



March / April 1981

New Jersey  
**OUTDOORS**



Brendan T. Byrne  
Governor

Department of Environmental Protection



Jerry Fitzgerald English  
Commissioner

Editorial Advisory Board

- Al Toth, *Chairman*
- Richard J. Sullivan
- Irwin Zonis
- Gordon A. MacInnes, Jr.
- Gene Hill

New Jersey Outdoors Magazine

Steve Perrone  
*Editor*

Harry Grosch  
*Photographer*

Lucy Brennan  
*Circulation*

Edi Joseph  
*Environmental News*

Sharon Ann Brady  
*Editorial Assistant*

Contributors

- Bob Byrne
- Joan Galli
- Bob McDowell
- Pete McLain
- Robert Soldwedel
- William Figley
- Robert Lund

NEW JERSEY OUTDOORS is the bi-monthly magazine of the Department of Environmental Protection of New Jersey. This publication is dedicated to the wise management and conservation of our natural resources and to foster a greater appreciation of the outdoors.

(Note: Costs of publishing the magazine not covered by subscriptions are met from general revenues available to the Department of Environmental Protection.)

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

New Jersey Outdoors (USPS 380-520) is published bi-monthly (six times a year) by the N.J. Department of Environmental Protection. Second-class postage is paid at Trenton, N.J. and additional mailing offices. Subscriptions are \$4.00 for one year, \$7.00 for two years, and \$10.00 for three years payable by check or money order to New Jersey Outdoors Mailing Office, P.O. Box 1390, Trenton, N.J. 08625. Single copies, if available, cost 80c. Change of address should be reported to the above New Jersey Outdoors mailing office. Send old and new addresses and the zip code numbers. The Post Office will not forward copies unless forwarding postage is provided by the subscriber. Allow eight weeks for new subscriptions and change of address to take effect. New Jersey Outdoors welcomes photographs and articles, but will not be responsible for loss or damage. Permission granted to reprint with credit to New Jersey Outdoors. Publication office at 3885 Quaker Bridge RD., Mercerville, N.J. 08619. Copyright © 1980 N.J. Outdoors

# New Jersey OUTDOORS

<b>Forestry in New Jersey</b>	2
<i>by Duke Grimes</i>	
<b>Wildlife in New Jersey/The Eastern Bluebird</b>	6
<i>By Joan Galli and Tom Mulvey</i>	
<b>Public Recreational Areas in Southern New Jersey</b>	8
<i>By Frank Montarelli</i>	
<b>Canoeing the Delaware</b>	10
<i>By Barry W. Coleman</i>	
<b>Nymph Dancing</b>	12
<i>By Allen G. Eastby</i>	
<b>Spruce Run Creek/A Final Encounter</b>	15
<i>By William B. Honachefsky</i>	
<b>Spring's Other Singers</b>	18
<i>by Wade Wander and Sharon Ann Brady</i>	
<b>Forest Fungi: Making Way for New Life</b>	20
<i>Wendolyn E. Tetlow</i>	
<b>Mullica River Oyster Program</b>	22
<i>By Tom McCloy</i>	
<b>On the Beach</b>	24
<i>By Robert McDonnell</i>	
<b>The Mystery of the Musconetcong</b>	26
<i>By Dr. Douglas E. Roscoe</i>	
<b>Backyard Predator</b>	28
<i>By Eleanor Gilman</i>	
<b>Greenwing Day</b>	29
<i>By Henry Hegeman</i>	
<b>Navigation Methods for Outdoorsmen</b>	30
<i>By Ken Oravsky</i>	

DEPARTMENTS

<b>Environmental News</b>	16A
---------------------------	-----

List of New Jersey's Biggest Trees  
By Santiago Porcella III  
(A Center Spread Snapout)

MINI FEATURES

<b>Coast Guard Auxiliary Day</b>	14
<b>Workshop on Coastal Problems and Resource Management</b>	16
<b>Wildlife Workshop for Teachers</b>	17
<b>Open House at the Fish Hatchery</b>	23

# from the editor

## *Spring is almost here—*

The tree buds of red maple in mid-January (as I write this editorial) are beginning to swell, the daylight hours are growing longer, and my mail is thick with announcements of Spring workshops, boating news, "Open House" events, and the opening of the trout fishing season on Saturday, April 11. And opening day trout is an *event* in New Jersey—based on past performances, we estimate that more than 200,000 New Jersey anglers (adults and juveniles) will try their luck on that day. So before the April 11 date rolls around, inspect your gear, buy a fishing license and trout stamp, and rehearse your best fish-that-got-away story. Then call your favorite rainmaker and ask for 10 inches of rain by opening day.

We have other "events" this spring—for families, for conservationists, for teachers, for students, for all. Check the Table of Contents for

locations:

- Open House at the Hackettstown Fish Hatchery on Sunday, March 29—A family fun day outdoors.
- Workshop on Coastal Problems and Resource Management on April 23-25 at Seaville Station.
- U.S. Coast Guard Auxiliary on May 3 at the Shark River and Manasquan Coast Guard Stations.
- Wildlife Weekend for Teachers: May 8, 9, and 10 at the Marine Consortium, Seaville, New Jersey; June 5, 6 and 7 at the State School of Conservation in Stokes State Forest, Branchville, New Jersey.
- Greenwing Day at the Conservation and Environmental Studies Center at Whitesbog. Get involved this year!

## **IN THIS ISSUE**

This is a forestry issue and the first article is titled, *Forestry in New Jersey* by Forester Duke Grimes. The May/June issue will carry the second half of this article, and the entire article (both halves) will be available as a booklet from the Bureau of Forestry.

The eight-page center-spread snapout contains the revised *List of New Jersey's Biggest Trees* by Santiago Porcella III, retired Chief, Bureau of Forest Management. This booklet will also be available from the Bureau of Forestry.

Other forestry theme pieces: *Public Recreational Areas in Southern New Jersey* by Frank Montarelli, and *Forest Fungi: Mak-*

*ing Way for New Life* by Wendolyn E. Tetlow.

Carol Decker's illustration of the Eastern Blackbird on the inside back cover introduces our Wildlife in New Jersey feature, *The Eastern Bluebird*, by biologist Joan Galli and Tom Mulvey. Tom is a bluebird fancier and chief of Law Enforcement in DEP's Division of Fish, Game and Wildlife.

*Canoeing the Delaware* by Barry W. Coleman tells *how, where* and the precautions to be taken when canoeing.

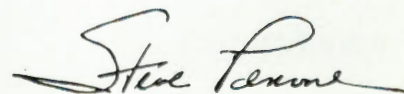
Trout anglers will enjoy *Nymph Dancing* by Allen G. Eastby, a familiar author here.

William B. Honachefsky, another

familiar name, writes about *Spruce Run Creek/A final Encounter*.

This issue has a marvelous mix of material. For example: *Spring's Other Singers*, by Wade Wander and Sharon Ann Brady; *Mullica River Oyster Program*, by Tom McCloy; *The Mystery of the Musconetcong*, by Dr. Douglas E. Roscoe; *Backyard Predator*, by Eleanor Gilman; *Greenwing Day*, by Henry Hegeman; *Navigation Methods for Outdoorsmen*, by Ken Oravsky, and *On the beach*, a pictorial by photographer Robert McDonnell.

And tell your friends to subscribe now before the price increase in July.



**New Jersey State Library**

# Forestry in New Jersey

## New Jersey's Forest Resource

By Duke Grimes

New Jersey is the most urban and densely populated state in the nation. Its nickname, "The Garden State," also attests to the significance of agriculture and the importance of supplying produce to nearby cities. But how many people think of New Jersey as "The Forested State"? Even those people who live or work in the forested areas of the state have little idea of the extent of this valuable resource.

Did you know that: ▀ 40% of New Jersey's land area, 1,856,800 acres, is classed as commercial forest land.

▀ an additional 14% of the state's land area is urban land with tree cover.

▀ 83% of this commercial forest, 1,537,900 acres, is privately owned and that 17%, 318,900 acres, is publicly owned.

▀ there are 63,600 private forest landowners; 83% of these are individual ownerships.

75% of the privately owned forests are in tracts of 20 acres or larger.

▀ the state owns 245,000 acres of forest, 13% of the total.

The forests of New Jersey are largely a privately owned resource. The reasons for owning forest land are as varied and numerous as the individual owners. but whether it's a ten acre house lot or state-owned forest land, each tract contributes toward supplying the products and amenities upon which we all depend. The amount of wood fiber, the availability of recreation, the abundance of wildlife, and the flow of clean water are all a function of the quantity and quality of these forests.



FOREST COVER MAP  
OF NEW JERSEY

Showing—  
ALL FORESTED AREAS

Prepared by—  
The Bureau of Forest Management

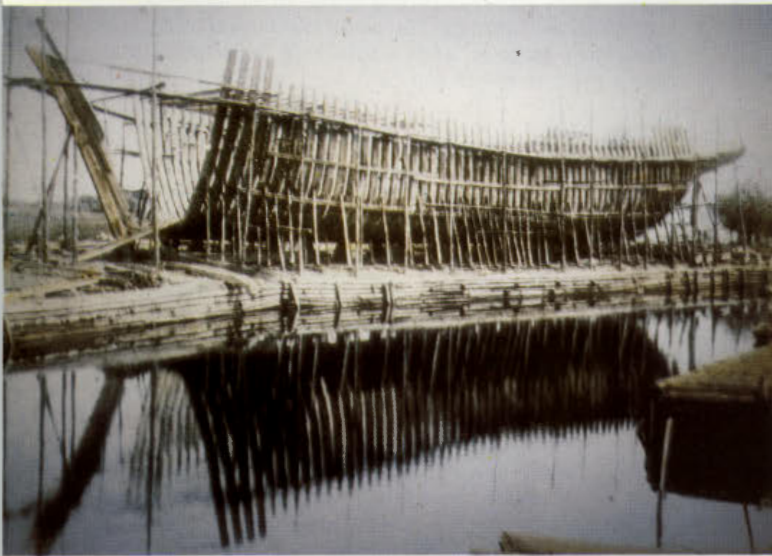
## Historical Trends in New Jersey's Forested Acreage

Acres in Forest Land						
1700	1786	1885	1899	1911	1956	1972
3,879,000	2,410,000	2,330,000	2,069,000	2,217,000	2,229,000	1,928,400

Photos provided by Bureau of Forestry



Our ancestors' perceptions of the forest were very different from those we have today. They saw a seemingly endless reservoir of timber which could provide the lumber and fuel for their homes and industry. The forest was also seen as an obstacle which needed to be cleared to make way for the farming of the rich agricultural areas of the State.



The vastness of the resource and its proximity to urban areas contributed significantly to the economic growth of New Jersey. Until the discovery of Pennsylvania coal, charcoal was the preferred fuel for heating homes, powering industry, and the smelting of iron. Its production caused the clearing of thousands of acres a year, primarily in the Pine Barrens region. The sawmills in this state, numbering more than 560 in 1840, provided the lumber for homes, furniture, and for specialized industries such as ship-building along the South Jersey coast.



There is still a large amount of logging in New Jersey today. An average volume of 23 million board feet of sawtimber is harvested annually. Other products such as veneer, pulpwood, piling, and wood chips contribute to a final annual total of 73.7 million board feet, in addition to 85,000 cords of firewood.

*Continued on page 4*



*Continued from page 3*

## **Forestry In New Jersey**

Approximately 5,000 people are employed in what is called the primary processing of forest products. This includes loggers, the workers in the 68 New Jersey sawmills, and even Christmas tree growers.



The most obvious difference in forest harvesting today is the change in the types of equipment used. Large log skidders get the wood out faster, and mechanized tree shears and whole tree harvesters better utilize the trees that are cut.



New Jersey uses a tremendous amount of wood, a total of 2.1 billion board feet per year. The importance of wood will continue in the future with an anticipated need for 3.1 billion aboard feet by the year 2000. This demand indicates the potential market for timber harvested from New Jersey forests.



This large volume of wood is not only used in the housing industry but is manufactured into products ranging from toys to millwork to pharmaceuticals. Pallets, the wooden platforms that are used in transporting so many other products, account for 114 million board feet alone!



There is a large industrial use for the sawdust, wood shavings and wood chips often produced as by-products from wood product manufacturers. These wood fines are used in the production of particle board, roofing shingles, animal bedding, oil absorbants, and in plastic, rubber processing. Formerly wasted wood is now also being used for energy production, and wood chips are utilized in the composting of sewage sludge.



As important as the forest is as a fiber-producing resource it also benefits New Jersey residents by providing other amenities. Demands for recreational opportunities in a forested setting will increase as people look for places closer to home where they can camp, hike or picnic.



Probably the most important function of the forest is in the protection of our watersheds. This role will become even more vital in the future, providing clean and plentiful water from New Jersey's 966 ponds, lakes and reservoirs, and its 6,448 miles of streams and rivers.



Eastern Bobcat

Forests provide food and cover to the majority of wildlife species in the state. The wide variation of forest types and ages, and their association with farm fields and open areas, create the conditions for the rich diversity of the game and non-game wildlife which we all enjoy.

*To be concluded in the May/June issue.*

# WILDLIFE IN NEW JERSEY

## *The Eastern Bluebird*

By Joan Galli and Thomas Mulvey

By the time you are reading, in March, what we are now writing in December, it will be bluebird season, and Spring will be arriving with the flip of the calendar page. The traditional expectation that bluebirds are the harbinger of spring was eloquently expressed by John Burroughs, who wrote in *Wake-Robin*:

*When Nature made the bluebird she wished to appropriate both the sky and the earth, so she gave him the color of one on his back and the hue of the other on his breast, and ordained that his appearance in the spring should denote that the strife and war between these two elements was at an end. He is the peace-harbinger; in him the celestial and the terrestrial shake hands and are fast friends. He means the furrow and he means the warmth; he means all the soft, wooing influences of the spring on the one hand, and the retreating footsteps of winter on the other.*

The appearance of bluebirds in New Jersey also means, for those of us who maintain nest box trails for them, a frantic effort to complete box repairs before the birds begin 'house hunting' in earnest.

In Burroughs' time, the bluebird was reportedly one of our most common birds, nesting close to human dwellings even in the residential areas of larger cities. Initially, as a species of open habitat, the bluebird benefitted from the colonists' activities opening and clearing the forests for farms and orchards. As cavity nesters, the birds readily utilized nooks and rafters about houses and barns, as well as cavities rotted out in wooden fence posts. However unlike other cavity nesters such as woodpeckers, the bluebird is unable to excavate its own nest hole. It is dependent on pre-existing cavities formed in decaying wood, excavated



Authors setting up bluebird nest box

CAROL NASH



Bluebird feeding young

JOAN GALLI



CAROL NASH



CAROL NASH

by previous tenants, or provided, unintentionally or otherwise, by human activities.

While colonization of the eastern seaboard initially benefitted the bluebird, by the mid-1900's the situation had changed drastically and a substantial decline in the Eastern Bluebird population was noted. Ornithologists' concern for the species led to detailed observations of its behavior. An understanding of the bluebird's habits and ecology made clear some of the reasons for their decline.

The Eastern Bluebird breeds in all states east of the Rocky Mountains. In New Jersey, the male bluebird, returning from his winter wandering, begins to prospect for a suitable nest site within the breeding territory during March. Once the nesting site has been selected, the female bird is primarily responsible for nest building and the subsequent incubation of three to six blue eggs. Depending on weather conditions and the diligence of the females, the eggs will hatch within two to three weeks. Both parents share in feeding the young for the two and half weeks until fledging. Usually, the female will begin a second clutch of eggs within a week or two, leaving the male to feed the first brood for an additional week until the young are foraging on their own. It is not uncommon for a pair of bluebirds to successfully raise three broods in a season.

