afford exceptional bluefishing opportunity. Well-known spots such as the 28 Mile Wreck, Lobster Hole, Atlantic City Ridge, Reasor Wreck, Barnegat Ridge, Slough, Tolton Lump, Manasquan Ridge, Mud Hole, 17 Fathoms, Five Fathom Bank, Sea Isle City Lumps, McCrei Shoal and the Farms provide good catches from June until late in November when ocean waters chill beyond the comfort level of blues.

Not to be overlooked are the middle-range structure areas that stretch endlessly from Cape May to Sandy Hook. As a rule, you'll find plenty of bluefish inhabiting all of the lumps and ridges situated just a few miles off the coast.

There's More Than One Way to Catch a Bluefish

Experienced anglers will use a variety of techniques to catch bluefish, never relying on one method. In addition to diamond jigging, many charter and private boat owners will troll. Trolling is a very effective method for taking bluefish from the lumps and open bottom grounds. Most charter captains prefer to troll early season blues and generally will use this technique rather than drift and diamond jig or anchor and chum.

Almost any artificial lure that is designed to imitate a small or wounded bait fish will get results. Sub-surface swimming plugs, spoons, nylons, plastics and almost any color leadhead jig that's dressed with feathers or bucktail hair are deadly when bluefish are the target.

Although trolling isn't the most exciting way to catch bluefish, it does put a lot of fish in the box that would not be caught on jigs or bait. Anyone hoping to be a success at catching bluefish should learn the how-to of trolling; at times, it is the only way to catch these hard-fighting fish.

Every boat will troll bluefish lures correctly at a slightly different speed. Outboards must be operated at 1,000 to 1,300 rpm to make the lures come to life, while boats powered by inboard or stern-drive engines require a slower speed, something around 900 to 1,100 rpm. The best way to determine if the lures are working properly is to drop a lure into the water, let out 20 feet of line and watch the lure to see if it is swim-

ming as it should. Once you have determined the correct engine speed, lay out about 150 to 200 feet of line, which is about the right distance for trolling swimming plugs, nylons or spoons.

Light tackle enthusiasts will find diamond jigging is a much more exciting way to catch blues inhabiting mid-depth waters. When fishing inshore waters where the bottom depth is less than 100 feet, it is advisable to use diamond jigs in the 2- to 6-ounce sizes. The actual weight of the lure will be determined by a combination of factors, including water depth, current and sea conditions.

Two-, three- or four-ounce diamond jigs, rigged with or without a surgical tube tail, are sufficient on days when winds are mild, the sea is calm and currents are moderate. At other times it may be necessary to use heavyweight diamonds of 6 to 10 ounces.

Although it is a messy way to fish, chumming is often the best way to get a good catch. Blues of all sizes will respond to a chum slick of ground-up menhaden (bunker). As a bonus, when chumming from an anchored boat it is possible to use very light tackle to enjoy the thrilling fight these fish are known to provide. Many Jersey coast charter captains are specialists at chumming and will supply all necessary tackle, hooks, rigs and bait with the price of a day's charter trip. Newcomers to the sport might arrange a charter trip or two to learn the finer points of this highly effective technique.

Charter rates vary from basin to basin, but as a rule a group can expect to pay about \$350 to \$500 for an all-day trip aboard a six-person charter boat. The only additional expense is the tip for the mate.

Be Ready for Exciting Inshore Fishing

Bluefish occasionally will go on a killing spree that brings schools of the kill-crazed choppers into shallow waters. Surface-feeding blues offer the best inshore fishing of the season. The swirls and splashes of feeding bluefish will be visible on the surface as they savagely slash and chop their way through tightly packed schools of hapless bait fish. The surface feeding frenzy doesn't last long, usually only a few minutes or at the most an hour. But when you are fortunate enough to be in the right spot at the right time, you'll enjoy the most exciting light tackle fishing you are likely to find anywhere in the world.

When fishing inshore coastal waters, it pays to be ready for whatever comes your way. Loading extra rods, reels and lures onto the boat may seem a hassle, but if you've had the opportunity to watch as hungry blues slashed into schools of small bait fish and not been able to cash in on the fun, you can appreciate what it means to have tackle rigged and ready.

I probably carry too much equipment, but I'm always prepared for whatever comes my way. In addition to a pair of 20-pound class trolling rods, two heavy-duty spin or plug-

When these bigger "slammers" are inhabiting shore area waters, it is not at all unusual to catch 10 to 15 pounders, one after another.

casting outfits for deep water jigging and a pair of fluke outfits, I carry a couple of medium-weight plugging or spinning outfits.

Each of the medium-weight outfits is rigged in advance, one with a leadhead jig and the second with a 2-ounce diamond jig. More often than not, I will encounter bluefish while on the way to my destination and am ready to cash in on the fun by having tackle rigged and ready to go at a moment's notice.

Big blues often provide a late-season bonanza for surf fishermen as well as anglers aboard boats. Although a late-season bluefish trip can be a feast or famine, most years big blues move down from New England waters in September and will linger along the Jersey coast through the end of November.

When these bigger "slammers" are inhabiting shore area waters, it is not at all unusual to catch 10 to 15 pounders, one after another, as fast as you can get a lure in the water.

I consider the months of October and November the best of the entire season. Not only are the blues bigger, meaner and full of fight, they always are in a mood to feed. At times a school of blues will invade the surf, attacking a school of mullet, bunker, rainfish or herring in less than a foot of water and chasing frightened targets onto the sand.

Sportsmen who are not into fishing from a boat might want to cash in on this explosive fishery. There is plenty of opportunity all along the Jersey Shore from Sandy Hook Park to Cape May Point.

Although beach buggies are not permitted at Sandy Hook, it is possible to park reasonably close to principal fishing areas to enjoy some of the finest late-season bluefish action found anywhere in the Northeast.

Island Beach State Park, and many communities from the park north to Mantoloking, offer equally good late-season surf fishing for blues. Beach buggies are permitted at Seaside and Island Beach, and parking is available close to the beaches at other sections from Manasquan Inlet south to Seaside Park.

Long Beach Island is another late-season hot spot for surf-casters. The entire length of the island is worth a try. Good catches often are taken by surf fishermen at Barnegat Light near the inlet and at Holgate, Surf City, Beach Haven, Brant Beach and Ship Bottom.



PETE McLAIN

Actually, almost any section of beachfront is likely to produce bluefish during the October to November period. I've had memorable trips when probing the surf at Hereford Inlet and Wildwood, and when fishing from the jetties at Cape May.

Loved by some and hated by others, the bluefish provides for some exciting fishing. If you haven't tried it yet, it's high time that you joined the thousands of others who understand what it means to "catch the Jersey blues." I guarantee that you will not be disappointed.

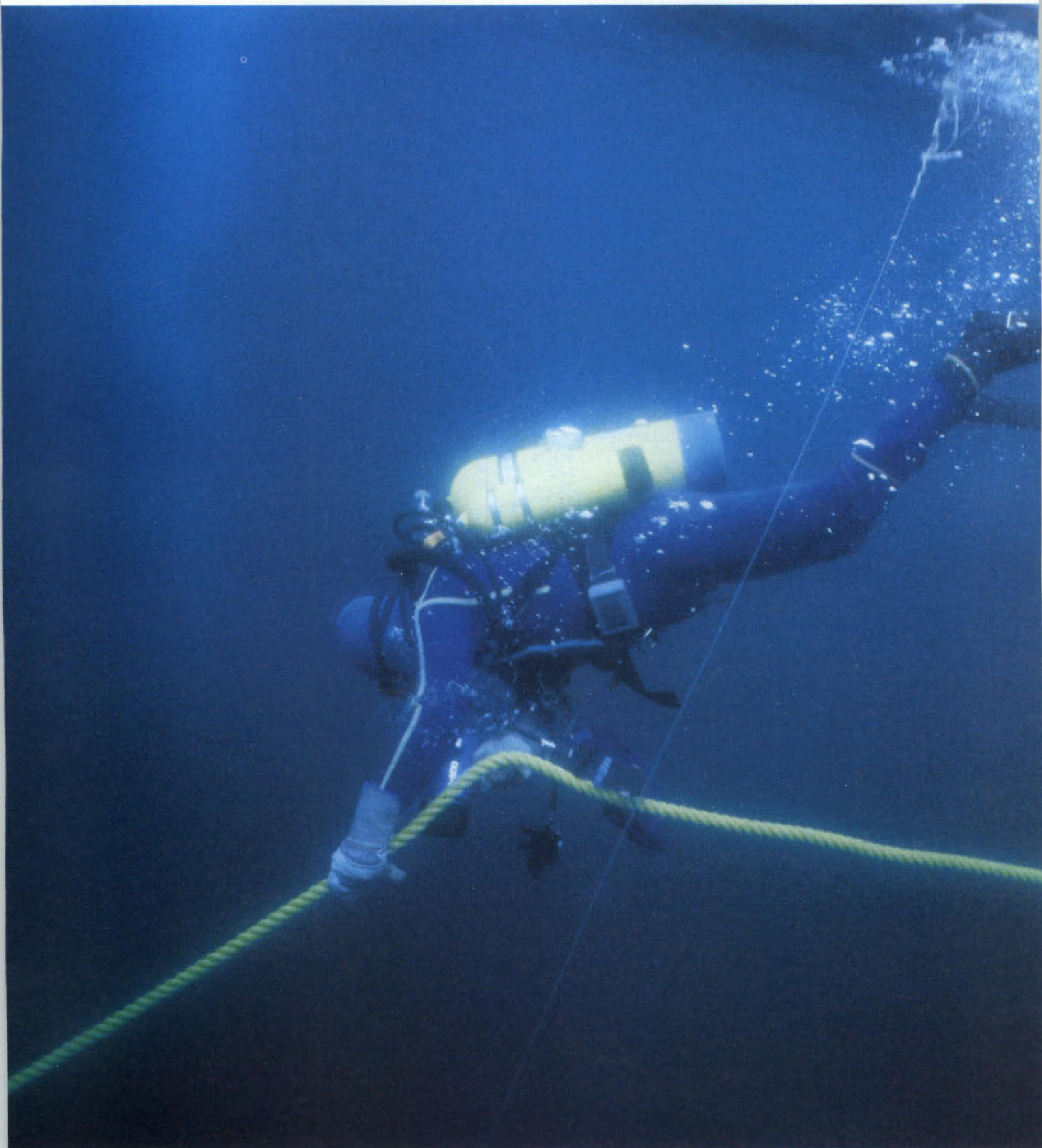
Russ Wilson is a freelance writer who lives in Neptune.


Bluefish provide exciting fishing opportunities for anglers of all ages.

Note Limit

There is a 10-fish limit per day on bluefish in federal waters, outside the three-mile limit.

A diver descends along an anchor line on the way to a shipwreck.





Get Ready to Go Scuba Diving

By Michael E. Benson

The waters off New Jersey, from Sandy Hook to Cape May, hold some of the finest underwater treasures along the Atlantic Coast. If your interests lie in history, you might want to study and document the stories of the almost countless ships that met their fates at the mercy of the elements, in tragic collisions or in contact with the explosive tips of German torpedoes. You can experience history firsthand by diving the wrecks of these ships. You can either just cruise and sightsee, or collect artifacts, ranging from liniment bottles to brass portholes and ship bells, before they become lost to the sea.

Have an interest in marine or environmental science? Perhaps you'd like to take part in the artificial reef surveys conducted by the New Jersey Department of Environmental Protection and Energy's Division of Fish, Game and Wildlife. The division encourages divers to visit the reefs and complete survey forms that record and track the development of marine life there.