Primarily insectivorous, bluebirds are particularly fond of cutworms and grasshoppers. As insect numbers decline with the coming of winter, bluebird families will flock together and either move south or switch to feeding on wild berries of red cedar, sumacs, bittersweet, holly, and other fruit producing plants, provided that starlings have not already stripped the trees.

It was the introduction of the European starling and the House Sparrow in the latter half of the 1800s that most significantly affected the bluebird. Not only does the starling compete for food, but both alien species are aggressive competitors with the bluebird for nesting cavities and they soon drove the bluebirds from suburban areas. The advent of the power saw, the prejudice against leaving standing dead timber or branches, where cavities can form, and the evolution of agricultural practices toward large scale farming, land clearing, and use of metal fence posts have also adversely affect the bluebird. In addition, the application of pesticides and the loss to development of old field areas and forests containing the berry producing vegetation necessary to sustain bluebirds, combined with a series of harsh winters, seriously reduced bluebird populations. However, recognition of the causes of decline soon led to the concept of bluebird nest boxes—artificial cavities—specifically designed to exclude competitors and predators while creating suitable alternative nest sites for the bluebird. For nest box design, see the May/June 1978, *New Jersey Outdoors*. When located in proper habitat and

carefully monitored, such nest boxes have resulted in local reestablishment of bluebird populations.

Our initiation into the ranks of bluebird fanciers and nest box builders resulted from observations in 1975 of a pair of bluebirds utilizing territory through which a jogging trail passed. The casual provision of one nest box five years ago rapidly expanded into a trail of 15 boxes from which nine pairs produced 117 eggs and 68 young in 1980. Biweekly monitoring of the trail from March through September often involves four or five bluebird fanciers. Much cursing of raccoons and snakes, maneuvers to outsmart and displace unwelcome house wrens (which destroy eggs and young bluebirds), benevolent indulgence for an occasional pair of Tree Swallows which may utilize a box, and a constant guard against parasites, are all part of the program. Last season the parasites, combined with extremely hot weather, killed three young and led to speculation on the development of solar powered air-conditioning units for the nest boxes. The rewards for our efforts have been simple—good fellowship, fun, fresh air, and 150 young bluebirds. Surveys conducted since 1978 by personnel of the Division of Fish, Game and Wildlife's Endangered and Nongame Species Project indicate that more than 20 New Jerseyites from Cape May to Sussex County also enjoy the satisfaction of successful bluebird trails. To date, the largest and most successful trail is maintained by personnel of the Great Swamp National Wildlife Refuge in Morris County. Last year, 103 young bluebirds were reported fledged in the Swamp.

Nationwide, the North American Bluebird Society (Box 6295, Silver Spring, MD 20906), founded in 1978, reports 1200 members, many involved in projects to reestablish bluebirds in their areas. In addition, members are actively involved in development of sparrow-proof nest boxes, parasite control research, and banding projects to learn more about the long-term behavior of individual birds. Membership in the Society is open to all individuals interested in the welfare of bluebirds. For more information on how you can aid the bluebird restoration efforts, write to the Society, or to the authors at N.J. Division Fish, Game and Wildlife, CN400, Trenton, NJ 08625. Before you begin a nest box trail, we also recommend that you read "The Bluebird: How You Can Help Its Fight For Survival" by Dr. Lawrence Zeleny published by the Indiana University Press and also available from the Bluebird Society, or as a special order from your local bookstore. □

**If you or an acquaintance maintain a bluebird trail or knew of active nest sites in 1980 and you did not receive a bluebird survey reporting form, please contact the Endangered & Nongame Species Project, CN 400, Trenton, New Jersey 08625 to report number of nests; location of nests (include map); number of eggs; number of young birds fledged.**

# Public Recreational Areas in Southern New Jersey

BY FRANK MONTARELLI

When New Jersey residents living north of the Raritan River consider spending some time in the outdoors of southern New Jersey, most of them probably think exclusively of the Shore.

And that's too bad, because southern New Jersey offers outdoors buffs far more than surf and sand. What's especially noteworthy of the state parks and forests of southern New Jersey is their expansiveness. They comprise a total of 162,541 acres, approximately double the total of 79,411 acres of state parks and forests located in the northern half of the state. And this does not count fish and wildlife management areas, with which the state's southern half abounds. (There are some 109,143 acres of management area in southern New Jersey.)

Two state parks in southern New Jersey readily accessible via major highways are Wharton State Forest and Island Beach State Park.

Wharton State Forest represents the epitome of southern New Jersey's woodlands. Covered with scenic pine forests and abundant wildlife, Wharton is also saturated with history, with the lore of Batsto, a once-thriving village centered around a furnace that churned out munitions for the Continental Army. Too, Wharton is a photographer's dream, with opportunities for stunning photos of natural settings, wildlife and, at Batsto, photos for horse-drawn wagons, restored buildings that date back to the 1700s, and even a functioning Post Office in one of the venerable structures.

Island Beach State Park, on the other hand, represents the quintessence of the New Jersey shoreline as it once existed before the introduction of development. Yet, it offers much more than surf and sand. Complete with hand-pump wells, bicycle paths along its sole paved road, which stretches nearly the entire length of the 11-mile barrier island, Island Beach

State Park serves as a wildlife sanctuary, a subject of ongoing ecological study, and as a tourist Mecca for summer beach-goers. Four-wheel drive vehicles can be seen lumbering along its expansive beaches during the "off-season," fall through spring, and a good deal of surf fishing is done there. Also a photographer's dream, Island Beach State Park forms the north border of Barnegat Inlet, across from which is the Barnegat Inlet Lighthouse, the centerpiece of Barnegat Lighthouse State Park. East of Island Beach State Park is the Atlantic Ocean; west of Island Beach is sprawling Barnegat Bay and the mainland—towns such as Beachwood, Bayville and Lanoka Harbor. Those who limit their visits to Island Beach State Park to summer trips for lazy days of sunbathing miss out on the tranquil beauty of its year-round natural splendor.

Some 50 miles south of Island Beach State Park is the nearly 700-acre North Brigantine Natural Area, a near-pristine natural area flocking with birdlife. It borders an exceptional body of water: Great Bay, which is perhaps the finest, though not the largest, bay along the Jersey Shore. What makes Great Bay so exceptional is what surrounds it: North Brigantine Natural Area along its southern shores, the wildlife management area called Great Bay Boulevard along its northern shores, meanwhile being fed by the Mullica River, so broad at its mouth, meandering from its forested birthplace and source deep within the Pinelands, near Batsto, and the Bass River, also originating from within the Pinelands. The record catch for weakfish in New Jersey was made in the Mullica, which flows from its origin in Wharton State Forest with grand magnificence some 20 miles to Great Bay. And a trek along the Bass River, which flows from Bass River State Forest, north and west of beautiful Lake Absegami (which is by itself worth at least a day's visit),



ROBERT J. McDONNELL

Everyone loves a lighthouse! A mother and her children view "Old Barney" from the ocean side of Barnegat Lighthouse State Park. A close look reveals the presence of a workman atop the structure.



FRANK MONTARELLI

takes the hiker through a virtual wilderness area. On the far eastern side of Great Bay, where it meets the Atlantic Ocean, is Little Egg Inlet, through which a great rush of waters provides Great Bay with as much as approximately six-feet of tide differential, allowing the area's marshlands, estuaries and lagoons to cleanse themselves daily, and discharging into the bay a great number of fish during the summer months.

There are also several large, undeveloped islands just south of Great Bay containing extensive marshland areas due west of Brigantine and Little Bay. Too, the historic Village of Smithville marks Brigantine's western border, with the road Leeds Point extending deep within the refuge.

Even during the summer months, when southern New Jersey's beaches are jammed with sun worshipers, many of its inland natural areas are all but begging for the appreciation of outdoor buffs. Thus, residents of northern New Jersey should not limit their excursions southwards to the popular beaches along the Jersey Shore. Rather, they should consider the thousands of acres of forests and wildlife sanctuaries of southern New Jersey. Of course, northern New Jersey possesses an ample number of truly beautiful woodlands with its rolling hills, cool lakes and numerous state forests and parks. Nonetheless, those heading southward would not

want to exclude from their tour a sampling of the natural abundance that flourishes in southern New Jersey. What follows is a brief comparison of the near-natural acreage set aside in northern and southern New Jersey.

Northern New Jersey divides its nearly 80,000 state acres among 31 state forests and parks, while southern New Jersey generously spreads its nearly 163,000 acres among just 15 state parks and forests—and that's giving away 1,000-acre Cheesequake Park in Matawan and a few smaller tracts in the Middlesex-Mercer county area to the state's northern half.

A comparison of the largest tracts in the northern and southern halves perhaps best illustrates the difference. The thickly forested 14,864-acre Stokes Forest in Sussex County (northwestern New Jersey) is dwarfed by 99,672-acre Wharton Forest in Burlington and Camden counties (smack in the middle of southern New Jersey's Pinelands).

Wharton Forest is the largest single tract of land open for recreational use in southern New Jersey. Moreover, it serves as a sort of geographical centerpiece for the environmentally protected 1500-square-mile Pine Barrens and is virtually surrounded by state forests and wildlife management areas.

For example, northeast of Wharton are 9000-acre Greenwood Forest in Ocean County and 29,413-

acre Lebanon Forest in Burlington and Ocean counties. East of Wharton are 3366-acre Penn Forest in Burlington County, 9100-acre Bass River in Burlington and Ocean counties, wildlife management areas Stafford Forge (2788 acres), Manahawkin (965 acres) and Great Bay Boulevard (3789 acres), all in Ocean County, and 3002-acre Island Beach State Park, also in Ocean County.

Southeast of Wharton are 679-acre North Brigantine Natural Area, 1313-acre Absecon Wildlife Management Area, and 1078-acre Swan Bay WMA, all in Atlantic County.

Southwest of Wharton are wildlife management areas Winslow (1715 acres) in Gloucester and Camden counties, and Glassboro (2337 acres) in Gloucester county.

South of Wharton, travelers must cross most of Atlantic County before they reach 12,438-acre Lester G. MacNamara Wildlife Management Area. In Cumberland County (and partially in Cape May and Atlantic counties) is 14,000-acre Peaslee Wildlife Management Area. In Cape May County are 11,270-acre Belleplain Forest and 1400-acre Marmora Wildlife Management Area.

State parks in southern New Jersey include Salem County's 1125-acre Parvin Park, Monmouth County's 2620-acre Allaire Park, and Cape May County's 190-acre Cape May Point Park.

For additional information on New Jersey State Parks and forests, write to:

**TOURISM**  
Box 400  
Trenton, N.J. 08625

or  
**Division of Parks & Forestry**  
State Park Service  
P.O. Box 1420  
Trenton, N.J. 08625

If you're interested in the state's 60 wildlife management areas, send a \$4 check or money order for the 124-page Wildlife Management Guide, complete with three-color maps of each area, directions, and what's there. The new revised guide will be available in mid-March or early April.

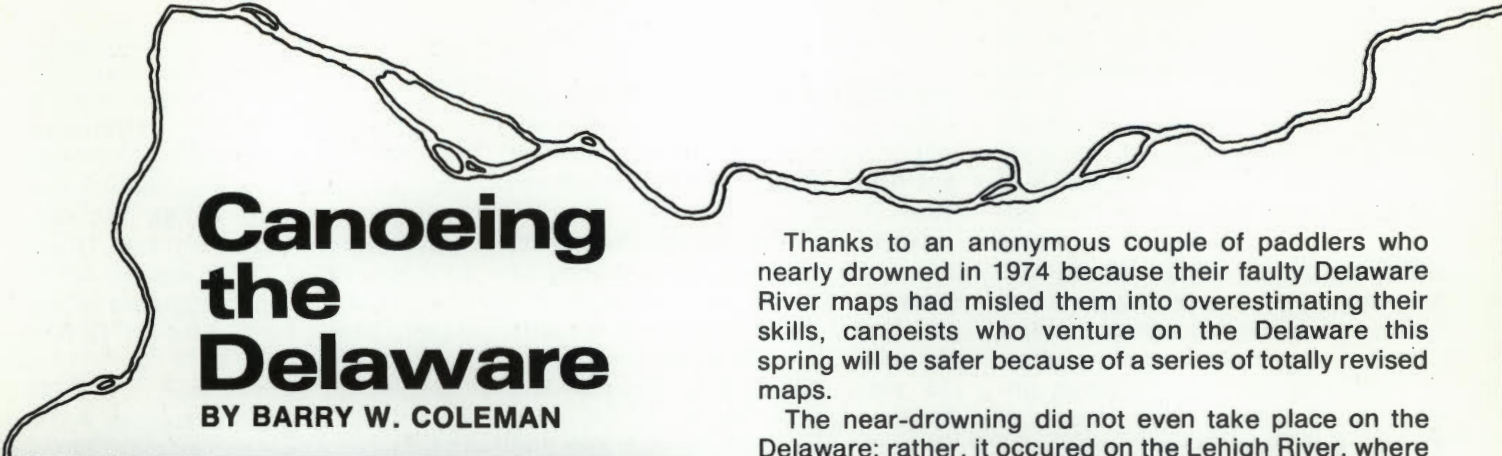
The address for the Wildlife Management Guide is:

**Wildlife Management Guide**  
Division of Fish, Game & Wildlife  
CN400  
Trenton, N.J. 08625

ROBERT J. McDONNELL



One of the most distinctive features of Island Beach is its sand dunes—each one a unique piece of art formed by the hands of Nature.



# Canoeing the Delaware

BY BARRY W. COLEMAN



An inexperienced couple finds themselves in trouble on the Delaware River as a knowledgeable kayak paddler works his way through the swirling pools and rapids.

Thanks to an anonymous couple of paddlers who nearly drowned in 1974 because their faulty Delaware River maps had misled them into overestimating their skills, canoeists who venture on the Delaware this spring will be safer because of a series of totally revised maps.

The near-drowning did not even take place on the Delaware; rather, it occurred on the Lehigh River, where frenzied white water overturned the couple's canoe in the rapidly-flowing cold water.

Simultaneously, William Huber and Christian Nielsen, both experienced canoeists, were negotiating the swirling currents. They hauled the frightened pair from the current.

Curious to know why the obviously inexperienced pair had attempted such a difficult spot in the river, a tributary to the Delaware River, Mr. Huber was startled when one replied:

"We've paddled one of the highest-rated rivers in the country—the Delaware. It's a Class 6 river, you know."

Canoeists judge all rivers on the six-part scale of the International Canoe Federation's River Difficulty Ratings. The higher the number (6 is maximum), the more difficult and dangerous the river. A Class 6 river would be both rare and extremely dangerous.

Mr. Huber, then Commodore of the New York Canoe and Kayak Club, knew the International River Difficulty Ratings by heart. He also knew the Delaware well—it is nowhere near one of the nation's roughest rivers.

Back home, Mr. Huber studied the 10-part recreational maps issued in 1966 by the Delaware River Basin Commission (DRBC). The DRBC maps rated the various water movements of the Delaware from one to six just as the international ratings, but the DRBC ratings were not related to any standard.

"I would not have rated any white water on the Delaware River higher than a Class 2," Mr. Huber said.

Thus alerted, Mr. Huber and fellow canoe club members encountered many other novices who had been misled by success on the Delaware River to venture on rivers far beyond their capabilities.

"They had absolutely no chance on those rivers," Mr. Huber commented. "The old DRBC ratings of the Delaware were leading canoeists into real danger on tough rivers. It was an honest mistake by the DRBC, but one we felt had to be corrected."

Finding that the DRBC had no qualified personnel to rate the river on the International scale, Mr. Huber volunteered to head a steering committee. Starting in 1977, organized teams of trained and highly experienced canoeists studied the entire 200-mile recreational stretch of the Delaware. The project had the full endorsement of the DRBC.

Mr. Huber's committee included Charles Walbridge, National Safety Chairman of the American Canoe Association; Walter H. Daub, a veteran canoeist and boat

designer who has lived near the Delaware most of his life; and Christian R. Nielsen, also a veteran canoeist.

Mr. Nielsen coordinated 28 canoeists who made the survey. He personally paddled the 200 miles several times from Hale Eddy in New York State to Trenton, New Jersey. Each team was given approximately 20 miles of the river to study and rate riffles, rapids, and quiet pools, assessing them against the International scale.

Each of the river's flow characteristics received at least three ratings from various canoeists on separate days. The ratings were made from mid-spring until late summer in 1978, during the months that the river carries its heaviest traffic.

Participating canoeists came from the Mohawk Canoe Club, The Kayak and Canoe Club of New York, the Metropolitan Canoe and Kayak Club, and the Suffolk County Canoe Club.

"All of the ratings were collated," Huber said. "There was little or no dispute over most of the ratings but since every detail of each area of the river was recorded, some ratings were hotly debated. It was amazing how involved everyone became."

Factors considered in rating rivers include the width of the maneuverable channel, how continuous the rapids are, whether there are pools at the end of a drop, the length of the rapids, the height of waves, and the irregularity of waves.

By the previous DRBC scale, the Delaware River's mild rapids were rated up to Class 6. Now the river's highest normal rating, based on the International scale, is 2-plus. That rating might jump to Class 3 when water temperature drops below 55 degrees or during unusually high water levels. In comparison, the Lehigh River in Pennsylvania is rated as a Class 3, and the Savage River in West Virginia and the Octigani River in Pennsylvania are Class 4 rivers.

"As a maximum, the most an open canoe can negotiate is a Class 3 river," Huber said. Kayaks and rafts are generally used on the rougher waters.

Robert Everest, Planning Coordinator at the DRBC, is pleased with the new maps. "Many of the Delaware's

canoeists are Mom, Pop, and the kids. Many are out there for the first time. We want to give as much detail as possible."

Mr. Everest whose Commission is concerned for the safety of the tens of thousands of people canoeing the Delaware every year, admitted that the new maps are long overdue and is relieved to have them available: "The International Canoe Association warned us that the old maps created a dangerous situation; I don't know if they resulted in any deaths. The river had never been classified by white-water people before, and our staff was not qualified to do it. We were approached by these experienced canoeists who said they would re-map the river as a public service, at no cost. It has been a tremendous service to the public."

According to Mr. Everest, water flow in the Delaware is kept consistent by the steady regulated release of water from New York State reservoirs. The freshwater releases serve to prevent saltwater from working up river into the Philadelphia water supply intake points.

The waterway has become a major recreational focus for the Middle Atlantic states area. On any given weekend day during the canoeing season, according to DRBC more than 10,000 canoes are rented from about 26 local canoe liveries. That figure jumps when privately-owned canoes are added.

Mr. Huber believes that a "typical scene on a crowded day on the Delaware River is two canoes wrapped around a rock—destroyed." He hopes that the new maps will abate much of that.

"The Delaware is a very good river for novices and has some great areas for beginners," said Mr. Huber. "We included more information on the new maps to help the inexperienced canoeists, such as locations of eel weirs. An unsuspecting canoeist can get trapped in one of these and find himself cascading over rocks."

The weirs are rock walls built out into the river by commercial fishermen. As they travel downstream, eels are diverted by the walls into traps.

Landmarks have also been added to the new maps to help the weekend paddler keep track of his location. Mile markers placed on bridges along the river are coordinated with the maps to help make the maps more readable.

Before anyone attempts to paddle on any river, Mr. Huber warns that they must put aside the popular idea that "nature is benevolent." He added: "That is naive and misleading. If you make a wrong move and end up wrapped around a rock, nature doesn't care how nice a person you are."

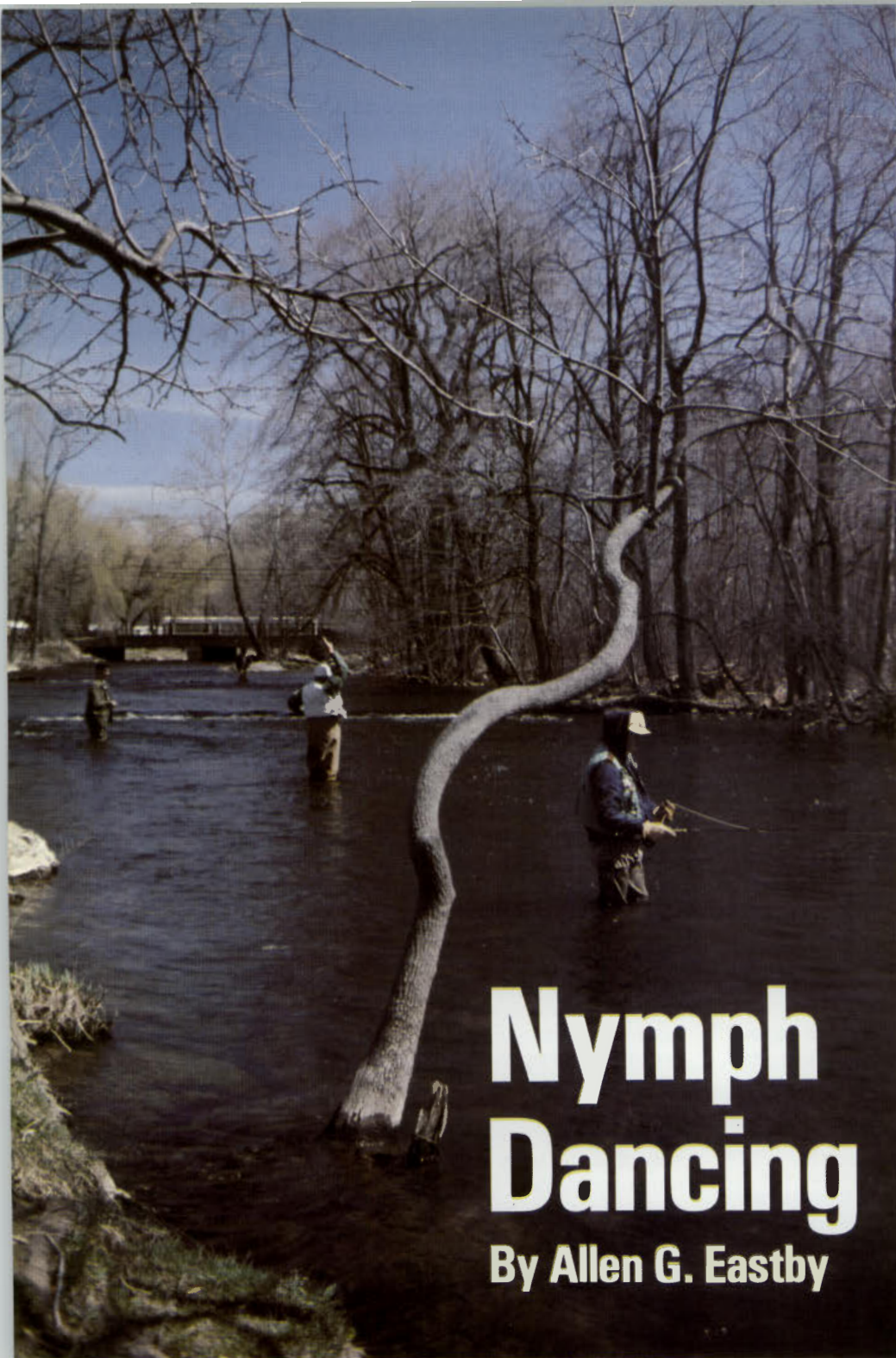
Even with accurate maps, a beginning canoeist venturing out with little knowledge of what he is doing is taking a chance on his life, according to Mr. Huber. "Any river can be a killer," he warns. "The Delaware claims canoeists' lives every year. The river behaves like any other. When you make a mistake, it extracts its price."

The new Delaware River maps can be obtained from the Delaware River Basin Commission, P.O. Box 7360, West Trenton, New Jersey, 08628. They are printed on waterproof paper, in awareness that some canoeists still will overturn. The maps are \$4.00 for the complete set of 10. □

PHOTOS BY AUTHOR



An inexperienced canoeist attempts white water on the Delaware River—holding on for what could be his life.



# Nymph Dancing

By Allen G. Eastby

The first dance of the season on the Musconetcong.

PHOTOS BY AUTHOR

We paused on the center of the Roy Bridge and looked upstream at the half-dozen or so anglers working their nymphs in the Big Flatbrook's currents. Pointing at them, my wife asked if I knew what they were doing. Oh, she went on, she knew they were nymphing. But if you looked, really looked at them, it was

as if they were dancing. And she was right. They *were* dancing. They were nymph dancing.

Fishing the nymph is much like a dance and it is one every flyfisher seems to be doing. It has replaced the dry fly waltz, the wet fly gallop, and the streamer rhumba. Nymphing is the disco of flyfishing and

everyone wants to disco whether they know how or not. Unfortunately, although the overwhelming majority of flyrodders seem to have mastered the basics—casting and controlling drifts—many of the finer points, the intricate flourishes that separate novices from experts, are missing from most nymph dances.

Nymphing, if it is to be more than casting practice, demands knowledge of trout, trout streams, and above all else, a deep, intimate understanding of trout-stream insects.

Most flyfishers actually believe that the important trout-stream insects have been cataloged and that correct imitations of them are readily available. Most anglers still think of trout-stream insects in terms of mayflies and caddisflies and, occasionally, stoneflies. Furthermore, for so long has flyfishing literature been dominated by those who fish streams physically, chemically, and biologically different from ours that even those who should know better have come to believe that flies designed on Michigan's Pere Marquette or Pennsylvania's Big Fishing Creek are perfectly suited to the Pequest or Paulinskill. Simply put, all the books about aquatic insects lining the shelves in anglers' dens and fishing shops cannot take the place of intimate first-hand knowledge, the kind of knowledge that comes only through fishing and observing what is going on. Why is this so? Because, no matter how you look at it, the Musconetcong is not the Yellowstone. Our flies should be just that, *our* flies. They should be based upon the realities of our streams and tied to mimic insects that our trout see and eat.

The key to good flies is understanding trout-stream insects and one way to achieve this is observation: simply using your eyes. To supplement observation, anglers who really want to master their art can study streams more thoroughly using the techniques employed by biologists in their field work. Some, however, have neither the time nor the inclination to ascertain pH, total alkalinity, specific conductivity, and so on and then relate them to fishing. But nearly everyone does carry a stream thermometer and most try to develop some rough-and-ready rules about what kind of flies to use



On the stream bank, Clara Eastby sorts her capture. Note the numbers on the tops of the specimen bottles: They are keyed to date, place and water type.



And this is what was found.

and how to use them when air and water are at certain temperatures. However, the effective (and most enjoyable) way to learn about aquatic

insects is by sampling the life of the stream.

I have been gathering trout-stream insects with varying degrees of success and diligence for 20 years. Now that duty has been taken over by my wife, who brings to the task patience and perseverance. Our combined collections are an invaluable guide for fly design and selection.

Very little equipment is needed for instream insect collecting. The most important piece of apparatus (if it can be dignified with such a name) is a net. The one we have been using is homemade: a section of fine mesh nylon cloth (bought in a fabric shop—it was material for making wedding veils) stapled to two lengths of varnished dowel. The other material—small bottles, a pair of tweezers or forceps, and some alcohol (80% ethanol) are easily obtained.

The actual taking of a sample is easy. All you have to do is wade into a stream, position the net in the water downstream from you, and then turn over some rocks with your feet. The current will carry bottom material into the net. Back on shore, the net mesh is examined and anything that looks alive is placed in alcohol-filled bottles. The bottles should be labeled and notes should be made as to what type of water (riffle, pool, cascade and so on) the specimens came from. Later the insects can be studied and with the aid of one of the anglers' entomology texts most flyrodders own, they can be identified.

But before you rush out and start digging up stream bottoms, take a word of advice, and of warning. If anglers start tearing up streams, the trout will soon be facing a famine. There is no need for hundreds or even scores of samples—two or three will do. There is no need to churn up large areas of stream—a rock or two overturned is enough. Remember always—moderation. The trout, the streams, and the insects have enough problems and certainly don't need anglers adding to their woes.

As a collection grows an angler will begin to see certain salient relationships between streams and insects. What kind of nymphs live in streams, the various water types and stream bottoms that harbor different

species, and how nymphs grow and change during the season will become apparent. After a few hours spent examining, contrasting, identifying specimens the angler will be able to develop flies simulating insects in streams he or she fishes. And isn't it just common sense to use a fly tailored specifically for the South Branch of the Raritan rather than one depicting an insect found in the Firehole?

There have been some efforts made at tying regional nymph patterns—such flies as the "Musky Shrimp" come to mind—but these are so few and far between that each is worthy of note. Much work remains to be done. All of us who enjoy nymph dancing should be busily engaged devising, tying, and field-testing flies for our streams. Then, especially if we share what we have learned, our nymphing will be something more than a flashy hustle: It will become what it should have been all along, a sumptuous, elegant, and perfectly executed *pas de deux* between flyfisher and trout.

## PATTERNS FOR NYMPH DANCING

### Whirligig Larvae

The immature forms of many beetle species are an integral part of the fauna of trout streams. The first pattern purportedly represents a member of the genus *Gyrinus* found across the Delaware in Pennsylvania. It appears to incorporate features from a pattern in a well-known book and a great deal of imagination. The second pattern was tied from specimens found in the South Branch of the Raritan near Califon.



### Gyrinus Larva

Hook: Mustad #79580 sizes 10 and 12.  
Thread: Olive.  
Body: Brown dubbing or yarn.  
Thorax: Olive dubbing or yarn.  
Gills: Olive hackle, palmered and trimmed.  
Legs: Olive (usually dyed partridge).

### Whirligig Larva

Hook: Mustad #79580, sizes 12 and 14.

Continued on page 14

Continued from page 13

# Nymph Dancing

Thread: Olive.

Body: Dubbing—equal parts of hare's ear and olive-dyed rabbit, heavily picked out and trimmed on top and bottom.

Rib: Fine gold tinsel.

Thorax: Dubbing (same as body) topped off with a latex strip tinted olive.

Legs: Olive-dyed partridge.

## Damselfly Nymphs

One of the country's leading nymph dancers, Charles Brooks, has designed a damselfly imitation that works well in the Rockies. But does it work on the Rockaway? Accompanying Brooks' pattern is a more delicate fly, copied from damselfly naiads found in the Musconetcong and the Flatbrook.



### Brooks' Damselfly Nymph

Hook: Mustad #9672 or equivalent, sizes 6 through 10.

Thread: Black or olive.

Tail: Three strands of peacock herl.

Body: Green or olive yarn.

Rib: Gold tinsel.

Hackle: Grizzly or grey partridge dyed yellowish-olive.

## Olive Damselfly Nymph

Hook: Mustad #79580, sizes 14 through 8.  
Thread: Olive.

Tails: Olive-dyed partridge.

Body: Medium olive polyester or nylon-acrylic yarn.

Wingcase: Latex strip tinted olive.

Legs: Olive-dyed partridge.

## Dragonfly Nymphs

These patterns, similar though they may appear, are tailored to different streams. The first nymph does well on stretches with relatively fast water and predominantly rock bottom. The second fly is particularly suited to slower-moving, silt- and mud-bottomed reaches. Try them and see if I'm right.

### Grey-Brown Dragonfly Nymph

Hook: Mustad #9672, sizes 8 and 10.