If you have a hankering for fresh seafood, try your hand at spearing a 50-pound cod, grabbing a five-pound lobster or simply scooping up delicious, sand-free mussels.

Start With a Certification Course

The requisite and best preparation for Jersey diving is taking a certification course through a local dive shop, sanctioned by one of the major scuba certifying agencies, such as the National Association of Underwater Instructors (NAUI).

"A one-day resort course in calm, shallow Caribbean water might be fine if you plan on limiting yourself to bathtubs and swimming pools, but there is simply no substitute for a full-fledged open water course," says Gene Peterson, owner and operator of Atlantic Divers, a NAUI pro shop in Pleasantville, Atlantic County.

Once certified, a novice diver will be encouraged to book passage on any of the numerous dive boats servicing New Jersey waters. Local dive shops invariably maintain a schedule of chartered dives appealing to divers of all skill levels, from rank beginner to the highly experienced.

PHOTOS BY HERB SEGARS

What to Expect

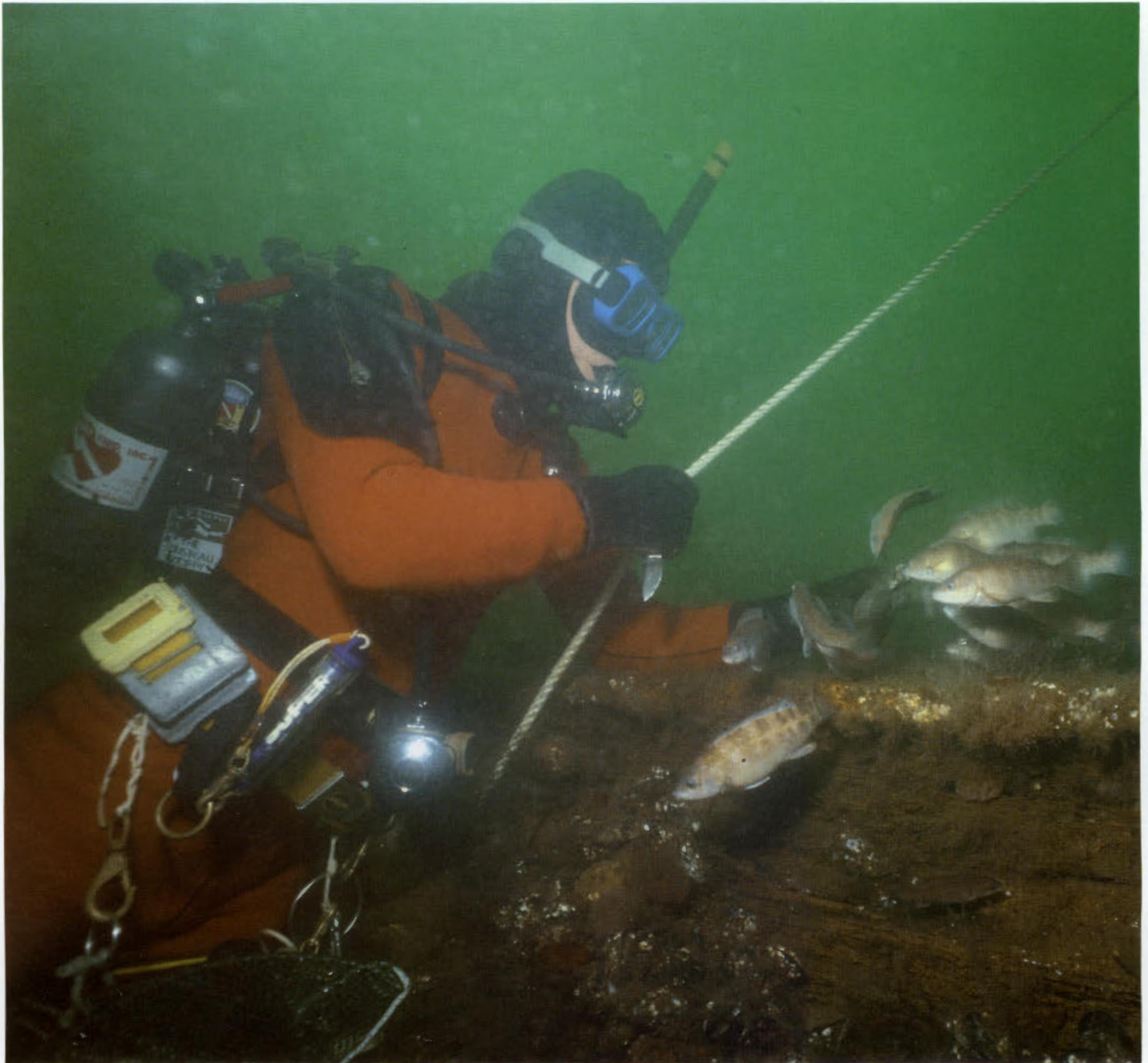
The basic certification course, Open Water I, generally offers six to eight weeks of pool and class instruction, featuring one session per week that lasts three to four hours. The average instruction fee is \$125, with all necessary equipment, excluding mask, fins and snorkel, supplied by the dive shop.

The class and pool sessions, taught by highly experienced instructors with hundreds, if not thousands, of hours of dive time under their weight belts, cover the essentials of diving. These include snorkeling; equalizing ear pressure, mask clearing, water entries, rescue techniques,

and assembling, donning and safely using scuba equipment.

You will find that the basic scuba unit of air tank, regulator and buoyancy compensator device will readily allow a freedom of exploration underwater that you probably never thought possible. The tanks are specially designed for scuba diving, holding compressed air at pressures generally in the area of 3,200 pounds per square inch. That high tank pressure is reduced and delivered to your mouthpiece at a comfortable ambient pressure through a "two-stage" regulator. The first stage, located directly on the tank, houses a mechanical assembly that reduces tank pressure. The

Diver Dan Clark feeds bergalls on a shipwreck.



second stage, connected to the first stage by hose and fitted with a mouthpiece, allows easy and dry inhalation and exhalation. The buoyancy compensator is essentially a life jacket type of device connected by hose to the regulator's first stage. It allows the diver to add or eject air as needed for trimming buoyancy, or flotation.

The primary emphasis in the pool is on becoming comfortable and confident with a system of equipment that allows you, born without gills, to safely commune with fish. It is not unusual for instructors to confront the typical threshold fears that arise at the start of class: "Can I be crushed by the pressure?" "What if I run out of air?" "What do I do if my mask comes off?" These fears will be put to rest as virtually every major aspect of diving safety is detailed and practiced.

At the outset, your swimming skills will be assessed. The NAUI recommends a minimum ability of 220 yards, non-stop, using any stroke. Snorkeling instruction will highlight the best methods of clearing the snorkel after you've been submerged. Numerous people who have gone to the bottom of a pool and experienced ear discomfort assume they can never dive. A simple, but critical, ear-clearing technique, the Valsalva maneuver, is thoroughly practiced and allows easy descents to any sport depth.

Anyone who has used a swim mask knows it will leak on occasion. Students learn to remove, replace and completely clear their masks underwater. Do all of those hoses, valves and buttons on your scuba equipment seem intimidating? Each aspect of properly using your scuba tank and regulator is reviewed in detail, to the point where you can remove everything (masks, fins, weights and scuba unit) underwater and put it all back on.

Class lectures will focus on the physical effects of water pressure at depth and how to avoid, as well as recognize, diving injuries. Here you will study and practice, at length, the use of specialized dive tables providing recommended dive time limits for any given diving depth down to 130 feet. In general, as you dive deeper and stay down longer, the chance of suffering decompression sickness, or the bends, is increased. The dive tables recommend progressively shorter dive times as greater depths are planned.

At the conclusion of the classes, students will be given a comprehensive written exam. Four open water checkout dives, over a course of two days, will follow, conducted under close supervision in a quarry and/or in the ocean. Costs for the checkout dives will include the rental of scuba equipment and wet suit at approximately \$50 per day. If the checkout is conducted from a dive boat, expect a boat fee of \$50 per day.

With successful completion of the course comes an enormous feeling of satisfaction and accomplishment. You will receive your certification card, good for life, which will enable you to continue a never-ending process of education and fascinating discovery.

Preparing for Wreck Diving

New Jersey diving is synonymous with wreck diving. But before you take the plunge, be well-prepared. The average wreck dive is

A scuba diver enters the water. In the background is another dive boat at anchor.



in the 70- to 90-foot depth range. Even at the height of summer, thermoclines, which are sudden changes in water temperature, can cause your thermometer to plummet from 70 degrees Fahrenheit at the surface to 50 degrees at the bottom. A must is a good quarter-inch, neoprene, full-length wetsuit with hood, gloves and boots. The wetsuit permits a thin layer of water to be trapped between the skin and the suit. That water layer becomes heated by your own body temperature, allowing a substantial level of comfort in waters down to 50 degrees Fahrenheit. Many Jersey divers, especially those extending their season through the winter, favor dry suits. These suits are sealed and allow no penetration of

A diver-down flag warns boaters to steer clear of the area.



water. Thermal underwear is worn to provide insulation.

In addition to the standard primary regulator, submersible pressure gauge, air tank and buoyancy compensator, you are well advised to carry a bottom timer (a pressure- and water-resistant automatic watch); a depth gauge; a pony bottle (a small spare air tank) with an independent regulator; dive knives for cutting monofilament and other potential entanglements left on wrecks; a broad beam dive light; a backup light; and a mesh collecting bag.

A decompression reel, lift bag and dive computer also should be considered. A decompression reel is a compact spool wrapped with at least 300 feet of biodegradable sisal rope, providing the diver with a personal anchor line that can be tied off on a wreck. Lift bags have become commonplace for divers recovering heavier artifacts. The bags are tied to artifacts and filled with air, causing the artifacts to float to the surface. Dive computers, although expensive (ranging from \$300 to \$500), provide a constant monitoring of depth and remaining dive time, and can help gauge and control your rate of ascent when returning to the surface.

A properly outfitted diver's initial equipment costs will range from \$900 to \$1,700. With proper post-dive maintenance, however, the equipment will provide many years of reliable service.

Be a Safe and Environmentally Conscious Diver

Diving the North Atlantic can be rigorous and challenging.

Avoid unnecessary risks by following these safe scuba-diving practices:

- ☐ Dive with a buddy.
- ☐ Stay physically and mentally fit.
- ☐ Do not use intoxicating beverages or dangerous drugs.
- ☐ Regularly inspect and maintain your equipment.
- ☐ Keep all equipment trim and readily accessible when diving.
- ☐ Practice and establish buoyancy control.
- ☐ Know your personal limits.
- ☐ Continue your scuba training with advanced and specialty courses.

Respect your diving environment. Nothing should go overboard but you and your equipment. When hunting lobster, restrict the catch to legal size (3-1/4 inches from the rear of the eye socket to the end of the carapace and beginning of the tail) and leave the females with eggs. When hunting fixed artifacts, avoid "search and destroy" operations. If that fine porthole is beyond your equipment or capabilities, leave it intact for the next diver. When in need of rope that must be cut and left on the bottom, use sisal; it's quickly biodegradable. Visibility and conditions along the New Jersey coast are improving year by year. During the course of your regular land life, support all present and future efforts to keep our waters clean.

Michael E. Benson is a Vineland attorney who enjoys spending his spare time diving off New Jersey's coast.

Bookshelf

30 Walks in New Jersey, by Kevin Dann and Gordon Miller, published by Rutgers University Press, is a revised and expanded edition of the popular *25 Walks in New Jersey*. It contains walks for every ability and emphasizes both the natural history and historical diversity of the state. The five new walks include trips through Allaire State Park, Moore's Beach and Bridgeton. Cost is \$25 (hardcover) or \$12.95 (paperback). Available at bookstores. For more information, call toll-free: 1 (800) 446-9323.