Thread: Dark grey.

Body and Thorax: Dubbing—equal parts hare's ear and grey-dyed rabbit.

Tail: Grey-brown partridge fibers.

Wingcase: Latex strip tinted brown over grey.

Legs: Grey-brown partridge.



### Wiggle Dragonfly Nymph

Hook: Mustad #3906 and extension (same total length as above fly).

Thread: Brown.

Tail: Grey-brown partridge fibers.

Body: Medium brown nylon-acrylic or polyester yarn.

Wingcase: Latex strip tinted brown.

Legs: Grey-brown partridge.

NOTE: In these patterns any soft, mottled greyish-brown feather can be substituted for partridge.

## Crane Fly Larvae

Crane flies are, indeed, "forgotten insects." Virtually no one carries and uses imitations of them, which I suppose is lucky for those who do since they are effective flies. These patterns are two interpretations of the same insect. The models were found in the lower portion of the Little Flatbrook.



### Spring Hole Crane Fly Larva

Hook: Mustad #79580, sizes 12 and 14.

Thread: Cream or grey.

Body: Dirty cream dubbing—four parts cream, one part grey (use either fur or seal-substitute).

Rib: Fine silver tinsel.

Thorax: Grey muskrat fur dubbing.

Antennae: Medium dun hen hackle fibers.

### Cream Wiggle Crane Fly Larva

Hook: Mustad #3906 and extension (same total body length as above).

Thread: Cream or grey.

Body: Dirty cream dubbing—four parts cream seal substitute, one part grey beaver.

Rib: Fine silver tinsel.

Antennae: Medium dun hen hackle fibers.

# Safe Boating Films and Displays

*open to the public*

*Free Coffee, Cake, and Door Prizes*

## WHAT:

- Division VIII U.S. Coast Guard Auxiliary Day

## WHERE:

- Shark River U.S. Coast Guard Station  
Avon, N.J.
- Manasquan U.S. Coast Guard Station  
Point Pleasant Beach, N.J.

## WHEN:

- Sunday, May 3, 1981  
12:00 Noon to 4:30 PM

## PURPOSE:

- The Coast Guard Auxiliary is a voluntary civilian organization that is dedicated to safe boating. The special *Auxiliary Day* is meant to increase our public exposure and further our goals of educating the public in safe boating.

## HAPPENINGS:

- Ribbon Cutting Ceremony—12:00 Noon
- Blessing of Fleet—By Chamber of Commerce
- Coast Guard Boats and U.S. Coast Guard Aux. Boats (Patrol for Action)
- U.S. Coast Guard Aux. Booth
- Tour of Coast Guard Station (Communications Room, Etc.)
- Sailboat Booth
- Rules-of-Road Booth
- Legal Requirements Booth
- Aids-To-Navigation Booth
- Marlinspike Seamanship Booth
- Vessel Examination
- Radio Telephone Booth (Communications)



## Spruce Run Creek/a final encounter

BY WILLIAM B. HONACHEFSKY

DRAWINGS BY TONY HILLMAN

A thousand thoughts raced through my mind as I negotiated the car down the final stretch of roadway. It has been almost 10 years to the day since I had last visited this portion of Spruce Run Creek and recorded for posterity my rare encounter with a family of beavers who had taken up residence there. (See "An Encounter at Spruce Run Creek," NJO, April 1970.)

I was a bit apprehensive. A lot of things can happen in a decade. In my own instance, it was a new wife, children, new house, and even a new career. Would the Spruce Run Creek that I had known 10 years ago still be the same? Had the beaver colony survived? That's what I had come to find out.

At last, it was the final hill and the car seemed to float down the asphalt as if drawn by a magnet, and seconds later I rolled to a stop on the dirt shoulder. I turned the ignition key to "off" and rolled down the window to listen for a moment to the early morning symphony of spring. The thickets of the floodplain literally crackled with a hundred different bird songs, all blending into a sort of garbled melody, except for the plaintive cooing of some mourning doves perched high in the branches of an ancient sycamore out along the creek. The sun hadn't poked its head up over the eastern mountain ridge and as I exited from the car I could feel the cool air currents of the valley floor rushing past my face. I shivered

a little and buttoned my down jacket one snap higher.

Across the creek, I spied the old Peterson homestead, or what was left of it, anyway. Perhaps it was a premonition of what was to come. The once stately white farmhouse was but a shell now, with boarded-up windows and some white ash samplings growing through a rotting porch stoop. A faded "For Sale" sign sporting a brand new "Sold" sticker was tacked to the front railing and hung precariously by a single nail. Beyond the house, I could still see the remnants of what were once cultivated fields and which had once produced bountiful harvests of corn, oats, and wheat. Fallow now, their borders were almost impossible to discern amongst the tangled briars and weeds.

There would be no need to ask Mrs. Peterson for permission today.

I stepped off the creek bank and even through two pairs of cotton socks, I felt the immediate chill of Spruce Run's waters. Some 15 minutes later and a half mile upstream, the landscape began to bring back faded memories. Here, hidden beneath the spicebush, were the beds of bellworts and violets, or at least, that's where they used to be. A new sandbar now covered the old wildflower beds and somewhere beneath that sand, I hoped lay the seed of a new generation. I moved on.

Finally, there it was: the old familiar bend curving off to my left. I

moved silently now on the chance that if the pool was still there, so too might be the wood ducks, and perhaps even the beavers themselves. I eased around the bend. The pool was still there and I looked down the length of it, searching for some sort of activity on its still surface. The beaver dam was gone, the stick and mud structure replaced by a shallow stone dam that looked more man-made than natural. I stepped into the pool's edge, the deepening water pinning the sides of my rubber hip boots to my legs, and numbing them even more. My eyes carefully swept over the perimeter of the pool.

Suddenly, up at the head of the pool on the opposite streambank I caught the flutter of something. I watched intently, eyes tearing slightly as they strained. There it was again. With the water level lapping precariously at the tops of boots I slowly backtracked to the lower end of the pool, crossed through the rifles, and hopped onto the opposite bank.

As I moved along the rocky slope, the object of my searching eyes became clearer. It was an orange ribbon flashing in the early morning breeze. Less cautious now, I quickened my pace and soon I was standing next to a wooden stake into the side of the bank. Marked in black letters below the flapping ribbon were the words, "centerline 36-inch drainage pipe." Confused somewhat by the discovery of this apparent lone stake, I looked about and quickly realized that this was not an isolated marker. An entire line of them went from this one down a cut path through the adjacent floodplain meadow almost as far as I could see and there were others also—interspersed throughout the entire meadow, some with yellow ribbon, some with red.

Mounds of excavated soil dotted the landscape around them: evidence of someone's desperate efforts to get a satisfactory percolation test in the floodplain soil. I was in the midst of someone's proposed subdivision. As I moved around the marker, something caught my boot tip and I stumbled. Peering down I couldn't believe my eyes. It was the chiseled stump of a tree: the very one I had photographed 10 years ago. I bent down to examine it close-

*Continued on page 16*

## What:

New Jersey Department of Environmental Protection presents a workshop on Coastal Problems and Resource Management

When: April 23-25

## Where:

Seaville Station,  
Cape May County

### OVERVIEW

*Coastal Problems and Resource Management* (CPRM) is a one semester course for secondary school students. The course focuses on the coastal region of the United States and the political, economic and ecological factors involved in the development of coastal resources. The growing demands of an increasing population, a society seeking new energy sources and an environmentally conscious citizenry often collide in coastal areas. This special environment provides a rich and interesting setting for the analysis of many of these most pressing social problems.

### PROGRAM GOALS

1. To increase students appreciation for the beauty, fragility, and utility of coastal environments.
2. To identify major social, political, legal and economic problems involving coastal areas.
3. To identify key elements in the political, legal and economic decision-making process as it relates to management of coastal resources.
4. To relate specific local coastal problems to broader national issues.
5. To investigate the opportunities for citizen participation in decisions affecting coastal resource management.

### CURRICULUM FORMAT

The course is organized in 4 units:

- Unit I: At the Water's Edge
- Unit II: Understanding Coastal Ecology
- Unit III: Resource Management: Politics and Planning in the Coastal Region
- Unit IV: Case Studies in Resource Management

Various instructional approaches are used including filmstrips, overhead transparencies, slides, in-class debates and discussions, case studies, field trips, readings and worksheets, simulation games, and role-playing experiences. Several lessons in CPRM can be supplemented and enriched with activities that refer to local issues and concerns. The course materials include: Teacher's

Guide, Student Readings, Student Worksheets and the Coastal Resource Development Game (Ostrich Bay).

Teacher Materials: A complete set of procedures accompanies each lesson. The procedures can be followed exactly as written, or teachers can adjust them to better fit their classes. All lesson plans use a similar format, each having:

1. a unit and lesson title
2. an estimated time for the activity
3. a purpose of the lesson
4. a list of materials needed
5. an overview of the lesson.

Student Materials: Student materials fall into two categories, student worksheets and student readings. Worksheets are typically filled out by students and then collected by the teacher for evaluation. The readings include case studies, reference materials and other descriptive information that can be handled as in-class or homework assignments.

This workshop has been held in 14 states. The New Jersey workshop will be held at the Seaville Station in Cape May County on April 23-25, 1981. Cost for room and board will be \$45.00.

The fee for this initial workshop includes materials for both teacher and students. After this workshop, schools will be responsible for purchasing the classroom sets (valued at \$300).

Registration will give first priority to high school social studies teachers, but all others are welcome to apply.

For information, contact Adele Gravitz or Linda Comerchi at DEP, Division of Coastal Resources, P.O. Box 1889, Trenton, New Jersey 08625 or call (609) 292-9762.

Continued from page 15

## SPRUCE RUN CREEK



ly as if it were an old friend. Though it was browned with age and sported a cluster of oyster scale fungus on its rearward side, I could still make out the distinctive tooth marks of old *Castor canadensis*. It had remained relatively intact all these years and I was elated to find that at least something from my past encounter had survived long enough for me to see it once more.

I sat down on an adjacent rock and looked out over the pool, trying to imprint its tranquil form into my memory. Someday soon, I knew that's all that would remain, as bulldozers pushed and tugged its banks and scoured its bottom, forcing it to comply with artificial floodlimit lines drawn up on a map in someone's office so one more house lot could be squeezed to its edge.



Suddenly, there it was, coming

toward me: a tiny brown head creating a vee in the still surface of the pool. Could it be, could it be one of them? Onward he came. My heart was pounding with anticipation, eyes straining, hoping beyond all hope. But secretly I guess I knew it was a futile wish. Some 50 feet from me, the muskrat came to a complete stop, his tiny feet treading water in the flow-moving current. Sensing danger, he slapped his tail and dove beneath the surface and the pool lay still, once more.

It was time to go. Ten years had brought significant changes to this portion of Spruce Run Creek, and even more dramatic changes would soon be forthcoming. This next decade, Spruce Run Creek would belong to others and sadly I knew neither the beaver nor I would pass this way again. □



# Environmental News



Governor Byrne on January 22 issued Executive Order #103 which bans nonessential uses of water in 187 towns located in the Delaware and Raritan River Basins. Byrne's action implemented, in New Jersey, the Delaware River Basin Commission (DRBC) resolution of January 15. (See DRBC story.) At a press conference which followed the signing of the document, Governor Byrne (photo left) used a map to point out how the drought-affected area had grown to involve all or parts of 17 counties in New Jersey. Also present to answer reporters' questions on the water emergency were (photo right) DEP Commissioner English, DEP Deputy Commissioner Paul Arbesman (speaking) and Deputy Director of the department's Division of Water Resources Dirk Hofman.

## BYRNE CALLS FOR ACTION ON MANY 'TOUGH ISSUES'

In this January's "State of the State" message to the State Legislature, Governor Byrne touched on the accomplishments of his administration over the past seven years and presented proposals for dealing with many of the current "tough issues" requiring legislative action. He called the protection of the state's natural resources "a commitment which we owe to the present and future generations." He pointed out that in our compact, densely-settled state, the restoration and preservation of the diverse pattern of forests, cities, farms, industry, air and water is a challenging but essential task. Byrne said, "This diversity must be maintained into the future if we are to remain healthy as a society and an economy." Some of the environmental proposals are given below.

The Governor urged the Legislature to

—approve the major water supply construction program and proposed legislation necessary to give the State effective control over its water resources; significantly augment the State's resources to deal with hazardous waste and garbage control; establish a process for the siting of modern hazardous waste disposal and recovery facilities; approve appropriations to proceed with land acquisitions in the Pinelands, aiming to add more than 20,000 acres to the State's holdings; approve Green Acres funding for parks development; implement measures to preserve farmland and farming; act on legislation to develop a regional agency for the Hudson Waterfront; and encourage development of resource recovery facilities which generate energy or useful products from solid waste. □

### Nonessential uses banned

## DRBC DECLARES WATER SUPPLY EMERGENCY IN FOUR-STATE AREA

Nonessential uses of water were banned throughout the four-state, 13,000-square-mile region drained by the Delaware River on January 15 when the Delaware River Basin Commission (DRBC) met at the New Jersey State Museum in Trenton and declared a water supply emergency.

For New Jersey this added all or parts of 187 municipalities, representing 38 percent of the state's area, to the region in the northeastern part of the state which had been placed under similar restrictions by Governor Brendan Byrne in September 1980. The western part of New Jersey affected by the Basin Commission action is occupied by 1.7 million persons located in the Delaware River Watershed. New Jersey provides 23 percent of the four-state basin area.

Although most of the restrictions offer little practical application during winter months, the DRBC action readied the entire basin for their enforcement with expected continuation of the drought into the spring and summer. It also set the stage in the basin states of New Jersey, New York, Pennsylvania and Delaware for more stringent steps, such as water rationing or industrial shutdowns, which could become necessary.

Inadequate rainfall in crowded northeastern New Jersey led to the September ban on nonessential water use in Bergen, Passaic, Essex, Union, Morris, Hudson and part of Somerset counties, plus water rationing in 113 municipalities in those counties. From that region the shortfall in precipitation made itself felt through an increasing area of the northeastern and mid-Atlantic states. By mid-January the Basin Commission reported a 30 percent deficit in precipitation for the preceding six months throughout the basin.

Immediate effects of the Basin Commission action were to restrict New York City's water department to a maximum withdrawal from the basin of 520 million gallons per day (mgd) instead of the Supreme Court-decreed maximum of

*Continued on page 16D*

## Commissioner's Spotlight On—

### CLEANUP OF CHEMICAL DUMPS



*On March 4, 1980 I announced DEP's "war on hazardous waste dumping" in New Jersey. This included a full-scale effort to clean up illegal dumps around the state. We knew it would be an enormous task, we knew it would be extremely costly—but it had to be done to protect the health and welfare of the citizens of New Jersey.*

*We have made a good start. In only nine months, by December 31, more than 100 million pounds and 4.5 million gallons of hazardous materials and toxic substances had been removed from 17 dumpsites. All removals were performed in an environmentally acceptable manner and in compliance with all appropriate rules and regulations. As of that date, the cost of the cleanups had reached \$23.7 million.*



The cleanups are being accomplished under the supervision of **Paul Giardina**, director of DEP's Hazardous Management Program. Mr. Giardina

prepared the progress report given

below.

Between March 4 and December 31, 1980 the Hazard Management Program addressed 24 abandoned hazardous waste sites, a number considerably greater than the original goal of 14. Of the 24 sites, 13 cleanups had been completed, four were nearing completion, and work had begun at seven sites. The huge amount of hazardous wastes and toxic substances removed from only 17 dumpsites by the end of the year is a good indication of the size of the job yet ahead.

The total cost of the 13 completed cleanup operations was \$1,168,327; the cost for the cleanup at the four sites nearing completion was \$22,584,000 as of the end of the year (estimated final cost, \$28,420,000). Of the more than \$23.7 million spent on the cleanups, \$3-\$4 million was provided by the federal government (U.S. Environmental Protection Agency) and the remainder, by the state (N.J. Spill Compensation Fund).

The 13 completed abandoned site cleanups: Wilson Farm in Plumsted Township; Gordon Chemical Services, Jersey City; Atlantic Development Company, Sayreville; Bubenick Property, Piscataway; Thomas H. Cook building, Newark; El Cid Contracting Corporation, Howell Township; Liberty State Park, Jersey City; Northern Fines and Chemical Franklin Mines (adjacent sites), Franklin Township; Altman Street Drum Dump, Rutherford; Madison Circle, East Rutherford; Sampson Tank, Jersey City; and Swoco, Hillsborough.

Cleanups nearing completion: A.O. Polymer in Sparta; A-Z Resource Recovery, New Brunswick; Goose Farm, Plumsted Township; and Chemical Control Corporation, Elizabeth. □



### IAN R. WALKER HEADS N.J. GEOLOGICAL SURVEY

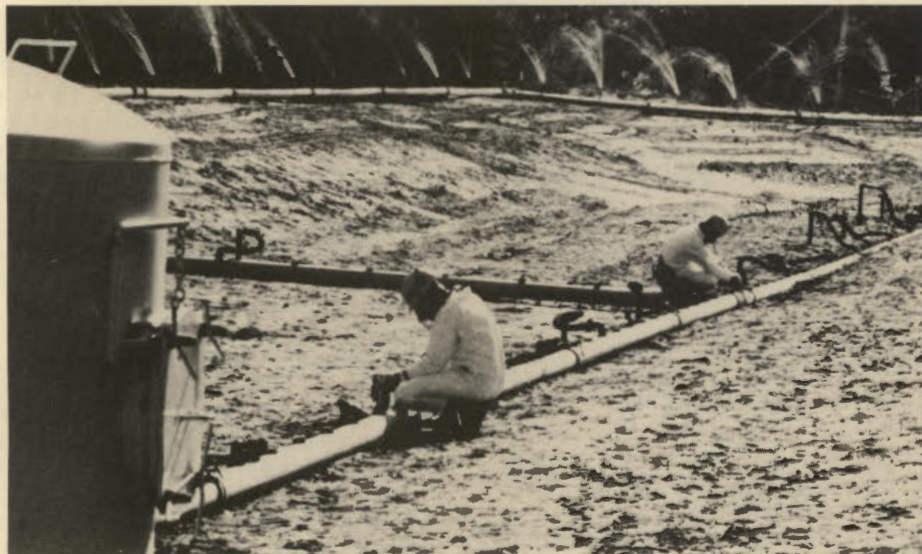
Ian R. Walker, 44, of Princeton, has been named Administrator of the New Jersey Geological Survey, a unit within DEP. Walker joined the department in July 1975 as chief of environmental assessment for the Division of Water Resources and was chief of DEP's Office of Public Participation before assuming his new position.

Walker received a master's degree in geology from the University of South Dakota after earning a bachelor's degree in the same subject from Ohio Wesleyan University. He later served as a geologist with the New Jersey Bureau of Geology, the Cape May County Planning Board and the Soil Conservation Service (U.S. Department of Agriculture) in New Jersey. From 1970-1975 Walker was executive director of the Stony Brook-Millstone Watershed Association. □

### PUBLIC HEARS PROPOSALS ON D & R CANAL DREDGING

Proposals for dredging the Delaware and Raritan (D & R) Canal to ease the flow of water in those areas where accumulated silt and debris has restricted its ability to transport water were aired at a public meeting in Princeton Township (Mercer County) in late January. DEP, early in 1980, contracted with Rutgers University to make an environmental impact assessment of a proposed dredging plan for the canal. At the meeting, scheduled by DEP's Division of Water Resources, the Rutgers team made known its findings relating to methods of dredging, access and storage locations and methods of disposal of dredged spoils, and presented various proposals for dredging the canal.

(The D & R Canal provides a raw water supply source for up to 60,000 residents of New Jersey with over 75 million gallons a day under long term contract to major potable water purveyors, industries and irrigational users along its 60-mile length.) □



**TREATING THE GROUNDWATER.** Goose Farm, Plumsted Township—Hazardous materials in drums and bulk were dumped and buried at this site. There was significant soil and groundwater contamination. Excavation of the site has been completed—4,884 drums were removed, all bulk liquids have been removed. Above, DEP Hazard Management personnel check the groundwater treatment system which draws contaminated water up through pipes to a carbon filtration unit and releases treated water through sprays. By the end of December 1980 a cumulative total of 5,734,700 gallons had been treated. The treatment system is still in operation.

**TO REPORT ABUSES  
OF THE ENVIRONMENT  
CALL ACTION LINE  
609-292-7172**

# List of New Jersey's Biggest Trees

BY SANTIAGO PORCELLA, III



White Oak, on North side of Sky Top Drive, Watchung Reservation, Scotch Plains Township, Union County, N.J. This tree was discovered by the late Secondiano Gargiuli of Plainfield, a professional nurseryman and landscaper. Mr. Gargiuli is shown in the picture—Photo courtesy of Robert S. Garguili, Plainfield, N.J.

How large are the big trees in New Jersey? Where are they located? The answers to these questions came from many interested citizens and from members of the New Jersey Chapter, Allegheny Section, Society of American Foresters. Especially helpful were the foresters of the Department of Environmental Protection, who aided in measuring many of the trees. Most measurements were made at a point  $4\frac{1}{2}$  feet above the ground.

Big trees grow older and eventually die. Sometimes storm damage, insects, or diseases may hasten death. If, in the future, you find that one of the trees on this list is dead or has been destroyed, please inform the N.J. Bureau of Forest Management. It will help keep the list up to date. Also, information about trees greater in circumference than those listed will be welcomed.

Trees are important to the people in New Jersey. Many landowners grow trees as a crop just as they grow corn and potatoes. Such trees are scientifically managed to produce high-quality lumber, veneer logs,

piling for shipyards, and fenceposts. Trees of lower quality are harvested for paper, fuel wood, and other products.

Thirty-eight percent of the State is classified as commercial forest land. About 27,000 cords of pulpwood, 85,000 cords of firewood, 1,500,000 board feet of veneer logs, 23,000,000 board feet of sawlogs, and 2,600,000 cubic feet of other products are produced annually. Altogether, our homegrown wood products provide employment for about 5,500 persons, with a value of industry shipments of over \$186,000,000.

Trees serve many purposes, ranging from wood products and erosion control to cover for birds and wildlife. Trees make our homes and environment more livable and beautiful. They are a renewable natural resource.

For other  
forestry  
information  
contact:

George H. Pierson, Chief  
N.J. Bureau of Forest Management  
CN-028  
Trenton, New Jersey 08625  
Spring 1981

Species	Circumference	County	Location	Owner or Reporter
<b>Ailanthus</b> <i>Ailanthus altissima</i>	15'2"	Cape May	From intersection of Bucks Ave., 500 feet east on Goshen Cape May Court House Rd., Goshen	Owned by Sam Clark
<b>American arborvitae (See northern white cedar)</b>				
<b>Ash, Black</b> <i>Fraxinus nigra</i>	3'5"	Morris	Hacklebarney State Park 1/4 mile up stream from Reinhart's Brook	Reported by John E. Kuser Dept. Forestry/Hort. Rutgers University, New Brunswick
<b>Ash, Blue</b> <i>Fraxinus quadrangulata</i>	5'5"	Middlesex	Bucclench Park, New Brunswick	Reported by John Kuser
<b>Ash, European</b> <i>Fraxinus excelsior</i>	7'6"	Middlesex	Front of Lipman Hall, Cook College, New Brunswick	Reported by Robert Bosenberg, Cook College
<b>Ash, Green</b> <i>Fraxinus pennsylvanica</i>	12'2"	Somerset	N.J. Bell on Rt. 202-06 North at Rt. 287, Bedminster	Reported by Clare Sperapani, County Agric. Agent Somerset County
<b>Ash, White</b> <i>Fraxinus americana</i>	20'5"	Camden	Near Administration Bldg., Bancroft School Grounds, Hopkins Ave., Haddonfield	Reported by Michael F. McLenigan, 274 E. Kings Hwy., Haddonfield, N.J. 08033
<b>Apple</b> <i>Malus pumila</i>	8'6" @ 3 1/2"	Cumberland	Along west side of Roadstown Rd. prop. of Walter Hitchner, RD 3, Shiloh	Reported by Stephen R. Field 5 Eveln Rd. Vineland, N.J. 08360
<b>Atlantic coast cedar (See southern white cedar)</b>				
<b>Baldcypress</b> <i>Taxodium distichum</i>	21'9"	Salem	On property of Edgar J. Meyers, Poplar Street, Hancock Bridge	Reported by Charles W. Holsworth, Bureau of Forest Management
<b>Basswood, American</b> <i>Tilia americana</i>	20'1"	Monmouth	On property of J.G. Marzulla, 308 Tuttle Ave., Spring Lake	Reported by G. Lester Alpaugh Bureau of Forest Management
<b>Beech, American</b> <i>Fagus Grandifolia</i>	16'6"	Monmouth	On property of Dr. A.B. Judd, 942 Broad Street, Rt. 35, Shrewsbury	Reported by Margaret Crooks 303 Bell Place, Sea Girt
<b>Beech, purple</b> <i>Fagus sylvatica v. atropunicea</i>	17'8"	Mercer	Conover farm, Rt. 539, 1 mile sw Hightstown	Reported by Santiago Porcella, III 11 E. Delaware Ave., Pennington, N.J.
<b>Beech, weeping</b> <i>Fagus sylvatica v. pendula</i>	17'9"	Mercer	Property of Perry Morgan Constitution Hill, Princeton	Reported by Ames T. Brown, III, 226 Harrison St. Princeton, New Jersey
<b>Birch, black</b> <i>Betula lenta</i>	6'4"	Middlesex	Helyer Woods at edge of soil pit, Cook College	Reported by John Kuser
<b>Birch, European</b> <i>Betula pendula</i>	8'3"	Middlesex	Woodbury Hall, Cook College	Reported by Steven Brodtkin
<b>Birch, Dalecarlia</b> <i>Betula dalecarlia</i>	6'5"	Morris	James Cline, 237 Fairmount Road, Long Valley	Reported by Paul P. Berezny Bureau of Forest Management
<b>Birch, paper</b> <i>Betula papyrifera</i>	4'11"	Middlesex	Cook College Campus near pond	Reported by John Kuser
<b>Birch, river</b> <i>Betula nigra</i>	9'4"	Mercer	On the property of Mrs. William Nicklin, 61 Sanhican Dr., Trenton	Reported by Santiago Porcella, III
<b>Birch, yellow</b> <i>Betula alleghaniensis</i>	4'2"	Morris	Hacklebarney State Park along Trout Brook, 200 yards from Park office	Reported by D. Kyle Ely Cook College
<b>Blackgum (see sourgum)</b>				
<b>Boxelder</b> <i>Acer negundo</i>	4'8"	Morris	In parking lot at entrance to Hacklebarney State Park	Reported by John E. Kuser
<b>Boxwood</b> <i>Boxus sempervirens</i>	3'4"	Camden	In rear, 264 E. Kings Hwy., Haddonfield	Reported by Michael F. McLenigan
<b>Buckeye, Ohio</b> <i>Aesculus glabra</i>	11'3"	Union	Liberty Hall, sw corner in front of building, Union	Reported by Santiago Porcella, III
<b>Buckeye, yellow</b> <i>Aesculus octandra</i>	6'7"	Union	Liberty Hall, sw corner in front of building, Union	Reported by Santiago Porcella, III
<b>Butternut (see white walnut)</b>				
<b>Catalpa, northern or hardy</b> <i>Catalpa speciosa</i>	10'5"	Burlington	In rear of Walter Dubrow property (Hereshome), Riverton Road, Morrestown	Reported by Eileen Hand 7 Chatham Road, Vincentown

Species	Circumference	County	Location	Owner or Reporter
<b>Catalpa, southern</b> <i>Catalpa bignonioides</i>	15'8"	Somerset	On property of Henry Rushman (Meadowbrook Farm) 1/2 mile south of Bernardsville Quarry on U.S. Rt. 202, left side of road opposite mile post 37	Reported by Ronald J. Sheay Bureau of Forest Management
<b>Cedar, Atlas Blue upright</b> <i>Cedrus atlantica v. fastigiata</i>	7'6"	Mercer	In rear of main building, Hun School, Edgerstoune Road, Princeton	Reported by Santiago Porcella, III
<b>Cedar, deodar</b> <i>Cedrus deodra</i>	5'2"	Mercer	On Williams Street, across from house number 56, Princeton University, Princeton	Reported by John E. Kuser
<b>Cedar of Lebanon</b> <i>Cedrus libani</i>	11'5"	Mercer	Prospect Hall, Princeton University	Reported by J.I. Merritt, Stanhope Hall, Princeton University
<b>Cedar, red (Not a true cedar. See Redcedar, eastern)</b>				
<b>Cedar, white (Not a true cedar. See northern or southern white cedar)</b>				
<b>Cherry, weeping Higan</b> <i>Prunus subhirtella pendula</i>	8'2" @ 3'	Somerset	sw corner of parking lot A at Colonial Park, East Millstone	Reported by R.W. Vandergoot Somerset County Park Commission
<b>Cherry, wild black</b> <i>Prunus serotina</i>	16'11"	Salem	On property of Lawrence Antonik, Harvey Court, east of Deepwater Generating Station and north of Churchtown Rd., Pennsville	Reported by Bob Gardner Salem County Agent, Salem, and Lewis S. Howell, Bureau of Forest Management
<b>Chestnut, American</b> <i>Castanea dentata</i>	4'0"	Salem	On property of R. Rieck, Remsterville Road, 1 mile from Friesburg	Reported by Charles Holsworth
<b>Chestnut, Chinese</b> <i>Castanea mollissima</i>	10'1"	Burlington	Opposite side of street numbered 154 Elizabeth St., Pemberton	Reported by Louis E. Hand
<b>China, fir</b> <i>Cunninghamia lanceolata</i>	4'0"	Mercer	Marquand Park, Princeton	Reported by Santiago Porcella, III
<b>China-tree (See Goldenraintree)</b>				
<b>Coffeetree Kentucky</b> <i>Gymnocladus dioicus</i>	12'5"	Bergen	118 Engle St., Tenafly	Reported by John Dobson
<b>Corktree, Amur</b> <i>Phellodendron amurense</i>	5'1"	Mercer	Marquand Park, Princeton	Reported by Santiago Porcella, III
<b>Cryptomeria</b> <i>Cryptomeria japonica</i>	7'1"	Mercer	On property of DeWitt Boyce, Mercer St., Princeton	Reported by John Kuser
<b>Cypress, Sawara</b> <i>Chamaecyparis pisifera</i>	9'7 1/2"	Camden	Bancroft School Grounds, Hopkins Ave., Haddonfield	Reported by Michael F. McLenigan
<b>Dogwood, Chinese</b> <i>Cornus kousa 'chinensis'</i>	7'0" @ 2'	Mercer	Carter Rd. at Traffic light and Rt. 206, property of S.W. Lambert, Lawrenceville	Reported by John Kuser
<b>Dogwood, Flowering</b> <i>Cornus florida</i>	5'5"	Middlesex	572 Cranbury Road East Brunswick	Reported by Raymond A. Clark
<b>Douglasfir</b> <i>Pseudotsuga menziesii</i>	9'1"	Mercer	Superintendent's House, Rt. 546, Washington Crossing Park	Owned by State of New Jersey Dept. of Parks & Forestry
<b>Elm, American</b> <i>Ulmus americana</i>	17'5"	Mercer	On property of WJB Stokes 3801 Lawrence Road, Princeton	Reported by Santiago Porcella, III
<b>Elm, Chinese</b> <i>Ulmus parvifolia</i>	9'2"	Mercer	Property of Rudy Grier, 94 Library Place, Princeton	Reported by John Kuser
<b>Elm, English</b> <i>Ulmus procera</i>	20'0"	Mercer	On property of Dr. David Mayer, 940 Kingston Rd., (NJ Rt. 27), 3 miles north of Princeton	Reported by Santiago Porcella, III
<b>Elm, Slippery</b> <i>Ulmus rubra</i>	9'5"	Middlesex	Near Pond, Cook College, New Brunswick	Reported by Robert Bosenberg, Cook College
<b>False cypress, sawara moss</b> <i>Chamaecyparis pisifera v. squarrosa</i>	6'7"	Mercer	Marquand Park	Reported by Santiago Porcella, III
<b>Fir, Cilician</b> <i>Abies cilicica</i>	7'3"	Mercer	Marquand Park, Princeton	Reported by Santiago Porcella, III
<b>Fir, Concolor</b> <i>Abies concolor</i>	6' 1/2"	Passaic	Skylands Manor winter garden north of Manor House, Ringwood	Reported by David R. Edelman N.J. Bureau of Forest Management
<b>Fir, Greek</b> <i>Abies cephalonica</i>	9'5"	Burlington	5 miles south of Bordentown on Georgetown Rd., south of house owned by Mrs. W.G. Kuser	Reported by John Kuser