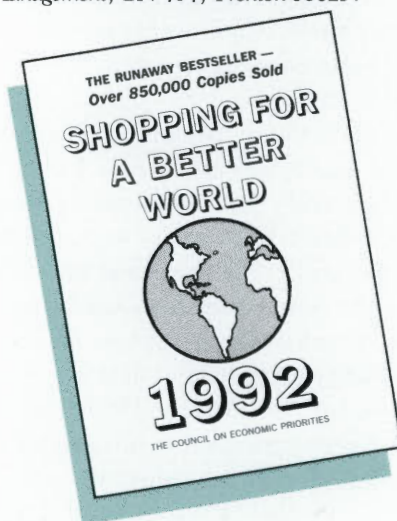
Wild Echoes, Encounters With the Most Endangered Animals in North America, by Charles Bergman, published by Alaska Northwest Books, is a personal, thought-provoking account of the author's travels through North America and his confrontations with its endangered wildlife. Cost is \$12.95. Available at bookstores. To order, call 1 (800) 343-4567, extension 571.

The Naturalist's Path: Beginning the Study of Nature, written and illustrated by Cathy Johnson and published by Walker and Company, reveals how to observe the outdoors from a naturalist's point of view, create sketches and keep journals of your discoveries. Cost is \$26.95 (hardcover) or \$14.95 (paperback). Available at bookstores. To order, call Walker and Company's customer service department at 1 (800) AT WALKER.

1876 Atlas of Bergen County, New Jersey, published by Bergen Historic Books, provides a comprehensive view of the people and places of Bergen County during the time period. It contains a detailed history of Bergen County from the time of the earliest settlers through the Revolutionary War, and up until 1876. An extensive personal name index has been added to make research easier. Cost is \$55. To order, add 7 percent sales tax plus \$5 shipping for each book and send check to: Bergen Historic Books, P.O. Box 2094, Teaneck 07666-2094.

New Jersey's Biggest Trees, by Santiago Porcella III and George H. Pierson, published by the New Jersey Department of Environ-

mental Protection and Energy's Division of Parks and Forestry, is a list of the largest trees indigenous to the state or that are able to reproduce in the state. Information on tree species, circumference, location and owner/reporter is given. Available free by calling (609) 292-2532, or by writing to: Bureau of Forest Management, CN 404, Trenton 08625.



The Nature Directory: A Guide to Environmental Organizations, by Susan D. Lanier-Graham, published by Walker and Company, is a compilation of groups concerned with environmental issues. Entries detail the history and goals, achievements, ongoing projects, future plans, membership information and volunteer possibilities for 107 organizations in the United States. Cost is \$22.95 (hardcover) or \$12.95 (paperback). Available at bookstores. To order, call Walker and Company's customer service department at 1 (800) AT WALKER.

Handle With Care: Your Guide to Preventing Water Pollution, published by the Terrene Institute, reveals how to "pollution-proof" your home and take personal responsibility for pollution prevention. This colorfully illustrated booklet also contains an up-to-date national source list for help and advice. Cost is \$9.95. Available by calling (202) 833-8317, or by writing to the Terrene Institute, 1000 Connecticut Ave. NW, Suite 802, Washington, D.C. 20036.

The New Jersey Department of Environmental Protection and Energy Annual

Report 1991 sums up the department's activities for the year and details the progress made in the areas of environmental regulation, site remediation, policy and planning, science and technical programs, enforcement, and management of natural and historic resources. Available free by contacting the DEPE's Office of Publications at (609) 633-1317.

Shopping for a Better World 1992, presented by The Council on Economic Priorities, is a quick and easy guide to socially responsible supermarket shopping. It is designed to let consumers know how major manufacturers rate on the most prominent issues, including the environment and animal testing. This year's guide rates 166 large and small firms and more than 2,000 of their products in 72 categories. Cost is \$7.49 each, or five for \$23.95. Available by contacting the CEP at 1 (800) 729-4CEP, or by sending a check to the organization at 30 Irving Place, New York, N.Y., 10003.

The Community Right to Know Annual Report for Survey Year 1989, prepared by the New Jersey Department of Environmental Protection and Energy's Bureau of Hazardous Substances Information, summarizes the findings on hazardous and toxic substances produced, used, stored and released in New Jersey. The report also describes Community Right to Know enforcement activities in 1990. Available free by contacting the DEPE's Bureau of Hazardous Substance Information at (609) 292-6714.

1991 Site Remediation Program Site Status Report, produced by the New Jersey Department of Environmental Protection and Energy, summarizes statewide site remediation activities from July 1, 1990, to June 30, 1991. It details the progress in New Jersey's efforts to clean up 615 of its major contaminated sites. To order a report, send a check or money order for \$55, payable to "Treasurer, State of New Jersey," to: NJDEPE, Maps and Publications Sales Office, Bureau of Revenue, CN 402, Trenton 08625-0402. Please allow three to six weeks for delivery. For more information, call (609) 777-1038 or 777-1039.

Putting a Value on the Party Boat Catch

Every year, thousands of fishermen take to party boats off New Jersey, from the first signs of spring through Christmas, if weather permits. New Jersey's fishery is an important source of income to the residents of shore communities, both for those who provide the services and the equipment needed by the recreational angler and for those commercial fishermen who harvest the fish that end up on dinner tables. And most important of all, it is a source of value to those who fish as a leisure activity and to those who consume the catch in their homes and in restaurants.

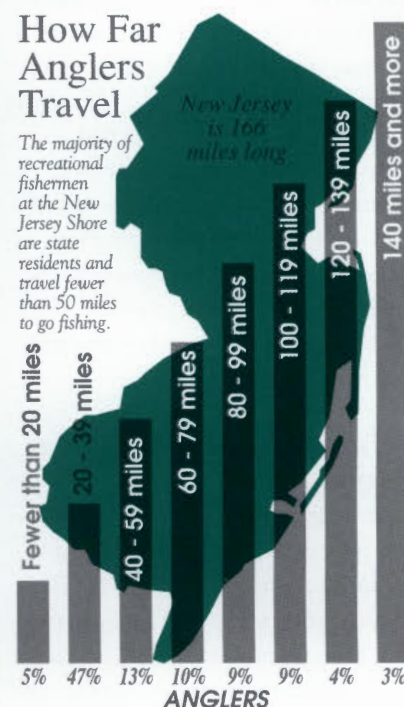
During the 1990 season, the New Jersey Division of Fish, Game and

Wildlife interviewed recreational anglers at sea to determine how much they spend on fishing, what's important to them, how various management techniques will affect them and how perceived pollution affects their behavior. This kind of information will help economists determine the impact of party boat fishing on New Jersey's economy and aid fisheries managers as they plan for the wise management of the state's resources.

Participants in the survey were asked about their fishing experiences, habits, attitudes and values. At the end of the trip, their catch for the day was noted. In all, 410 anglers on 76 trips and 38 different vessels were interviewed. The interviewers were students from Stockton State College, participants in the Division of Fish, Game and Wildlife's volunteer program and technicians for the Bureau of Marine Fisheries.

How Far Anglers Travel

The majority of recreational fishermen at the New Jersey Shore are state residents and travel fewer than 50 miles to go fishing.



The Brook Trout: Our New State Fish

New Jersey now has an official state fish, the brook trout, thanks to a four-year effort by a sixth-grade teacher from Hopatcong, Sussex County, and her students.

Mary Ellen Soriano, a teacher at Hopatcong Middle School, started the campaign when she was a teacher at Our Lady of the Lake School in Mount Arlington, where she encouraged her fourth-grade class to write letters to state legislators. The brook trout movement soon included other schools and fishing organizations and resulted in a 2,000-signature petition. Soriano's efforts continued when she moved to the Hopatcong Middle School and culminated with the signing of the brook trout bill by Governor Jim Florio in her classroom in January.

"This was a great experience for the



Brook trout are sensitive to pollution and thrive only in high-quality water.

kids, to see all the support they received," says Soriano.

Brook trout are very sensitive to pollution and thrive only in high-quality water. They are very particular about their habitat, preferring a stable water flow, a mixture of pools and rapids, a silt-free gravel bottom, rocks and boulders, and well-vegetated stream banks.

The state has been stocking New Jersey's waters with a variety of trout since 1914 when trout production began at the Hackettstown fish hatchery in Warren County. Today, the Pequest Fish Hatchery, also in Warren County, annually raises 200,000 to 230,000 brook trout, which average 11 inches in size.

Which Species Are Important?

The party boat angler generally has a specific species in mind when he chooses to go fishing, and the party boat operator caters to these preferences by announcing in advance which species will be targeted on each trip. Thirty-four percent of the anglers interviewed listed bluefish as their prime targeted species, while fluke at 26 percent was almost as desirable. These two species, along with sea bass, tuna, tautog and weakfish, represented 90 percent of directed effort.

The angler also had expectations of how much his catch would be, but the fishing frequently was less than what he had hoped for. For example, anglers on bluefish trips hoped to harvest an average of 10 of the targeted species, but when their catch was counted at the end of the day, there was an average of seven bluefish. However, species other than those targeted also were caught, and many fish that are caught are released.

Attitudes and Values

The party boat customer pays for the trip whether he catches any fish or not. The survey attempted to determine the value the angler placed on his targeted species by asking what he would be willing to pay if he knew he could catch one more of the targeted fish. This was then followed up by asking how much he would be willing to pay to double his catch. For the major targeted species, the average value to the angler of catching one more fish was \$9 for bluefish, \$4 for fluke and \$6 for black sea bass. When the question was asked in terms of doubling the fisherman's catch, the figures were \$29 for bluefish, \$22 for fluke and \$37 for sea bass. As the average harvest for these species was seven, two and nine, respectively, obviously the experience of catching a fish at sea makes it more valuable than when it is purchased in the supermarket.

Similarly, when two-thirds said they were affected by marine pollution, interviewers tried to find out how much they really were affected. They asked the anglers how

much they would be willing to pay in yearly taxes if the money were used toward a cleaner ocean. The average of the answers of those affected was \$50. However, those who went much beyond \$50 were more than offset by those who were below \$50, and the middle value was only \$20. Many, of course, thought that they already were paying for a clean ocean and on principle refused to pay anything additional.