Species	Circumference	County	Location	Owner or Reporter
<b>Fir, Japanese</b> <i>Abies brachyphylla</i>	7'6"	Burlington	On property of Mrs. W. G. Kuser, Georgetown Rd., Bordentown	Reported by John Kuser
<b>Fir, nikko</b> <i>Abies homolepis</i>	10'7"	Mercer	On property of Robert Geddes, 229 Mercer St., Princeton	Reported by John Kuser
<b>Fir, noble</b> <i>Abies procera</i>	8'8"	Mercer	63 Lovers Lane, near Guernsey Hall, Princeton	Reported by John Kuser
<b>Fir, Nordmann</b> <i>Abies nordmanniana</i>	6'6"	Mercer	Marquand Park, Princeton	Reported by John Kuser
<b>Fringetree</b> <i>Chionanthus virginicus</i>	1'7"	Cumberland	South side of Landis Ave. across from Public Library, Vineland	Reported by Stephen R. Field
<b>Ginkgo</b> <i>Ginkgo biloba</i>	15'10½"	Bergen	Front Courtyard Heritage office, 555 Kinderkamack Rd., Oradell	Reported by Burton Dezendorf 401 Hasbrouck Blvd., Oradell
<b>Golden Larch</b> <i>Pseudolarix amabilis</i>	5'3"	Mercer	In front yard of main building, Hun School, Edgerstoune Rd., Princeton	Reported by John Kuser
<b>Goldenrain-tree or China-tree</b> <i>Koelreuteria paniculata</i>	6'7"	Passaic	Skyland Manor House, by tennis court, Ringwood	Reported by Santiago Porcella, III
<b>Hackberry</b> <i>Celtis occidentalis</i>	12'7"	Mercer	On River Rd., North of Titusville	Reported by Santiago Porcella, III
<b>Hemlock, eastern</b> <i>Tsuga canadensis</i>	13'4"	Mercer	Marquand Park, Princeton	Reported by Santiago Porcella, III
<b>Hickory, bitternut</b> <i>Carya cordiformis</i>	6'3"	Middlesex	Johnson Park, Piscataway near picnic ground by river	Reported by John Kuser and Ken Korzun
<b>Hickory, mockernut</b> <i>Carya tomentosa</i>	9'2"	Burlington	Masonic Home, Oxmead Rd. at edge of field near fence se of Bldg.	Reported by Louis E. Hand
<b>Hickory, pignut</b> <i>Carya glabra</i>	12'6¾"	Cumberland	From intersection of Stage Coach Rd., and Rt. 47, travel Southwest on Stage Coach Rd., 1,500 feet to gravel road, 200 feet to sand road, 400 feet on sand road to tree, Maurice River Township	Reported by Mrs. Carolyn P. Bacon, Mauricetown
<b>Hickory, Sand</b> <i>Carya pallida</i>	11'1"	Cumberland	1490 N. West Avenue, Vineland	Reported by Stephen R. Field
<b>Hickory, shagbark</b> <i>Carya ovata</i>	11'9"	Morris	On property of Albert Rizzo corner of Russia Rd. and Weldon Rd., Milton	Reported by Ronald J. Sheay
<b>Holly, American</b> <i>Ilex opaca</i>	7'0"	Cape May	Garden State Parkway between N & S lands 23 miles N of Cape May City, or 3 miles S of Ocean City exit	Reported by Santiago Porcella, III
<b>Honeylocust</b> <i>Gleditsia triacanthos</i>	13'4½"	Burlington	Rancocas Rd., Pentacostal Assembly Church, Burlington	Reported by Louis E. Hand
<b>Hophornbeam, eastern</b> <i>Ostrya virginiana</i>	1'8"	Mercer	Property of Wm. Hart, 208 Federal City Rd., Pennington	Reported by Santiago Porcella, III
<b>Hornbeam, American</b> <i>Carpinus caroliniana</i>	4'8"	Mercer	Academy St. in front of Grade School, Pennington	Reported by Santiago Porcella, III
<b>Horse-chestnut</b> <i>Aesculus hippocastanum</i>	13'10"	Bergen	Property of Maurice Coffey 39 O'Connor's Lane, Old Tappan	Reported by Bruce Kulpan
<b>Insense-cedar</b> <i>Calocedrus decurrens</i>	8'7"	Mercer	In rear of Eugene Gillespie property, 51 Lovers Lane, Princeton	Reported by John Kuser
<b>Katsuratree</b> <i>Cercidiphyllum japonicum</i>	9'0"	Mercer	North Grad Courtyard, Princeton University, Princeton, N.J.	Reported by Ames T. Brown
<b>Larch, European</b> <i>Larix decidua</i>	9'2"	Monmouth	In front of Old Tennant Church Yard, Tennent	Reported by Santiago Porcella, III
<b>Linden, European</b> <i>Tilia europaea</i>	7'9"	Mercer	Constitution Hill, Princeton	Reported by Ames T. Brown
<b>Linden, Pendent</b> <i>Tilia petiolaris</i>	9'2"	Passaic	50 yards south of Main House, Skylands Ringwood	Reported by David R. Edelman
<b>Linden, white</b> <i>Tilia heterophylla</i>	13'7"	Union	75 N. Martine Avenue, Fanwood	Fanwood Environmental Comm.

Species	Circumference	County	Location	Owner or Reporter
<b>Locust, Black</b> <i>Robinia pseudoacacia</i>	11'0"	Warren	In front of house of M. Sincrope, Rocksburg Rd., Harmony Township	Reported by David R. Edelman
<b>Magnolia, bigleaf</b> <i>Magnolia macrophylla</i>	3'1"	Mercer	63 Lovers Lane, Guernsey Hall, Princeton	Reported by John Kuser
<b>Magnolia, cucumbertree</b> <i>Magnolia acuminata</i>	15'9"	Mercer	In rear of Eugene Gillespie property, 51 Lovers Lane, Princeton	Reported by John Kuser
<b>Magnolia, saucer</b> <i>Magnolia soulangeana</i>	4'6"	Mercer	Prospect Hall, Princeton University	Reported by John Kuser
<b>Magnolia, southern</b> <i>Magnolia grandiflora</i>	6'0"	Burlington	On property of Ms. Frances Adams, 902 US #130, Burlington	Reported by John Kuser
<b>Magnolia, star</b> <i>Magnolia stellata</i>	7'5" @ 2'	Mercer	On property of Kenneth Atchley, 2281 Pennington Rd., Trenton	Reported by Santiago Porcella, III
<b>Magnolia, sweetbay</b> <i>Magnolia virginiana</i>	4'10"	Ocean	Manahawkin Swamp, 1/2 way between road to AT&T site and the southern white cedars swamp	Reported by Louis E. Hand
<b>Maple, coliseum</b> <i>Acer cappadocicum</i>	12'6 1/2"	Mercer	Hun School, Edgerstoune Rd., Princeton	Reported by C.C. Bahrenburg Hun School groundskeeper
<b>Maple, Japanese</b> <i>Acer palmatum</i>	5'7"	Essex	N.W. of Edison Home, Glenmont Liewellyn Park, W. Orange	Reported by Morris Highlands Audubon Society
<b>Maple, Norway</b> <i>Acer platanoides</i>	14'8"	Morris	On property of John Heilman, Green Pond Rd., 2 miles south of Newfoundland, Rt. 513, Jefferson Township	Reported by Ronald J. Sheay
<b>Maple, red or swamp</b> <i>Acer rubrum</i>	14'5"	Cumberland	0.15 mile from intersection of Othello-Bacons Neck Rd., Othello	Reported by G. Steever
<b>Maple, silver</b> <i>Acer saccharinum</i>	19'5"	Morris	On property of Richard Gill, N. Main St., Boonton	Reported by Mrs. Paul Tilly, Boonton
<b>Maple, sugar</b> <i>Acer saccharum</i>	17'11"	Sussex	900' behind 99 Sawmill Rd., Sparta	Reported by Mr. & Mrs. John Griffen, Laidlaw Estate, Sparta
<b>Mimosa (See Silk tree)</b>				
<b>Mulberry, red</b> <i>Morus rubra</i>	17'2"	Burlington	On side of Apt. #4, Shady Oaks Apts., 1/2 mile West of Hanover St., Pemberton	Reported by John E. Perry Bureau of Forest Management
<b>Mulberry, white</b> <i>Morus alba</i>	15'5"	Atlantic	On property of Raymond Knudsen, north side of Salem Ave., 4 mile from center of Newfield	Reported by Louis E. Hand
<b>Oak, bartram</b> <i>Quercus x bartramii</i>	11'8"	Middlesex	East of hog pens, Cook College, New Brunswick	Reported by John W. Andressen, Cook College
<b>Oak, black</b> <i>Quercus velutina</i>	18'5"	Warren	100 yards from Musconetcong River in hedgerow between two open fields, Lane entrance on Rt. 51, opposite Hazen Road	Reported by Dennis Bredie Hackettstown
<b>Oak, blackjack</b> <i>Quercus marilandica</i>	8'9"	Burlington	In front of Apt. 5C Shady Oaks Apts., north on Rt. 530 (Hampton St.) 1/2 mile west of Hanover St. Traffic light, Pemberton	Owned by Lewis-Chester Agency, Morris Ave., Union
<b>Oak, bur or mossycup</b> <i>Quercus macrocarpa</i>	13'1"	Middlesex	Cook College Campus, New Brunswick	Reported by Erick Shallock and Nick Demico, Cook College
<b>Oak, bushes</b> <i>Quercus x bushii</i>	10'4"	Burlington	Behind Shady Oaks Apts. & Thompson's Lawn & Garden Supply, Rt. 530 (S. Pemberton Rd.) 1/2 mile west of Hanover St., Pemberton	Reported by Louis E. Hand
<b>Oak, chestnut</b> <i>Quercus prinus</i>	15'4"	Cumberland	On property of Philo Chapman, east on Garden Rd. 2 miles from Rt. 47, Vineland	Reported by Louis E. Hand
<b>Oak, English</b> <i>Quercus robur</i>	9'1" @ 3'	Morris	Morris St. by Moore's Hardware Store and R.R. Station, Morristown	Reported by Morris Highlands Audubon Society

Species	Circumference	County	Location	Owner or Reporter
<b>Oak, European white</b> <i>Quercus petraea</i>	10'6"	Ocean	50 Cliffside Drive, Toms River	Reported by Pat Cipolletti Toms River
<b>Oak, laurel</b> <i>Quercus laurifolia</i>	5'2"	Camden	Corner of Haddon and Hawthorne Ave., Haddonfield	Reported by C. Frazer Hadley, MD 21 Haddon Avenue Westmont, N.J.
<b>Oak, overcup</b> <i>Quercus lyrata</i>	12'4"	Hunterdon	Main St. opposite monument of Bryan Realty, Flemington	Reported by Otto W. Kunkel Bureau of Forest Management
<b>Oak, pin</b> <i>Quercus palustris</i>	19'10"	Burlington	On Kuser property, 2,000 feet east of intersection Rt. 545 on White Pine Rd.	Reported by Karl Braun, White Pine Rd., Columbus, N.J.
<b>Oak, post</b> <i>Quercus stellata</i>	11'8"	Cape May	On property of Mrs. D. Donald Caroll, east side of Route 9, opposite Friend's Meeting House, 221 Shore Rd.	Reported by George H. Pierson Bureau of Forest Management
<b>Oak, red</b> <i>Quercus rubra</i>	18'3"	Bergen	In rear of 737 Wyckoff Avenue, home of R. Miller, Wyckoff	Reported by Deedee Williamson 103 Wood Street, Wyckoff, NJ 07481
<b>Oak, sawtooth</b> <i>Quercus acutissima</i>	2'11"	Mercer	166 Nassau St., Princeton, in front of store	Reported by John Kuser
<b>Oak, scarlet</b> <i>Quercus coccinea</i>	17'4"	Burlington	On property of Capt. Henry, 139 E. Main St., Moorestown	Reported by Santiago Porcella, III
<b>Oak, southern red or Spanish</b> <i>Quercus falcata</i>	16'2"	Camden	Cherry Hill Baptist Church, Cherry Hill	Reported by Paul W. Keiser 57 Cunningham Lane Cherry Hill
<b>Oak, swamp white</b> <i>Quercus bicolor</i>	20'6"	Burlington	On Rosebud Farms property, 1 1/8 miles NNE of Springfield Meeting House Rd., Jobstown	Reported by Louis E. Hand
<b>Oak, turkey</b> <i>Quercus cerris</i>	12'1"	Union	On property of Mr. and Mrs. R. Whittington, 40 Forest Rd., Fanwood	Reported by Louis E. Hand
<b>Oak, water</b> <i>Quercus nigra</i>	5'11 7/8"	Cumberland	Property of Amos Pepper on miles from Rt. 553—S.E. corner of open field, Dividing Creek, NJ	Reported by Daniel O'Connor
<b>Oak, white</b> <i>Quercus alba</i>	21'8"	Monmouth	Between Hornertown & Cream Ridge on Highway 37 (also known as 539) near fruit tree test plots. Tree is east of stream at NE of property on south side of Rt. 539, Cream Ridge, Upper Freehold Township	Reported by David C. Shaw Supt. Shade Tree Commission, Holmdel Arboretum
<b>Oak, willow</b> <i>Quercus phellos</i>	21'4"	Burlington	On property of Cozy Morley Beginning at Medford Circle, travel 1/2 mile west on Rt. 70, make right turn on Hartford Rd., travel 1/4 mile to tree in field on east side of road, Medford	Reported by Richard L. Washer, Burlington County Agent, Mount Holly, and William E. Johnson Church Rd., Medford
<b>Osage-orange</b> <i>Maclura pomifera</i>	13'7 1/2"	Burlington	Scully-Bozarth Post, VFW Grounds, 138 W. Pearl St., Burlington	Reported by John T. McNeil
<b>Pagoda, Japanese (See Scholartree)</b>				
<b>Paulownia</b> <i>Paulownia tomentosa</i>	14'11"	Essex	Glenmont Edison National Historical Site, Llewellyn Park, West Orange	Reported by George R. Crothers Llewellyn Park
<b>Pear, Bartlett</b> <i>Pyrus</i>	7'5"	Union	Informal garden, Liberty Hall, Elizabeth	Reported by Santiago Porcella, III
<b>Pear, Seckel</b> <i>Pyrus</i>	8'8"	Union	Informal garden, in rear Liberty Hall, Elizabeth	Reported by Santiago Porcella, III
<b>Pecan</b> <i>Carya illinoensis</i>	9'4 1/2"	Cape May	At home of F. Bertram James, Marmora	Reported by Louis E. Hand
<b>Persimmon, common</b> <i>Diospyros virginiana</i>	7'10"	Hunterdon	Behind dwelling on Lloyd Haas Farm on Flemington-Sergeantsville Rd., just beyond Sunset Village, about 100 feet into pasture, Flemington	Reported by William C. McIntyre
<b>Pine, Austrian</b> <i>Pinus nigra</i>	9'4"	Middlesex	Property of Annete & Elizabeth Funk, 166 Washington Ave, Milltown	Reported by Donald Knezick Bureau of Forest Management