A non-monetary aspect of angler values is seen in their reactions to fisheries management efforts. Almost three-quarters of those surveyed said that they would approve a limit on the number of fish they could keep if it were necessary to protect a species. But when asked if a bag limit would affect them, only 29 percent answered affirmatively. The overlap, however, was high. Sixty-percent of those who said they would be affected nevertheless favored limits. How would they react to this hypothetical bag limit? One-third of those who said they would be affected would cut down on their fishing trips, 17 percent would switch to other species trips and 10

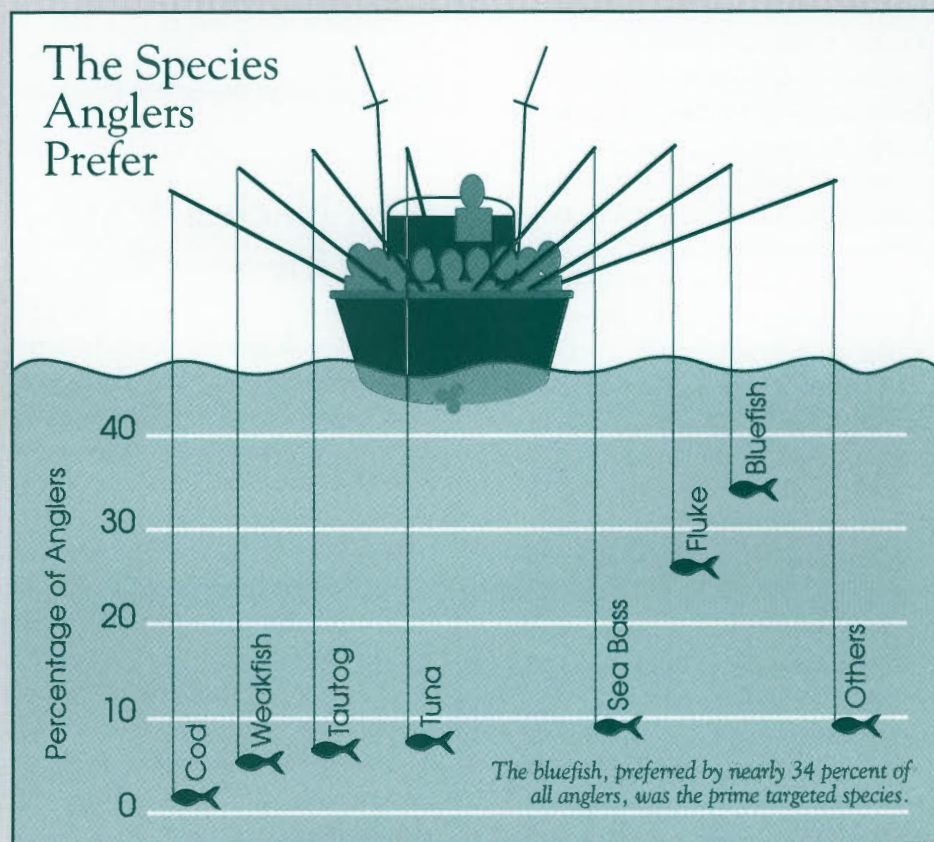
percent took the extreme view that they would cease party boat fishing altogether.

Are They Happy?

On the trip back, interviewers checked each participant's catch and asked which species, and how many, he had released. Bluefish, followed by ling, cunner, sea bass and fluke, were the leading species harvested. Of these, cunner and fluke have an appreciable release rate.

When asked if they were satisfied with the trip, 93 percent said they were. But when asked if they were satisfied with their catch, only 53 percent answered affirmatively. Obviously, there is more to the party boat experience than strictly catching fish. But that doesn't mean that having fish out there to catch isn't a critical component of recreational fishing.

By Bernard Brown, an economist with the New Jersey Division of Fish, Game and Wildlife, who did the research with Douglas Ofiara of the Rutgers Bureau of Economic Research. Partial support for the survey was provided by Federal Aid to Sport Fish Restoration Funds, administered by the U.S. Fish and Wildlife Service.



4 Sites Granted Historic Status

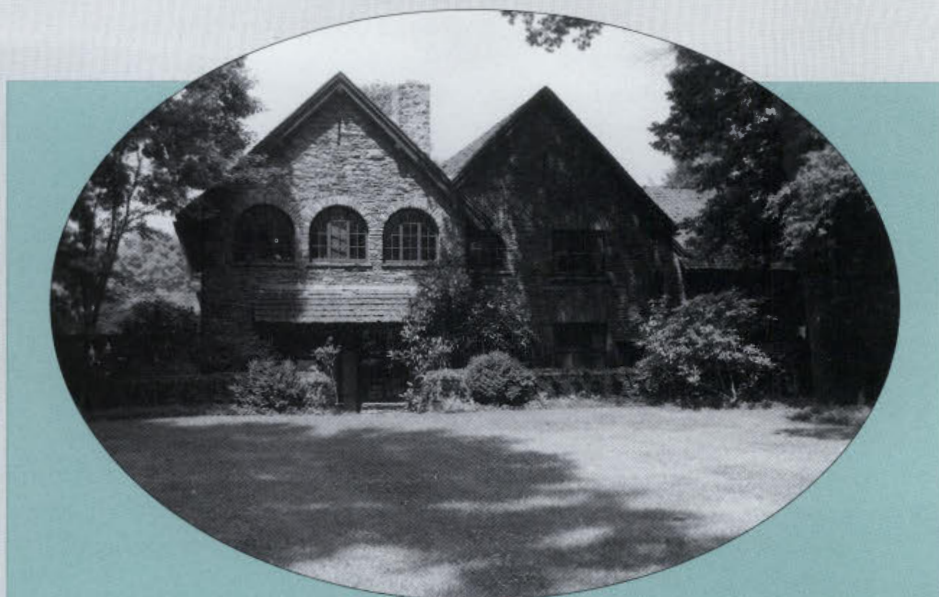
The following four sites have been added to the New Jersey Register of Historic Places and will be considered for listing on the National Register of Historic Places:

❑ **The Stone House by the Stone House Brook** in the Township of South Orange Village, Essex County is significant due to its association with William Augustus Brewer, Jr., who from 1866 to 1916 helped transform South Orange into a modern community. Brewer served as village president and was instrumental in improving the village's roads, bridges, sidewalks, street lights and public sewers. He also helped reduce the public debt through the floating of municipal bonds and raised the level of health care to a point that significantly reduced South Orange's incidence of death and disease.

❑ **The Donald Grant Herring Estate**, also known as Rothers Barrows, is part of one of the last "gentleman farms" that once were found in the area around Princeton, Mercer County. The estate is considered one of central New Jersey's best examples of the Arts and Crafts style designed by prominent Philadelphia architect Wilson Eyre, Jr. The original complex, built in 1919, now survives as three separate properties, which feature the main house, the cottage and a structure that has incorporated fragments of the garage and barn walls.

❑ **The Old School Baptist Church**, also known as the War Memorial Building, and its cemetery were the first church and cemetery built in South River. The church is one of the only remaining satellite churches established by the First Baptist Church of Hightstown at the end of the 18th century. A monument in the cemetery was sculpted by John Frazee, one of this country's first sculptors.

The church is a two-story, three-bay, wood-framed vernacular building originally constructed as the first church of what was then known as the Village of



The Donald Grant Herring Estate is one of four sites recently added to the New Jersey Register of Historic Places.

Washington. The church was built circa 1805 to face the river, but when a portico was added to the north facade in 1862, the focus of the building changed from the riverfront to Main Street.

❑ **The Dutch Stone Houses of Montville**, Morris County, is a multiple property inclusion to the register that encompasses all significant 18th- and 19th-century stone houses in Montville that retain a high degree of architectural

integrity. The houses reflect the geographical dispersal and cultural identity of the Dutch and are considered a notable colonial American building type. The houses are almost all that remains of the era when Montville, then known as Pequannock, was a Dutch outpost in an English county, with its own language, church and architecture.

New Nuclear Monitoring System On-Line

A system designed to monitor the radiation levels of New Jersey's four nuclear power generating stations, considered to be the most sophisticated and comprehensive monitoring system in the country, went into effect last winter.

The Continuous Radiological Environmental Surveillance Telemetry system, or CREST, is able to detect elevated levels of radiation and trigger an analysis to determine if the levels exceed regulatory limits established by the U.S. Nuclear Regulatory Commission.

New Jersey has four nuclear power stations: Oyster Creek in Lacey Township, and Salem 1, Salem 2 and Hope Creek on Artificial Island in Lower Alloways Creek Township. Sixteen monitors are sited around Oyster Creek and 10 are located around Artificial Island.

The CREST system, which is operated by the New Jersey Department of Environmental Protection and Energy, transmits data every minute, 24 hours a day, to the department's new computer in Trenton. CREST was acquired with revenue from the Nuclear Emergency Response Fund, which is generated from a tax on utilities that own or operate nuclear power generating stations in the state.

New DEPE Center a Natural Source for Environmental Info

Whether you're looking for a guide to New Jersey's state parks or the latest environmental study or report, you're likely to find it in the New Jersey Department of Environmental Protection and Energy's new Public Access Center.

Located on the first floor of the DEPE's headquarters at 401 East State Street in Trenton, the center serves as a front door to the department's information on almost any environmental or energy-related issue.

Knowledgeable staffers can provide visitors or callers with a wide variety of information and materials, including publications, press releases, notices of upcoming hearings and public events, and proposed and adopted rules and regulations.

Center staff also can refer visitors to DEPE employees who can answer technical questions on topics such as the status of a permit application or the locations of hazardous waste sites in an area where someone is considering buying a home.

In addition, the center has on file the names and phone numbers of contacts in other state and federal agencies who handle environmental and energy-related issues outside the DEPE's jurisdiction.

The Public Access Center is barrier-free and open weekdays from 9 a.m. to 5 p.m., excluding state holidays. For information, call (609) 777-DEPE, or write to: DEPE Public Access Center, New Jersey Department of Environmental Protection and Energy, 401 East State Street, 1st Floor, CN 402, Trenton 08625-0402.

Correction

An item in the Spring 1992 issue of Roundup should have listed March 14 to September 19 as the hunting season for woodchucks, not woodcocks.



Visitors look over publications available in the DEPE's new Public Access Center.

GREG JOHNSON

Union Carbide Opens Plastics Recycling Facility

The Union Carbide Corporation has opened its first multi-plastics recycling facility in the country in Piscataway, Middlesex County. The facility is capable of processing 27 tons of waste plastic annually.

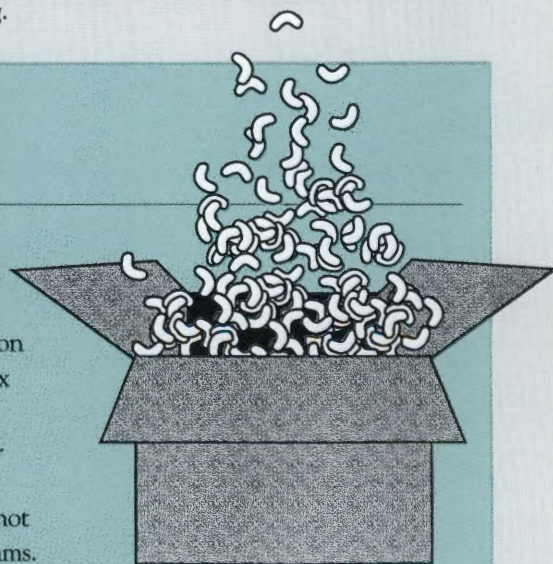
The plant recycles polyethylene film, used in bags and wrappings; high-density polyethylene (HDPE), found in milk, juice and water jugs, and soap, detergent and cleaning agent containers; and polyethylene terephthalate (PET), which is used in soda, liquor and salad dressing bottles.

More than half of New Jersey's 567 municipalities incorporate plastics into their curbside recycling programs. Union Carbide's plant serves a 250-mile radius, accepting plastics from New Jersey, New York, Connecticut and Pennsylvania.

The plant markets the recycled plastic to customers such as Rubbermaid, Inc., which uses the material to create 32-gallon trash receptacles. Other manufacturers transform the material into soap, detergent and refuse and recycling containers, plastic drainage pipes, garbage and merchandise bags, and fencing.

Don't Throw Out Those Peanuts

Ever get a package filled with those polystyrene "peanuts"? Now it's easier to recycle them. The Plastic Loose-Fill Producers' Council has started a collection program using more than 2,000 Mail Box Etc. outlets. For the outlet nearest you, check the phone book or call 1 (800) 828-2214. A market for recycled polystyrene is starting to emerge, but the material has not been included in curbside collection programs.



65 Wintering Eagles Spotted

Bald eagles were more widely scattered throughout New Jersey last winter than in the previous two years, according to a survey conducted by the New Jersey Division of Fish, Game and Wildlife's Endangered and Nongame Species Program.