Species	Circumference	County	Location	Owner or Reporter
<b>Pine, eastern white</b> <i>Pinus strobus</i>	12'6"	Mercer	On property of Dewitt Boyce, next to 229 Mercer St., Princeton	Reported by John Kuser
<b>Pine, Himalayan</b> <i>Pinus griffithii</i>	9'9½"	Morris	Backyard of Roger Gilman 980 Hillside Ave Plainfield	Reported by Paul P. Berezny
<b>Pine, jack</b> <i>Pinus banksiana</i>	3'3"	Bergen	Hackensack Water Co., Old Hook Rd., Emerson. So. of P.S.E. & G. Co. Station	Reported by Ray Cywinski Hackensack Water Co.
<b>Pine, Japanese red</b> <i>Pinus densiflora</i>	4'8"	Mercer	On property of Louis Verbeyst, Carter Rd., Mt. Rose	Reported by John Kuser
<b>Pine, Jeffrey</b> <i>Pinus jeffreyi</i>	7'7"	Passaic	Winter garden, Skylands Manor House, Ringwood	Reported by Santiago Porcella, III
<b>Pine, limber</b> <i>Pinus flexilis</i>	4'11"	Middlesex	Blake Hall, Cook College, New Brunswick	Reported by Francine Rabinowitz, Cook College
<b>Pine, loblolly</b> <i>Pinus taeda</i>	5'9"	Cape May	In woods about 200 yards north of Town Bank Road and 0.6 miles west of Shun Pike Road, Cold Spring. On the property of Joseph Busby	Reported by Louis E. Hand
<b>Pine, longleaf</b> <i>Pinus palustris</i>	3'3"	Burlington	Green Bank State Forest, Green Bank, adj. to shop	Reported by Santiago Porcella, III
<b>Pine, pitch</b> <i>Pinus rigida</i>	8'9"	Ocean	Near edge of woods 150 yds. S.W. of intersection of Stafford and Hilliard Blvd., Manahawkin	Reported by A. Morton Cooper Ocean County Environmental Agency, 54 Washington Street, Toms River, N.J.
<b>Pine, Pond</b> <i>Pinus serotina</i>	4'0"	Cape May	In woods about 200 yards north of Town Bank Road and 0.6 miles west of Shun Pike Road, Cold Spring. On the property of Joseph Busby	Reported by Louis E. Hand
<b>Pine, ponderosa</b> <i>Pinus ponderosa</i>	5'5"	Middlesex	Horticulture Farm #1, Cook College, New Brunswick	Reported by Eric Triplett
<b>Pine, scotch</b> <i>Pinus sylvestris</i>	17'8"	Bergen	Property of New Jersey Bell Telephone, Broadway & Harrington St., Hillsdale	Reported by Albert J. Huber Hackensack Water Co., Oradell, N.J.
<b>Pine, shortleaf</b> <i>Pinus echinata</i>	7'3"	Burlington	On property of Walter G. Spaeth, 150 ft. East of Horse Paddock, Friendship Road, Tabernacle	Reported by Louis E. Hand
<b>Pine, table mountain</b> <i>Pinus pungens</i>	4'10"	Hunterdon	On property of Joseph Landro, Rt. 523, 1 mile N.E. of Sergeantsville	Reported by Vincent Abraitys, Hunterdon S.C.D.
<b>Pine, Virginia</b> <i>Pinus virginiana</i>	7'2"	Burlington	N.E. Side of Budtown Rd. near Bush Turkey Farm	Reported by Donald Knezick P.O. Box 4, New Lisbon, NJ
<b>Plane, London</b> <i>Platanus acerifolia</i>	11'9"	Mercer	In front of State Museum on State Street, Trenton, NJ	Reported by Santiago Porcella, III
<b>Poplar, or Eastern Cottonwood</b> <i>Populus deltoides</i>	17'10"	Bergen	Along fire road ½ mile N. of Fishing gate #6, Oradell Reservoir, Emerson	Reported by Ray Cywinski
<b>Popular, white</b> <i>Populus alba</i>	14'2"	Morris	On property of Archie Stiles, 596 Meyersville Rd., Gillette, 200 East on Meyersville center on left	Reported by Ronald J. Sheay
<b>Redbud</b> <i>Cercis canadensis</i>	5'11"	Gloucester	West side of Main St. near south blinker light, Newfield	Reported by John T. McNeil
<b>Redcedar, eastern</b> <i>Juniperus virginiana</i>	4'9"	Mercer	Prospect Garden, Princeton University, Princeton	Reported by Ames T. Brown, III
<b>Redwood, dawn</b> <i>Metasequoia glyptostroboides</i>	10'3"	Mercer	Prospect Hall, Princeton University, Princeton	Reported by John Kuser and J.I. Merritt
<b>Sassafras</b> <i>Sassafras albidum</i>	16'4"	Burlington	On the Mt. Laurel Quaker Meeting House grounds, Mt. Laurel	Reported by Walter Cinkowski Soil Conservation Service, Mt. Holly
<b>Scholartree, or Japanese Pagoda</b> <i>Sophora japonica</i>	9'11"	Middlesex	Near pond on Cook College Campus, New Brunswick	Reported by Richard F. West

Species	Circumference	County	Location	Owner or Reporter
<b>Sequoia, giant</b> <i>Sequoiadendron giganteum</i>	8'9"	Burlington	Holy Trinity Lutheran Church, Mt. Holly and Rancocas Rd., Burlington	Reported by John Kuser
<b>Servicberry or shadbush</b> <i>Amelanchier arborea</i>	7'9"	Monmouth	On property of Balmer, 96 Middletown Rd., Holmdel	Reported by Edwin R. Keahey c/o Bartlett Tree Expert Co. 443 S. Washington Avenue Piscataway
<b>Silktree, Chinese or Mimosa</b> <i>Albizia julibrissin</i>	8'6" @ 2'	Mercer	On property of Kenneth Kline, 323 Second Ave., Hightstown, adjacent to Walter E. Black Elementary School	Reported by Santiago Porcella, III
<b>Silverbell</b> <i>Halesia monticola</i>	6'4"	Passaic	25 yds. North of Manor House Skylands, Ringwood in Winter Garden	Reported by Santiago Porcella, III
<b>Sourgum, or Blackgum</b> <i>Nyssa sylvatica</i>	14'4"	Burlington	ON the Ezra Estate (Stokelan), Eayrestown Rd., 1 mile north of Rt. 70, Medford	Reported by Louis E. Hand
<b>Sourwood</b> <i>Oxydendrum arboreum</i>	2'11"	Middlesex	Near Pond, Cook College, New Brunswick	Reported by William Grau, Jr. Cook College
<b>Spruce, black</b> <i>Picea mariana</i>	3'10"	Warren	Swamp, southwest of Sunfish Pond, Worthington State Forest, approximately 750 sw of Sunfish Pond monument	Reported by Robert L. Zelle 167 Lincoln Avenue Yardley, Pennsylvania
<b>Spruce, Colorado blue</b> <i>Picea pungens</i>	5'	Mercer	On property of George Bush, 391 Nassau St., Princeton	Reported by John Kuser
<b>Spruce, Norway</b> <i>Picea abies</i>	13'10"	Mercer	Marquand Park, Princeton	Reported by Santiago Porcella, III
<b>Sweetgum</b> <i>Liquidambar styraciflua</i>	17'5"	Burlington	Close to the entrance of Fort Dix on Rd. 1/2 mile north of High School, Pemberton	Reported by Dennis Perham Fort Dix Forester
<b>Sycamore</b> <i>Platanus occidentalis</i>	23'3 1/2"	Warren	Behind the Sven Johnson & Son Automatic Screw Machine Bldg., Belvidere	Reported by Sven Johnson Hardwick Rt. Belvidere
<b>Tulip poplar</b> <i>Liriodendron tulipifera</i>	19'6"	Mercer	Children's Day School 520 W. State Street Trenton	Reported by Santiago Porcella, III
<b>Walnut, black</b> <i>Juglans nigra</i>	16'5"	Bergen	Lower Cross Road and Sheridan Avenue, Saddle River	Reported by Deedee Williamson
<b>Walnut, English</b> <i>Juglans regia</i>	11'7"	Hunterdon	2 miles south of Sergeantsville & about 1/2 mile east of Sandy Ridge; tree in pasture 200 feet south of Stewart Kean's house, Flemington	Reported by Otto W. Kunkel
<b>Walnut, white or butternut</b> <i>Juglans cinerea</i>	12'5"	Morris	Front of Pathmark Shopping Center, Kinnelon Rd., Kinnelon	Reported by Lucey A. Meyer Kinnelon Environmental Commission
<b>White cedar, northern or Arborvitae</b> <i>Thuja occidentalis</i>	6'3 1/2"	Morris	Sarah Frances Nursing Home, Boonton	Reported by Ms. Paul F. Tilly
<b>White cedar, southern, or Atlantic Coast</b> <i>Chamaecyparis thyoides</i>	9'2"	Ocean	Very wet woods, 1/2 hour walk by foot, Manahawkin	Reported by Louis E. Hand
<b>Willow, black</b> <i>Salix nigra</i>	19'3"	Hunterdon	Property of Bruce Herrigel, 300 sq. intersection of Studer Road, Sunrise Circle, Clinton Township	Reported by Otto W. Kunkel
<b>Willow, white</b> <i>Salix alba</i>	16'	Mercer	On property of Vladimir A. Metelsky, 143 North Harrison St., Princeton	Reported by John Kuser
<b>Willow, yellow</b> <i>Salix alba</i> var. <i>vitellina</i>	9'7"	Mercer	At foot of hill, Broadmead Road, Princeton University, Princeton	Reported by John Kuser
<b>Yellowwood</b> <i>Cladrastis lutea</i>	10'5"	Mercer	On property of Brymer Nursery Highway 29, 0.7 miles south on Pleasant Valley Rd., Titusville	Reported by John Kuser
<b>Yew, English</b> <i>Taxus baccata</i>	11'	Mercer	On property of Charles Fritsch, 80 Mercer St., Princeton	Reported by John Kuser
<b>Yew, Japanese</b> <i>Taxus cuspidata</i>	4'10"	Mercer	Prospect Garden, Princeton University, Princeton	Reported by Ames T. Brown

## PINELANDS PLAN WINS STATE & FEDERAL OK'S

The Master Plan for management of more than one million acres of Pine Barrens in South Jersey was approved by the state Pinelands Commission on November 21, 1980, signed by Governor Byrne on December 2, and approved by U.S. Department of the Interior Secretary Cecil B. Andrus on January 16, 1981. Andrus, who signed the document in the final days of the Carter Administration, sent the plan to Congress for the required 90-day review period.

At the same time, Andrus committed \$8.25 million to New Jersey as the federal share of the cost of acquiring about 11,000 acres of land in the Cedar Creek drainage area in Ocean County. The area is considered of critical ecological value and in danger of being degraded or destroyed. The purchase will link Greenwood State Forest and Double Trouble State Park. The state share of acquisition's cost, \$2.5 million, will come from Green Acres funds. (Total cost: \$11 million.) The area is part of the Pinelands National Reserve. □

You may be eligible!

### DEP ADMINISTERS FREE PASS PROGRAMS

**Senior Citizen Pass:** A New Jersey resident, age 62 or over, may obtain a Senior Citizen Pass for free admission and free parking to day-use facilities at any state park, forest or historic site by presenting proof of age and completing an application form. Other fees are not covered by the pass. The forms are available at each park/forest/historic site office or from DEP, Division of Parks and Forestry, Box 1420, Trenton 08625.

**Totally Disabled Persons Pass:** Any resident of New Jersey who is totally disabled may obtain a Totally Disabled Persons Pass which provides the same free parking and free admission privileges as the Senior Citizen Pass. The applications are available at places given in the preceding paragraph. Both programs are administered by DEP's Division of Parks and Forestry.

**Clamming and Oystering License—**one license is issued for both activities—is available to any New Jersey resident age 62 or over. Applications are available from DEP's Division of Fish, Game and Wildlife which administers the program. Write to the Division at Box 1809, Trenton 08625.

**Fishing License:** A free Fishing License is available to any New Jersey resident age 70 or over. Applications are available from the Division of Fish, Game and Wildlife at the address given in the preceding paragraph. □



**ARBOR DAY IS FRIDAY, APRIL 24.** The annual "celebration of the trees" is observed with tree planting ceremonies throughout New Jersey—in schoolyards and the greens of villages, towns and cities—to call attention to the benefits provided by these wonders of nature. Trees are a vital and renewable natural resource. The fruits from trees provide food for humans, animals and birds. Trees add beauty and grace to our homesites and streets, provide shade and protection against air and noise pollution, act as windbreaks, supply firewood for the hearth and lumber for building, protect steep hillsides from erosion, and watersheds from rapid runoff. Above, DEP forester Joseph Hughes (extreme left) helps Smokey the Bear distribute pine tree nurslings to schoolchildren who participated in an Arbor Day tree planting ceremony held in Trenton last year. □

### DEP'S 11TH ANNIVERSARY

**The New Jersey Department of Environmental Protection was created by law on April 22, 1970, the nation's first Earth Day. DEP remains dedicated to one goal—to assure a better quality of life for the citizens of New Jersey through the protection, conservation and preservation of our natural resources: air, water, land, flora, fauna, and our historic heritage.**

### SO THAT'S A PPM!

Many of the articles that appear in the NJO Environmental News section and in other publications' environmental stories mention reducing pollutants in air or water to fewer parts per million (ppm). But just how tiny a unit of measurement is one part per million?

The *Engineering and Mining Journal* once explained it this way: one ppm is—one minute in two years, or one second in 11.6 days, or one cent in \$10,000, or one ounce of vermouth in an 8,000-gallon tank car of gin. □

## DROUGHT INCREASES FOREST FIRE DANGER

The lack of precipitation over the past few months has left much of New Jersey's forested land tinder dry. Historically, the forest fire danger in the state is greatest between March 15 and May 15 with the peak usually in April. Dry conditions and high winds usually prevail during the spring season, but forest fires can occur anytime the woods are dry enough to burn.

Smokey the Bear "speaks" the truth when he says, "YOU can help prevent forest fires." More than 98 percent of all forest fires in New Jersey are caused by humans. Almost half are deliberately set—this malicious burning of the woods (incendiarism) is a criminal act. Any person who recognizes an act of arson should immediately report this to the nearest fire warden. Carelessness when smoking, failure to completely extinguish campfires and children playing with matches are but three examples of unthinking actions which can result in disaster.