Teams of state biologists and volunteers counted a total of 63 bald eagles and two golden eagles in New Jersey. Eight adult and nine immature bald eagles were counted in the upper Delaware River region and in the vicinity of several major reservoirs. The South Jersey count discovered 26 adult and 20 immature bald eagles, and two golden eagles.

New Jersey's eagle numbers have been bolstered by the success of the Wildlife Tax Check-Off on the state income tax form. These funds have paid for the importation of more than 60 Canadian bald eagles and their release in South



Jersey. The Division of Fish, Game and Wildlife monitors every nest during the breeding season, which runs from February through August, when the young eagles are ready to leave the nest. New nests are established each year as a direct result of the release and protection programs.

Summer Fees Cut at State Parks

Summer parking fees have been reduced at five state parks and eliminated entirely at another to make visits to these areas more affordable and the costs more in line with recreational opportunities offered, according to Scott Weiner, commissioner of the Department of Environmental Protection and Energy.

Parking costs will be cut by up to 50 percent at Allaire State Park, Batsto Village at Wharton State Forest, the Ringwood Manor and Skylands Manor sections of Ringwood State Park, Hacklebarney State Park and at Washington Crossing State Park. Parking fees will be eliminated entirely at Barnegat Lighthouse State Park, where a \$1 admission fee to the lighthouse itself remains in effect.



Explore New Jersey With Travel Guide

The New Jersey Travel Guide is a helpful directory for those who want to discover all New Jersey has to offer. Published by the New Jersey Division of Travel and Tourism, the guide provides information on recreational opportunities and historic sites, along with a wide variety of restaurants and places to stay.

The guide is free and can be obtained, along with a state map, by writing to the Division of Travel and Tourism, CN 826, Trenton 08625-0826, or by calling 1-800-JERSEY-7.

Report Eagle, Peregrine Sightings

The Division of Fish, Game and Wildlife's Endangered and Nongame Species Program, which monitors eagle and peregrine falcon nesting sites in New Jersey, is trying to locate additional nests. Eagles nest in trees, while peregrines are likely to nest on tall buildings, bridges, other man-made structures and cliffs. Potential nesting sites are circled on the map. If you spot an eagle or peregrine falcon, please report the sighting to the program at (609) 628-2436.

-  Peregrine Falcons
-  Eagles



DEPE ACTION LINE

To Report Abuses of
the Environment,

Call:

609-292-7172

24 hours a day

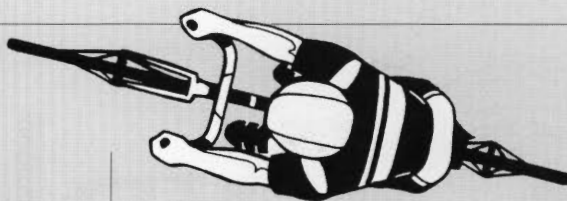
Marina Recycling Takes Hold

The number of marinas in New Jersey that undertook recycling programs jumped by 18 percent last year following the distribution of an instructional recycling handbook.

The handbook, *How to Recycle at Your Marina*, was a joint venture of the New Jersey Department of Environmental Protection and Energy and the New Jersey Shore Foundation, and was mailed to 476 marinas in the state. A follow-up survey found that 141 marinas had recycled in 1991, up from 119 in the previous year.

Glass bottles and aluminum cans were the most frequently recycled items, followed by plastics, newspaper and cardboard. Boaters were influenced by well-placed and marked containers and an aggressive public education campaign. Several marinas included recycling in the contract for seasonal boaters as a way to reinforce the recycling message.

The DEPE is offering free stickers and metal signs that carry the message, *New Jersey Shore — Keep it Perfect, Don't Litter*, to municipalities and marinas. For further information or to order, contact Dawn Blauth at DEPE's Communications Office, CN 402, Trenton 08625-0402; (609) 984-3643.



Helmet Requirement Among New Laws

Governor Jim Florio recently signed into law legislation on the following topics:

Safety — Starting June 1, bicycle riders under the age of 14 will have to wear a state-approved helmet before riding on streets. First offenses can result in fines of up to \$25, and subsequent offenses can draw fines of up to \$100. Funds generated from the fines will go into a special account to buy helmets for needy children. New Jersey is the fourth state in the country to require helmets for young riders. Local governments have the option to exempt the helmet requirement on trails and boardwalks.

Packaging — Starting January 1, 1993, the sale or use of any package that contains inks with lead, cadmium, mercury, or hexavalent chromium, all toxic heavy metals, will be prohibited. Thirty percent of the waste that winds up in landfills comes from packaging materials.

Batteries — Manufacturers will be required to remove almost all mercury (no more than 100 parts-per-million) from dry cell batteries by the end of 1995 and provide collection programs for used batteries as part of the country's strictest standards on the manufacture and disposal of dry cell batteries.

Directory of Recycling Markets Available

The *New Jersey Directory of Recycling Markets*, which lists more than 300 New Jersey vendors that market recycled materials ranging from paper and scrap metal to wood waste and plastics, has been published by the New Jersey Department of Environmental Protection and Energy.

The document identifies the vendors who are in the market for recyclables, thereby granting them greater exposure to the public and private officials who must access these markets.

The directory is available through the Division of Solid Waste Management's Communications Office, CN 414, 840 Bear Tavern Road, West Trenton 08625-0414; (609) 530-8591.

A number of other documents that offer marketing information also are available:

- ☐ *New Jersey Business Guide to Recycled Products*, published by New Jersey for A Clean Tomorrow (ACT)
- ☐ *Recycling Handbook for New Jersey Businesses*, published by the Association of New Jersey Environmental Commissions.
- ☐ *Small Business Guide to Cost Effective Recycling*, published by the Association of New Jersey Recyclers (ANJR)

The above documents can be obtained through the New Jersey State Chamber of Commerce, 50 West State Street, Suite 1110, Trenton 08608; (609) 989-7888.

The Association of New Jersey Recyclers distributes a computerized document, the *New Jersey Recycling Markets Directory*, to each county recycling office. The directory is available by computer or by contacting ANJR at (908) 722-7575.

Environary

Environmental terms are finding their way into our everyday vocabulary. Here are the definitions of a few common terms:

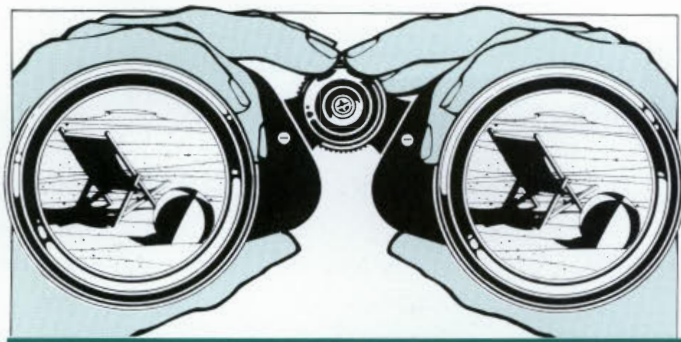
Greenhouse Effect — An excessive buildup of both man-made and natural gases, such as carbon dioxide, which may throw the earth's temperature out of balance.

Habitat — An organism's native environment, made up of both living

and non-living matter. Of all the organisms on the planet, humans have the most impact on their own habitat and that of other organisms.

Inversion — In the environmental field, a condition in which a layer of warm air prevents the rise of cooler air beneath it. If this cooler air contains pollutants, the pollutants are prevented from dispersing into the upper atmosphere and may increase the amount of air pollution to an unacceptable level.

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



Explorer

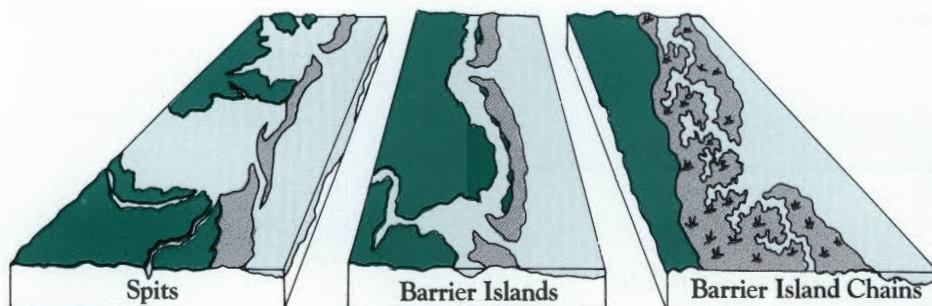
Hey, Explorers!

Have you every visited a New Jersey beach and wondered how the bays, dunes and beaches are formed? Did you know that over the course of time, dunes can move, islands are built and marshes can be filled in with sand?

New Jersey boasts more than 20 miles of mainland beaches and 106 miles of **coastal barriers** that separate the mainland from the Atlantic Ocean. Types of coastal barriers include a **spit** (a narrow point of land extending from the shore), a **barrier island** (a land area surrounded by

water) and a **barrier island chain** (short barrier islands with marshes between them and the mainland). Compare these with the pictures shown below.

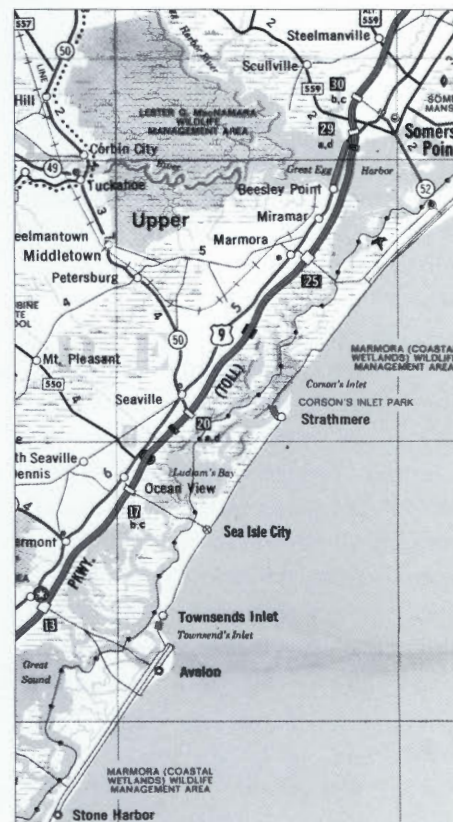
No one is sure just how these areas were created, but most theories are linked to changes in sea level caused by the freezing and thawing of glaciers during the ice ages. Since then, these long, fragile barriers of sand, shell and gravel have been the front lines of defense against winds, tides, storms and occasional hurricanes. As it absorbs the impact of wind, waves and currents, barrier sand shifts and moves from one place to another. Over time, barrier shape and size can be altered, and dunes shifted, islands formed and marshes filled in.



Sandy Hook
Holgate

Ship Bottom
Brigantine

Sea Isle City
Stone Harbor



Let's Take A Road Trip!

Ask someone in your family for a **transportation map** (road map) of New Jersey. Spread it out next to you and locate the Highlands peninsula (Sandy Hook), which seems to begin the state's coastline below the New York Bay. Trace the coastline with your eyes down into southern New Jersey, looking for examples of spits, barrier islands and barrier island chains along the way. (The towns listed below the diagrams are located on examples of these.) Enjoy your trip!

Shifting Sand:

Simple Experiments

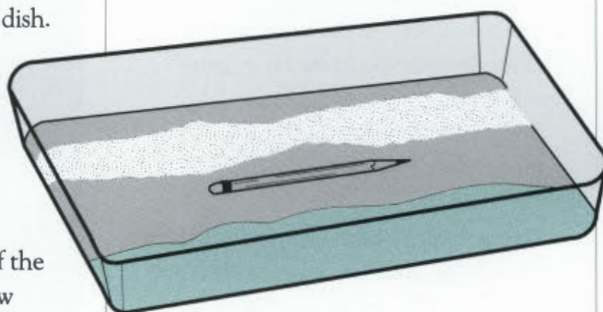
Ask your family to assist you in creating a miniature beach in your kitchen. You will need a 9-inch by 13-inch (33 cm. by 23 cm.) baking dish, preferably Pyrex; a liquid measuring cup with spout; a 1/4-cup measuring cup; a pencil; water; and at least 1/2 cup of white sugar. Place the Pyrex dish atop a dark, level surface. Put the pencil underneath the dish in its center, the length of the pencil parallel to the length of the dish.

1) Tilt the edge of the dish down on the left side. Fill the 1/4-cup measuring cup with sugar and use it to lay a band of sugar (about 1-inch wide by 1/2-inch high) along the left bottom edge of the dish. **This represents a beach.** Now gently tilt the edge of the dish down on the right side and pour in about 1/2 cup of water (see picture). **You are now ready to observe strong waves meeting the beach.** Quickly tilt the dish once to the left and then back to the right. Did any of the "sand" move? If so, why? Where did it go? Try it a second time.

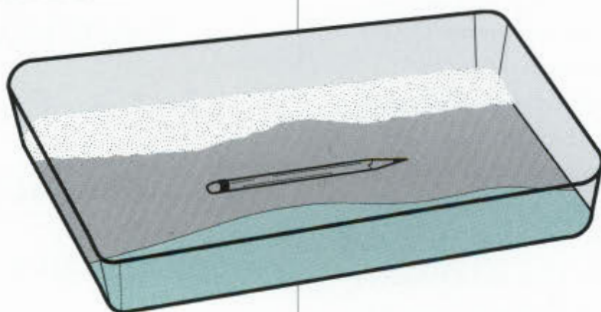
□ During a storm, high winds and water can move sand from the shoreline to deeper water, later replacing it. Waves also move sand along a beach, and often from one coastal barrier to another.

2) Rinse the dish, place it over the pencil and again tilt its edge down on the left side. Fill the 1/4-cup measuring cup with sugar and lay another band of it about 1-1/2-inch from the left edge. **This represents a coastal barrier.** A bay is on its left and the ocean is on its right. Fill the right side with water like before and quickly tilt the dish. What movement occurred this time? Try it again.

□ High water and waves also can move over the top of a barrier, carrying sand into the bay and even creating openings in the barrier.



3) Still curious? Rinse the dish and repeat Step 2, putting a gap somewhere in the band of sugar and **creating a spit**. What happens to the gap?



Think About It:

New Jersey's coastal barriers are valuable to photographers, boaters, swimmers, surfers and hikers, as well as to plants, waterfowl, migrating birds, mammals and a variety of endangered species. These areas also support homes, cities and vacation areas for thousands of residents. In some parts of New Jersey, the movement of sand is eroding beaches and threatening homes and roadways.

Have we interfered with nature or is nature interfering with us? Read the article on pages 24 through 29 with your family. A number of solutions are listed. If you were in charge of our coastal barriers, what would you do? What would you need to learn? We will print the best ideas in the Explorer section of a future issue of **New Jersey Outdoors**. Send your ideas to:

New Jersey Outdoors

Explorer Section

CN 402

Trenton, N.J. 08625-0402

Explorer by Tanya Oznowich, an educator in the Department of Environmental Protection and Energy's Office of Environmental Education

Outings

Just Go with the Flow in Tubing

Gently floating down the Batsto River, you detect the delicate aroma of sweet pepperbush in the air. Glancing over your shoulder, you notice a great blue heron wading in a shallow pool. A brilliantly hued dragonfly flutters across the water, while the greenery on either side provides a peaceful buffer from the rest of the world.

This type of stress-free exercise is what you'll enjoy while tubing down the rivers and streams of the Pinelands. Tubing is perfect for those interested in viewing wildlife, looking for a way to relax or seeking to cool off on a hot summer day. It's a popular activity with people of all ages, and all that's needed to participate is an inner tube, comfortable clothes and an old pair of sneakers.

"Tubing is popular because it's so easy. You just get in your tube and float down the river for a couple of hours," says Joseph Trujillo, activity coordinator for the Outdoor Club of South Jersey. "There's no work connected to it."

Once prepared, you'll have a choice of several excellent tubing runs in the Pinelands. The Batsto River, Cedar Creek and the Wading River all provide places to beat the heat as well as good opportunities to take in the splendor of the area.

The best time to go tubing is right after a heavy rainfall, according to Bert Nixdorf, an outings leader for both the Outdoor Club of South Jersey and the West Jersey Group of the Sierra Club. Under normal conditions, however, the water depth of most of the tubing runs is waist-high or less for adults.

Those looking for interesting wildlife will find an abundance of

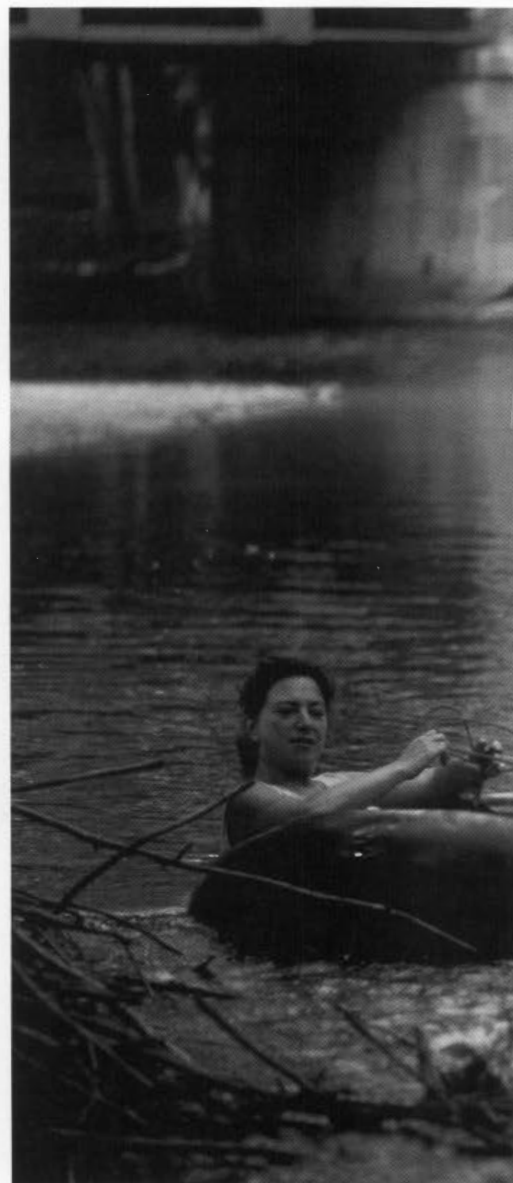
various birds, frogs and whirligig beetles swirling about on the water, an occasional harmless watersnake and perhaps some animals not commonly seen.

"Last year on the Batsto, we saw woodcocks in some of the little muddy inlets, and that's a bird a lot of people don't see unless they're diehard birders," says Nixdorf, who is the author of the booklet, *Innertubing in the New Jersey Pine Barrens*.

Following are some of the highlights of the various runs in that area:

❑ **Cedar Creek** is the cleanest of all the Pinelands streams, according to Nixdorf. On this trip, the water depth averages less than three feet under normal conditions. The stream bed of gravel and sand is visible for the entire length. One run in particular, beginning at Double Trouble State Park, features an abundance of wildflowers along the banks, including waterlilies, pickerelweed, Saint Johnswort and sweet pepperbush. Wild cranberries along the way begin to redden by mid-August.

❑ The runs along the **Batsto River** (Batsto meaning "bathing place,") feature a dipping hole called the "bathtub," a refreshing stop on your journey. Downstream, the route winds through a beautiful, jungle-like environment and further down the river becomes wider as a sea of grass covers most of the water area. This river averages a depth of four to five feet most of the way, with depths at some spots ranging from a few inches to six or seven feet. On the Hampton Furnace to Rider's Crossing trip, children can find excellent places to play near an old dam being reclaimed by the river.



Tubing in the Pinelands is a relaxing way to take in nature and cool off on a hot summer day.

You'll have a
choice of several
excellent
tubing runs in the
Pinelands.



❑ **The Wading River** features several different runs. Of particular interest is Breezeway Beach, unofficially named by Nixdorf and a group of tubing enthusiasts because of the rapid current just past Evans Bridge that can take you around the beach's curve like a whip in an amusement park. The run from Harrisville to Beaver Branch has the warmest water in the Pinelands, according to Nixdorf. Tubing is possible here as early as mid- to late May.

As in every water sport, life preservers should be worn by children and weak

swimmers. On outdoor excursions such as these, littering can be a serious problem. Please be considerate and eat before or after your tubing trips.

For more detailed information on these trips or to obtain a copy of his tubing booklet, contact Bert Nixdorf at (609) 267-7052.

By James Grubic, a Rutgers University journalism intern

Grab a Tube and Take a Trip

If you can find an inner tube that doesn't leak and a body of water, you can discover the serenity of tubing in New Jersey. Remember that private waters are off-limits unless you obtain the permission of the owner. The following is a list of organizations that sponsor trips on public waters.

❑ Delaware River Camping Resort

Four- or eight-mile trips are offered. Camping accommodations are available on the premises and at nearby Worthington State Forest. **Cost:** \$10, plus tax, and a \$1 damage release for tube. Cost includes life preserver. **Phone:** (908) 475-4517 **Location:** 100 Route 46, Delaware (Warren County)

❑ Point Pleasant Canoe and Tube

Tubers can choose from a three- or four-hour cruise down the Delaware. Those interested in an overnight trip can find camping accommodations at nearby Bull's Island State Park **Cost:** \$12 for adults and \$10 for children on weekends; \$10 for everyone on weekdays **Phone:** (215) 297-TUBE **Location:** Eight miles north of New Hope, off Route 32, Point Pleasant, Pa. (Bucks County)

❑ Winding River Campgrounds

These two-and-a-half hour trips in South Jersey meander along the Great Egg Harbor River and across Lake Lenape. **Cost:** \$6, plus \$4 deposit for tube **Phone:** (609) 625-3191 **Location:** 6758 Weymouth Road, Mays Landing (Atlantic County)

Costs for the tubing excursions listed above include transportation to the launch area, tube rental fee and, in some cases, life preservers. For the Delaware River trips, federal regulations require that life preservers be worn at all times.

Events

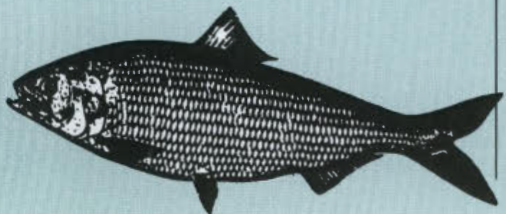
June

Weekends throughout Summer CATTUS ISLAND NATURE PROGRAMS These one-hour programs explore a variety of nature-related themes, including the natural history of Cattus Island and the plants and animals of the salt marshes. **Hours:** 2 p.m. **Admission:** Free, but donation appreciated **Phone:** (908) 270-6960 **Location:** Cooper Environmental Center, 1170 Cattus Island Blvd., Toms River

Through September 5 GREAT MAMMALS OF THE ICE AGE This exhibition features seven life-sized action models of Ice Age creatures, including the woolly mammoth and the giant ground sloth, which were inhabitants of New Jersey. **Hours:** 9 a.m. to 4:45 p.m. Tuesdays through Saturdays; noon to 5 p.m. Sundays **Admission:** \$5 for adults, \$3 for children and seniors, free for kids under 3 **Phone:** (609) 292-6347 **Location:** New Jersey State Museum, 205 West State St., Trenton

All Summer CHRISTOPHER COLUMBUS AND THE AGE OF EXPLORATION This exhibit features maps, navigational instruments, artifacts and texts from around the world. **Hours:** 9 a.m. to 4:45 p.m. Tuesdays through Saturdays; noon to 5 p.m. Sundays **Admission:** Free **Phone:** (609) 292-6347 **Location:** New Jersey State Museum, 205 West State St., Trenton

Year-round PUBLIC VISITATION OF PEQUEST HATCHERY Self-guided tours, films, exhibits and trails are available. Call or write for brochure. **Hours:** 10 a.m. to 4 p.m. on Fridays, Saturdays and Sundays **Admission:** Free **Phone:** (908) 637-4125 **Location:** Pequest Trout Hatchery and Natural Resource Education Center, Rte. 46, Oxford



13 WILDFLOWER WALK This several-hour walk will take you around the cranberry bogs, pine forests and blueberry fields surrounding Whitesbog Village. A tour guide will point out and discuss Pine Barrens plants. **Hours:** 9 a.m. to noon **Admission:** \$3 per person, \$9 per family, free for members **Phone:** (609) 893-4646 **Location:** Historic Village of Whitesbog, Rte. 530, Browns Mills

13 MOONLIGHT WALK Enjoy a five-mile walk around the bogs, ponds, reservoirs, cedar swamps and pine forests surrounding Whitesbog Village. **Hours:** 7 p.m. to 9 p.m. **Admission:** Free **Phone:** (609) 893-4646 **Location:** Historic Village of Whitesbog, Rte. 530, Browns Mills

13 FULL MOON HIKE: DEERFIELDS OF GREENWOOD Hear the night sounds of swampland denizens as you hike six easy miles over wildlife management lands. Bring snacks and a flashlight. Sponsored by the West Jersey Group of the Sierra Club. **Hours:** 7:45 p.m. **Admission:** Free **Phone:** (609) 267-7052 **Location:** Greenwood Wildlife Management Area, Rte. 539, Ocean County



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



14 BUTTERFLIES Robert Holt, director of the Great Swamp Outdoor Education Center, presents this slide show about butterflies. **Hours:** 2 p.m. **Admission:** Free **Phone:** (201) 635-6629 **Location:** Great Swamp Outdoor Education Center, 247 Southern Blvd., Chatham

20 TUBING THE WADING RIVER Spend about two hours on the water, with a short walk to and from the river. Call for details. Sponsored by the West Jersey Group of the Sierra Club. **Hours:** 10:30 a.m. **Admission:** Free **Phone:** (609) 267-7052 **Location:** Harrisville Dam, Rte. 679, Burlington County

June 24 through September 2 FREE BEACH WALKS Geared toward families, these leisurely strolls along the beach feature a different educational theme each week, including bird and shellfish identification and animals of the island. Call for details. Sponsored by the Marine Mammal Stranding Center. **Hours:** Wednesdays, 8:30 a.m. to 10 a.m. **Admission:** Free, but donation appreciated **Phone:** (609) 266-0538 **Location:** Meet at 14th Street parking lot, near the North End Beach, Brigantine

27, 28 BIRD-WATCHING COURSE FOR BEGINNERS Learn how to watch birds at North America's premier bird-watching spot. Indoor class time on Saturday will be followed by a bird outing on Sunday. Call for reservations. **Hours:** 7 p.m. to 10 p.m. Saturday; 8 a.m. to 10 a.m. Sunday **Admission:** \$10 for members, \$15 for nonmembers **Phone:** (609) 884-2736 **Location:** Cape May Bird Observatory, Cape May Point

200,000 Expected at July 4th Liberty Park Fest

June 29 through August 21 SUMMER NATURE CLASSES These one-week nature classes for children in preschool through grade 6 include hands-on activities, field trips, crafts and lessons on the salt marsh and beach environment. **Hours:** Call for details **Admission:** Call for fees; advance reservations and payment required **Phone:** (609) 368-1211 **Location:** Wetlands Institute, Stone Harbor Blvd., Stone Harbor

July

July 1 through August 26 GARDEN WALKS These guided tours of the extensive gardens surrounding the Wetlands Institute are given by local garden club members knowledgeable in horticultural techniques. **Hours:** 11 a.m. on Wednesdays **Admission:** \$3 for adults, \$1 for children, free for members **Phone:** (609) 368-1211 **Location:** Wetlands Institute, Stone Harbor Blvd., Stone Harbor

July 2 through August 27 NATURE LECTURES These illustrated lectures are on a variety of topics and appeal to all age groups. Call for details. **Hours:** 8:15 p.m. on Thursdays **Admission:** Fees vary **Phone:** (609) 368-1211 **Location:** Wetlands Institute, Stone Harbor Blvd., Stone Harbor

4 "40TH ON THE 4TH" View displays and exhibits of steam and diesel power trains as Pine Creek Railroad celebrates its 40th anniversary. Sponsored by the Pine Creek Railroad and the New Jersey State Park Service. **Hours:** Noon to 4:30 p.m. **Admission:** \$5 parking fee plus \$1.50 per person train fare. **Phone:** (908) 938-2371 **Location:** Allaire State Park, Rte. 524, Farmingdale

11 9th ANNUAL WHITESBOG CROSS-COUNTRY RUN This cross-country run takes participants around the blueberry field, cranberry bogs and pine forests of Whitesbog. **Hours:** 8 a.m. to noon **Admission:** \$12 preregistration fee (\$15 on race day) **Phone:** (609) 893-4646 **Location:** Historic Village of Whitesbog, Rte. 530, Browns Mills

LIBERTY STATE PARK PHOTOS



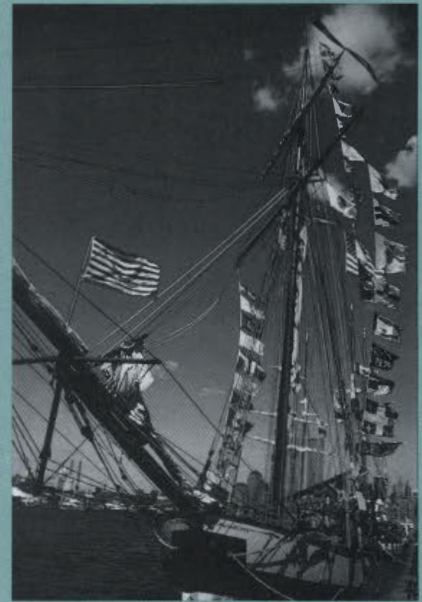
Liberty State Park in Hudson County will mark the 500-year anniversary of the arrival of Christopher Columbus in America with a parade of tall ships and fireworks display on July 4.

An estimated 200,000 visitors are expected to attend.

Beginning at 10 a.m., more than 250 tall ships from around the world will cruise past a reviewing stand on Governors Island, sail up the Hudson River to the George Washington Bridge and then return to their berths. The ships will be open to the public from July 5 through July 7 at the discretion of the individual captains. Replicas of Columbus' ships, the Nina, Pinta and Santa Maria, also will take part in the parade.

The day will be capped by a fireworks display at 9 p.m.

Special exhibits on the history of the New York-New Jersey Harbor area will be featured from Memorial Day to Labor Day at the Central Railroad of New Jersey Terminal. Free lectures will be offered at the park's Interpretive Center throughout the summer, including "The European Age of Exploration: Some

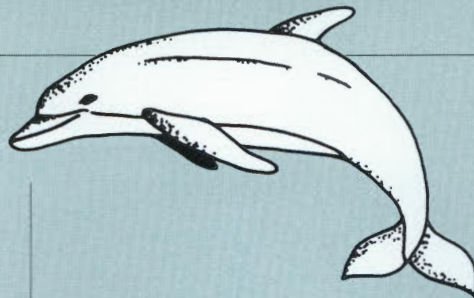


Fireworks and a parade of tall ships will be among the attractions as Liberty State Park marks the 500-year anniversary of Columbus' arrival in America.

"Causes and Consequences of 1492," which will be presented on Tuesday, July 7, at 7:30 p.m.

No vehicles will be allowed in the park during the July 4 celebration. Visitors are encouraged to take NJ Transit. For more information, call (201) 915-3400.

Events



11 9th ANNUAL WHITESBOG

BLUEBERRY FESTIVAL Hear continuous bluegrass/Pinelands music and go on educational bus and walking tours guided by local naturalists and historians. A large variety of blueberry goods will be available. Rain date is July 12. **Hours:** Noon to 6 p.m. **Admission:** \$10 per carload **Phone:** (609) 893-4646 **Location:** Historic Village of Whitesbog, Rte. 530, Browns Mills

11 HIKE ON THE PAULINSKILL VALLEY TRAIL

Same as June 14. **Hours:** 10 a.m. **Admission:** Free **Phone:** (908) 852-0597 **Location:** Footbridge Park, Rte. 94, Blairstown

11 SNAKES

Snake enthusiast Bill Boesenberg puts fears to rest as he teaches how to handle and care for these misunderstood reptiles. Sponsored by the Great Swamp Outdoor Education Center. **Hours:** 2 p.m. **Admission:** Free **Phone:** (908) 876-3100 **Location:** Schooley's Mountain Park, Camp Washington Rd., Washington Twp.



14 THE RAILROADS OF NEW

JERSEY This lecture, part of a series of presentations concentrating on the history of the Hudson River area, is sponsored by Liberty State Park. **Hours:** 7:30 p.m. **Admission:** Free **Phone:** (201) 915-3400 **Location:** Interpretive Center, Freedom Way, Exit 14B off the New Jersey Turnpike, Jersey City

18 DOLPHIN CRUISE This two-and-a-half hour cruise will take you around Cape May and into the Delaware Bay in search of dolphins. Preregistration required. Sponsored by the Marine Mammal Stranding Center. **Hours:** 10:30 a.m. to 1 p.m. **Admission:** \$13 for adults, \$9.50 for children **Phone:** (609) 266-0538 **Location:** Meet at Ottens Harbor, Wildwood

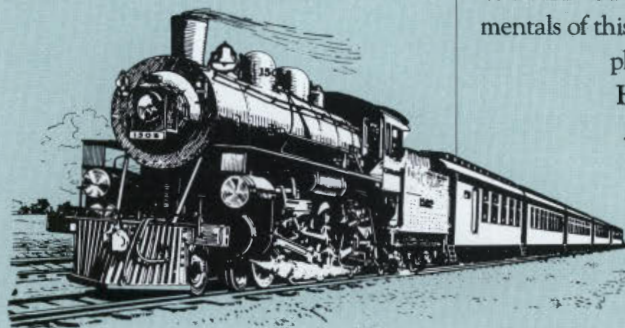
18 MOONLIGHT WALK Enjoy a five-mile walk around the bogs, ponds, reservoirs, cedar swamps and pine forests surrounding Whitesbog Village. **Hours:** 7 p.m. to 9 p.m. **Admission:** Free **Phone:** (609) 893-4646 **Location:** Historic Village of Whitesbog, Rte. 530, Browns Mills

19 APPALACHIAN TRAIL HIKE AND INTRODUCTION TO TRAIL

MAINTENANCE Learn trail maintenance issues and techniques during this leisurely hike. Sponsored by the New York-New Jersey Trail Conference. **Hours:** 10 a.m. **Admission:** Free **Phone:** (908) 850-9045 **Location:** Dunnfield Creek, parking lot 2, Delaware Water Gap

22-26 MONMOUTH COUNTY FAIR

See animal races, play games, go on carnival rides and view home and garden exhibits. Sponsored by the Monmouth County Park System. **Hours:** 5 p.m. to 11 p.m. Wednesday; 11 a.m. to 11 p.m. Thursday through Saturday; 11 a.m. to 6 p.m. Sunday **Admission:** \$3.50 **Phone:** (908) 842-4000 **Location:** East Freehold Park, Kozloski Rd., Freehold



25 INDIANS OF NEW JERSEY Learn about how the Lenni Lenape Indians lived. Sponsored by the Great Swamp Outdoor Education Center. **Hours:** 2 p.m. **Admission:** Free **Phone:** (908) 876-3100 **Location:** Schooley's Mountain Park, Camp Washington Rd., Washington Twp.

25, 26 BIRD-WATCHING COURSE FOR BEGINNERS

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



August

7 FOR-KIDS-ONLY ASTRONOMY PROGRAM

This program is geared toward teaching children about the constellations, planets and phases of the moon, with the help of a telescope. Sponsored by the New Jersey Astronomical Association. **Hours:** 8:30 p.m. to 11:30 p.m. **Admission:** \$1 **Phone:** (908) 638-6969 or (908) 638-8500 **Location:** Voorhees State Park, Rte. 513, Glen Gardner

8 NATURE PHOTOGRAPHY WORKSHOP - THE NATURAL

WORLD UP CLOSE Learn the fundamentals of this type of nature photography. Call for reservations.

Hours: 9 a.m. to 5 p.m.

Admission: \$25 for members, \$30 for nonmembers

Phone: (609) 884-2736

Location: Cape May Bird Observatory, Cape May Point

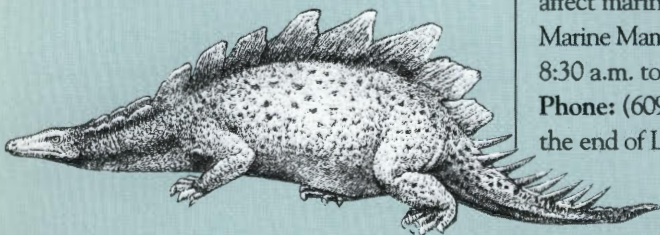
8 BENNETT BOG WILDFLOWER WALK Venture to this nationally famous botanical sanctuary about five miles north of Cape May. Call for reservations. **Hours:** 11 a.m. to 1 p.m. **Admission:** \$5 for members, \$7 for nonmembers **Phone:** (609) 884-2736 **Location:** Sponsored by the Cape May Bird Observatory, Cape May Point

8 OWLS OF NEW JERSEY Bird rehabilitator Giselle Smisko gives this slide presentation and discussion about the owls of New Jersey. Visitors will get the opportunity to meet two live owls. **Hours:** 2 p.m. **Admission:** Free **Phone:** (908) 876-3100 **Location:** Schooley's Mountain Park, Camp Washington Rd., Washington Twp.

12 DOLPHIN-WATCH WALK Observe wild dolphins in the near-shore waters. Sponsored by the Marine Mammal Stranding Center. **Hours:** 8:30 a.m. to 10 a.m. **Admission:** Free, but donation appreciated **Phone:** (609) 266-0538 **Location:** Meet at Brigantine Boulevard and 12th Street North, Brigantine

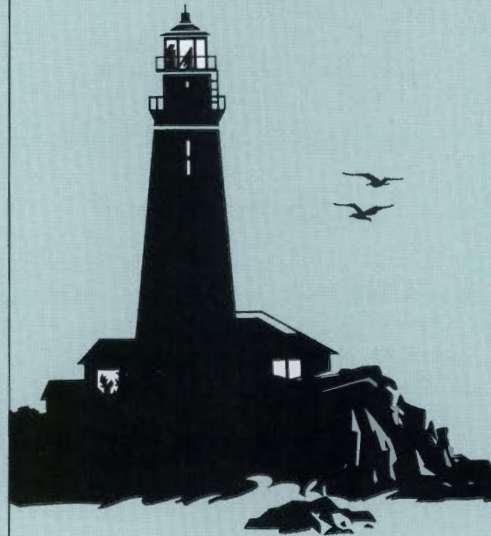
12 FULL-MOON HIKE: LAKE OSWEGO Explore the pristine Oswego Lake area in the Pinelands on this seven-mile hike. Bring snacks and a flashlight. Sponsored by the West Jersey Group of the Sierra Club. **Hours:** 7:15 p.m. **Admission:** Free **Phone:** (609) 267-7052 **Location:** Meet at the lake on Jenkins-Penn Forest Rd., 3-1/2 miles east of Rte. 563, Burlington County

15 DINOSAURS Discover which dinosaurs roamed through New Jersey and see life-sized replicas of their bones. Sponsored by the Great Swamp Outdoor Education Center. **Hours:** 2 p.m. **Admission:** Free **Phone:** (908) 876-3100 **Location:** Schooley's Mountain Park, Camp Washington Rd., Washington Twp.



15 MOONLIGHT WALK Enjoy a five-mile walk around the bogs, ponds, reservoirs, cedar swamps and pine forests surrounding Whitesbog Village. **Hours:** 7 p.m. to 9 p.m. **Admission:** Free **Phone:** (609) 893-4646 **Location:** Historic Village of Whitesbog, Rte. 530, Browns Mills

15 WHALE WATCH Venture to Plymouth Harbor to observe whales and dolphins in their natural environment. Pre-paid registration must be received by July 25. Call for details. **Hours:** 7 a.m. to midnight **Admission:** \$54 for non-members, \$49 for members **Phone:** (201) 835-2160 **Location:** Meet at Weis Ecology Center, 150 Snake Den Rd., Ringwood



18 LIGHTHOUSES OF NEW JERSEY This lecture, part of a series of presentations concentrating on the history of the Hudson River area, is sponsored by Liberty State Park. **Hours:** 7:30 p.m. **Admission:** Free **Phone:** (201) 915-3400 **Location:** Interpretive Center, Freedom Way, Exit 14B off the New Jersey Turnpike, Jersey City

19 GARBOLOGY Take a beach walk and learn how different types of litter affect marine life. Sponsored by the Marine Mammal Stranding Center. **Hours:** 8:30 a.m. to 10 a.m. **Admission:** Free **Phone:** (609) 266-0538 **Location:** Meet at the end of Lagoon Blvd., Brigantine

22 WHALE-WATCH CRUISE Search for whales on this trip aboard one of South Jersey's whale-watching boats. Preregistration required. Sponsored by the Marine Mammal Stranding Center. **Hours:** Call **Admission:** Call **Phone:** (609) 266-0538 **Location:** Meet at the end of Lagoon Blvd., Brigantine

22, 23 BIRD-WATCHING COURSE FOR BEGINNERS Learn how to watch birds at North America's premier bird-watching spot. Indoor class time on Saturday will be followed by a bird outing on Sunday. Call for reservations. **Hours:** 7 p.m. to 10 p.m. Saturday; 8 a.m. to 10 a.m. Sunday **Admission:** \$10 for members, \$15 for nonmembers **Phone:** (609) 884-2736 **Location:** Cape May Bird Observatory, Cape May Point

29 PINELANDS WALK Traipse through the Pinelands and view the trees, flowers and animals. Preregistration required. Sponsored by the Marine Mammal Stranding Center. **Hours:** 9 a.m. to 10:30 a.m. **Admission:** \$6 **Phone:** (609) 266-0538 **Location:** Meet at Estelle Manor County Park, Estelle Manor

29 NATURE PHOTOGRAPHY WORKSHOP - PHOTOGRAPHING BIRDS Learn the fundamentals of this type of nature photography. Call for reservations. **Hours:** 9 a.m. to 5 p.m. **Admission:** \$25 for members, \$30 for nonmembers **Phone:** (609) 884-2736 **Location:** Cape May Bird Observatory, Cape May Point

Editor's Note:

The Atlantic City Recreational Vehicle and Sports Show, included in the spring events listing, was canceled after that issue went to press. We regret any inconvenience this caused our readers. Events are verified before press time, but we encourage anyone who intends to attend an event listed here to call ahead for last-minute schedule changes.

Wildlife in New Jersey

The Eastern Painted Turtle

Like most youngsters growing up in the country, I was fascinated by snakes, frogs and turtles, and spent most of my summer vacations trying to catch them. My favorite place to find turtles was the old Morris Canal in northern Morris and southern Sussex counties, where my friends and I always found several eastern painted turtles, or red-leggers, as we used to call them.

One look at this reptile and it is easy to understand how it received the name "painted turtle." This common turtle has patterns of red, yellow and black on its body. Its neck, legs and tail are marked with brilliant red lines, and it has two bright yellow spots and a series of yellow lines on each side of its head.

Its smooth upper shell, the carapace, is usually dark brown, olive or black. A unique feature of the painted turtle is the design on its upper shell. The scales, or scutes, have light olive edges. When viewed altogether, they appear as light-colored bands extending across the entire shell. The painted turtle is the only turtle found in New Jersey in which the scutes are in straight rows across the back; on all other turtles, these plates are arranged in an alternating fashion. Along the edge of the upper shell are bright red markings that resemble semi-circles. The plastron, or lower shell, of a painted turtle is generally yellow, although it also can be orange or cream-colored. In addition, it may contain a dark spot or two.

The painted turtle is not a very large turtle. The males are four to five inches long, while the females are about an inch larger.

A painted turtle may be found anywhere in New Jersey where there is shallow water, plenty of aquatic vegetation and a soft, muddy bottom. Such habitat includes ponds, swamps and the

edges of lakes, ditches and slow-moving streams. The painted turtle is omnivorous, meaning it eats both plants and animals. Its food consists of aquatic

A painted turtle may
be found anywhere in
New Jersey where
there is shallow water,
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muddy bottom.

vegetation, insects, crayfish and other small aquatic animals. An adult painted turtle has few predators in New Jersey, but juveniles must be careful of predators such as mink, raccoons, crows, larger turtles and large fish.

A typical day for a painted turtle will begin at a preferred basking site. This may be a rock, stump, floating log or the bank at water's edge. The turtle may spend several hours each day basking in the sun until it has sufficiently raised its body temperature. Once this occurs, the turtle will begin to search for food. If it

happens to be the breeding season, it will search for a mate. In New Jersey, the painted turtle usually begins courtship in May. A male will become sexually mature at five years of age, while the female matures at age six. A male will search its aquatic environment until it finds a receptive female and then mating will take place.

The female painted turtle will be ready to lay her eggs in mid-June. She uses her hind feet to dig a nest in soft soil with good drainage and will lay a clutch of three to 11 white eggs, slightly more than one-inch long and about one-half inch in diameter. It will take approximately 75 days for the eggs to hatch. Once the young turtles emerge, their colors are even more vivid than those of the adults. The hatchlings grow rapidly and can almost double their size after one year.

During the winter months, painted turtles usually will hibernate under water, buried well in the mud, although ice fishermen occasionally have reported seeing them swimming under the ice. The turtles will emerge from hibernation in March or April as the temperatures warm up. Once spring arrives, you are likely to see several painted turtles basking in the sun on a log or rock, as they warm up to start the cycle all over again.

*By David Chanda, chief of the Office of
Information and Education for the New Jersey
Division of Fish, Game and Wildlife*





A party boat heads out on a nighttime bluefishing trip off Barnegat Light. For tips on bluefishing, see page 40.

In Next Season's Issue

Make Your Home More Energy Efficient

Get Ready to Go Birding

Meet the State's Prize-Winning Anglers