There are more than 2.7 million acres of forested land under the surveillance of DEP's Forest Fire Service unit. State Forester James Cumming said that property owners in woodland areas should remove debris and flammable materials to help prevent forest fires. He stressed that public cooperation, including good individual practices of sportsmen, picnickers and residents, along with the use of modern firefighting equipment and intensive training of forest fire personnel is vital to forest fire prevention and control. □

### STATE GEOLOGIST RETIRES

Dr. Kemble Widmer, 67, of Pennington, State Geologist and chief of DEP's Bureau of Geology and Topography, retired on January 1 after 27 years in state service, all of which involved some aspect of geology. Widmer's work included scientific research and preparation of reports and maps addressing various applied and economic geology and water resource problems. He is the author of "Geology and Geography, N.J." and during his tenure, the bureau produced publications explaining the geology of counties in New Jersey. Widmer, who became state geologist in 1958, began his state career as principal geologist with DEP's predecessor, the state Department of Conservation and Economic Development. □

**OPENING DAY  
TROUT SEASON  
SATURDAY, APRIL 11**

## WATER EMERGENCY

800 mgd, and cut New Jersey's basin withdrawal to 62 mgd. Normally, New Jersey is entitled to 100 mgd via the Delaware and Raritan Canal, although siltation of the canal has restricted the state's take to 75 mgd or less. New York City's withdrawals come through Cannonsville, Pepacton and Neversink reservoirs in New York State, and usually represent half of the water supply of the city.

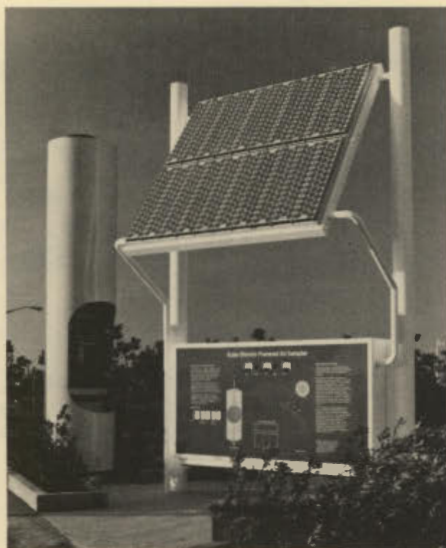
It was the first time since 1975 that all four basin state governors convened at a meeting. Business is normally conducted by voting alternates for the official membership consisting of the governors and a federal representative. (DEP Assistant Commissioner Steven J. Picco is Governor Byrne's alternate.) On hand January 15 were Governor Byrne (chairman), Pierre S. duPont, Delaware; Hugh L. Carey, New York; and Richard Thornburgh, Pennsylvania. Sherman W. Tribbit represented Secretary of the Interior Cecil Andrus, the federal member. Also participating were Mayors Edward Koch of New York City and William J. Green of Philadelphia. Gerald Hansler is DRBC executive director.

The Basin Commission also adopted resolutions authorizing its control of releases from the New York City reservoirs plus Pennsylvania reservoirs under jurisdiction of the U.S. Army Corps of Engineers.

The target of such balancing of the Delaware River flow is a seasonally movable point in its lower reaches near Philadelphia where the river's chloride content reaches 250 parts per million as it blends with ocean water. The Basin Commission must maintain sufficient flow in the river to keep the so-called "chloride front" from moving too far upstream allowing salt water to reach riverside aquifers and pumping intakes which provide potable (drinking) water. Camden, Philadelphia and adjacent parts of Pennsylvania and Delaware are vulnerable to this threat. Recent months have seen the chloride front averaging 20 miles farther upstream than normal.

By specifying in its January 15 action the nonessential water uses it was prohibiting, the Basin Commission provided the framework for enforcement of the same bans by the four member states.

**Prohibited are:** Use of water for nonagricultural irrigation, such as watering lawns, landscaped areas, trees and shrubs • Washing paved areas, such as streets, sidewalks and parking areas; Watering golf courses, except for tees and greens • Ornamental use of water, as in fountains • Noncommercial washing of cars, trucks or trailers • Use of water from fire hydrants or sewers except when necessary to protect public health • Serving of water in eating places unless requested by a customer. □



## SOLAR POWERED AIR SAMPLER

The nation's first solar photovoltaic-powered air monitoring station stands in New Jersey's Liberty State Park (Hudson County). In steady operation for more than a year, the solar electric monitor samples the ambient air every sixth day for a period of 24 hours. Air is forced through a glass fiber filter which traps minute particulate matter ("dirt"). Filters are removed each week for examination by DEP's Bureau of Air Pollution Control in Trenton. Excess electrical energy produced by the system is stored in a bank of lead-acid batteries specifically designed for solar electric use. Power is withdrawn during the evening and early morning hours of its weekly cycle. The heart of the silent, nonpolluting, 360-watt solar power system is its 96-square-foot array, consisting of 20 photovoltaic modules, a total of 860 individual silicon cells. The entire array is mounted atop a 17-foot-tall tubular aluminum frame.

The solar powered air monitoring system was produced under management of NASA-Lewis Research Center as part of the U.S. Department of Energy (USDOE) National Photovoltaic Conversion Program. The aim of the program is to develop solar cell power systems which can provide a significant amount of the nation's electrical energy requirements by the year 2000. The bulk of the cost (\$93,000) for the New Jersey unit was provided by the USDOE.

(The Bureau of Air Pollution Control, a unit within DEP's Division of Environmental Quality, operates a statewide continuous air monitoring network of more than 100 stations, including mobile labs and stationary units. The ambient air is continuously analyzed at each site and telemetered directly to the Air Pollution Control Bureau's computer in Trenton. The solar air sampler, though on a different "duty schedule," is part of the network.) □

## N.J. Academy of Sciences Plans Meeting

The 27th Annual Meeting of the New Jersey Academy of Sciences is to be held on Saturday, March 28, 1981, at Atlantic County Community College, Mays Landing, New Jersey. There will be morning and afternoon sessions devoted to presented papers.

A plenary session will be held in the early afternoon when Dr. Aiden McLellan, Assistant Commissioner for Science, N.J. Dept. of Environmental Protection will speak on the topic of "ACID RAIN: The Politics and Health Effects."

The meeting will begin at 9 a.m. and will conclude at approximately 4:30 p.m.

Registration (\$2.00 for members and students, \$4.00 for non-members) will begin at 8 a.m. Coffee and donuts will be provided to all attendees.

Further details on the program are available from Dr. A. Lee Meyerson, Earth Science Department, Kean College, Union, New Jersey, 07083, (201) 527-2000. □

## Wildlife Week Art Contest

The New Jersey State Federation of Sportsmen's Clubs today announced a special art contest for the best drawing relating to the theme of National Wildlife Week—We Care About Oceans. The federation said National Wildlife Week is March 15-21 this year. Prizes to contest winners.

### Contest Rules

1. All young people of New Jersey through age 18 may enter.
2. Entry must be:
  - a. A drawing relating to the theme WE CARE ABOUT OCEANS.
  - b. Paper size approximately 8 1/2 inches X 11 inches, or 11 inches X 17 inches, with the drawing taking up most of the space.
  - c. Color or black and white may be used.
  - d. Only one entry from each contestant will be allowed.
3. Required information. (Must be printed on back of entry.)
  - a. Entrants name, address, telephone number, and age.
  - b. Source of picture, (name of book or magazine, including page number, year, and month.) *tracing will not be accepted.*
4. Deadline: All entries must be post-marked no later than April 30, 1981.
5. Send to: Mail or deliver to Wildlife Week Art Contest, Jim Brooker, 114 James Avenue, Cranford, N.J. 07016.
6. All entries will become the property of the New Jersey State Federation of Sportsmen's Clubs for use in exhibits and will not be returned to the contestant. □

A "Hands-on" Experience to Take Back  
to the Classroom . . .

# wildlife workshopS for teachers

- **Marine and Estuarine Wildlife—May 8, 9 and 10, 1981 at the Marine Science Consortium, Seaville, New Jersey.**
- **Upland and Freshwater Wildlife—June 5, 6 and 7, 1981 at the New Jersey State School of Conservation in Stokes State Forest, Branchville, New Jersey.**

The Department of Environmental Protection's Division of Fish, Game and Wildlife, in an effort to aid teachers with environmental concepts in the classroom, has announced plans for the 1981 Teachers Wildlife Workshops. Now in its sixth year, the weekend workshop program is designed to provide teachers with the background necessary to include environmental concepts in their classroom curriculum. The courses, concentrating on New Jersey's wildlife resources, are taught by professional wildlife biologists. Most of the instruction takes place in the field, and is reinforced by slide shows and "Hands-on" Practice of wildlife management principles.

Rutgers University will award one graduate-undergraduate credit for those working on advanced degrees or wanting in-service training credit.

The first workshop, which will be held on May 8, 9 and 10 at the Marine Science Consortium, focuses on the wildlife resources in the marine and wetlands environment. The second workshop, to be given at the New Jersey State School of Conservation on June 5, 6 and 7, will emphasize upland and freshwater wildlife.



For further information and registration forms, fill out and mail the attached card, or contact:

**Wildlife Education Unit  
New Jersey Division of Fish, Game and Wildlife  
P.O. Box 327  
Hackettstown, N.J. 07840  
Phones: 201-852-2565; 201-852-8236; 201-852-8343**

NAME: \_\_\_\_\_

HOME ADDRESS: \_\_\_\_\_

CITY \_\_\_\_\_

COUNTY \_\_\_\_\_

STATE \_\_\_\_\_ ZIP \_\_\_\_\_

PHONE: \_\_\_\_\_

SCHOOL DISTRICT: \_\_\_\_\_

ATTENDED PREVIOUS WILDLIFE WORKSHOP: YES \_\_\_\_\_ NO \_\_\_\_\_

# Spring's Other Singers

by Wade Wander  
and Sharon Ann Brady



LEONARD LEE RUE III

It is late February. Daytime temperatures are starting to rise into the 40s and occasionally the 50s, but ice still covers the shadier areas of the swamp. Though spring is officially yet another month away, actually it has already begun. The skunk cabbage has already thrust up through the muck and mire, growing so fast that it gives off enough heat to melt the snow around it. The warmer days inspire cardinals, chickadees, titmice, and house finches to begin tuning up their familiar melodies. Red-winged blackbirds and grackles stream overhead in cackling flocks. But theirs are not the only songs of spring—we hear another as we pass along the edge of a flooded woods. It starts off slowly but increases in crescendo until we are overwhelmed by a cacaphony of ducklike quacks. But no mallards or black ducks are to be seen here—it is the Wood Frog which has erupted into chorus. This species is referred to as an “explosive” breeder (which means that their breeding season is a short burst of concentrated activity rather than that they detonate upon mating); therefore you must be afield often in late winter to catch the fleeting chorus of this black-masked frog. Soon, having attached their jelly-like egg masses to structures below the water's surface, the adult frogs quickly disperse, not to sing again until the next February.

But the lowlands do not fall silent—there is no intermission in this show. For with the Wood Frogs' exit a second act begins, a Spring Peepers join their countless plaintive but piercing “peeps” with the harsher notes of Upland Chorus Frogs, which sound like a fingernail run along a coarse-toothed comb. Though they're two of New Jersey's smallest frogs, they brave the late winter weather and are in full voice while their larger cousins still snuggle blissfully in the mud. Unlike Wood Frogs, peep and chorus frogs will often continue their performance, although with diminishing vigor, into June.

In April, this simple duet grows into an ear-boggling frog symphony. For it is in this month of blooming hepaticas, bloodroots, and anemones that Leopard, Pickerel, Green, and Carpenter frogs, along with their warty cousins the American and Fowler's toads, emerge to join the nighttime chorus. While the respective chuckling, snoring, and twanging songs of the first

three species may be heard almost anywhere, the Carpenter Frog lends its voice to only certain choruses—those that assemble in the acid-waterponds and lakes of the Pine Barrens. In large congregations, the distinctive “pa-tunk, pa-tunk, pa-tunk” of these frogs sounds like the hammering of an army of invisible little carpenters. The American Toad produces a beautiful, prolonged musical trill that one would hardly expect from that squat vocalist; the tiny sheeplike bleat of the Fowler's Toad seems more appropriate to its maker.

In late April and early May the rather deep, resonant trill of the Gray Treefrog pierces the evening air. Typical frogs sing from the ground, but this and other treefrogs climb to elevated perches to sing, using their suction-cuplike toepads. Their songs are also variable, the rate of trilling increasing with warmer temperatures. Also in late April we hear the warty, inch-long Cricket Frog, sounding like two marbles being tapped together.

Late in May the bass-fiddle voice of our largest frog, the Bullfrog, begins to boom “jug-o-rum” across lakes and ponds everywhere. Another, but much smaller, late-May vocalist is our own Pine Barrens Treefrog. On warm, humid nights, its nasal “quonk, quonk, quonk” emanates from the dark, mysterious recesses of southern whitecedar swamps. An endangered species in New Jersey, this brilliantly colored little frog breeds only in very acidic water which few other species can tolerate.

Only the heaviest spring or summer rains will inspire the Spadefoot Toad to leave its subterranean burrow for breeding; the woeful groans with which it greets this momentous occasion sound to human ears like strange music indeed!

Identifying the various New Jersey frogs and toads by voice can be great fun, and hearing a large mixed chorus close at hand is truly thrilling—one of the few aspects of nature after dark that humans can really appreciate. Trying to find that hidden choirister at your feet, however, can definitely be an exasperating experience! But a flashlight, patience, and stealth of movement will eventually reward the observer with the fascinating sight of a singing frog, complete with amazingly distended throat pouch, amorously calling forth into the night. □



**Upland Chorus Frog**



**Green Frog**



**Carpenter Frog**



**Gray Treefrog**



**American Toad**



**Pine Barrens Treefrog**

PHOTOS BY THE AUTHORS



# Forest Fungi:

*Making Way for New Life*

Wendolyn E. Tetlow

*Amanita muscaria*: Fly Agaric, it has hallucinogenic qualities

PHOTOS BY FRED TETLOW



*Morchella esculenta*: Morel, edible and highly sought after

*Polyporus betulinus*: Birch polypore, attacks the sapwood of gray birch



Imagine what the woods would be like if matter did not decay. We would be up to our ears in centuries' worth of fallen trees, downed branches, shed leaves, and piles of dead plants. Not even the strongest of species would be able to survive amidst the clutter. If it weren't for fungi—tiny agents of decay—there simply would not be enough room on earth for new growth.

But what are fungi? Where are they? How do they work? Fungi are nonflowering plants which cannot make their own food through photosynthesis. Because they require organic matter to survive, they are everywhere around us, breaking down dead vegetable and animal substances and attacking the weaker of living plant and animal life. The tiny molds that grow on bread and cheese are fungi. Mildews on clothes and furniture are fungi. Microscopic bacteria that cause decay and disease in plants, animals, and humans are fungi. Even yeast, that unique substance used in making bread and alcohol, is a kind of fungus.

But the most familiar fungi are mushrooms, or toadstools, which

almost everyone recognizes as umbrella-like plants that seemingly pop up overnight in fields, forests, and lawns. These fungi, or mushrooms, come in many sizes and shapes. Some look like shelves projecting from tree trunks. Some look like sea coral. Others appear like sponges. And others still look like blobs of jelly or balls of dirty cream cheese. But no matter what they look like, all fungi assist in the process of decomposition.

In the forest, fungi are especially important in the ongoing cycle of death and regeneration. By absorbing food from their host plant, they initiate the first step in transforming matter into rich humus, without which all soil would be barren. For instance, fungi on a tree trunk secrete enzymes that break down the woody material and reduce it to a shredded mass of fiber that mingles with other decayed substances in the soil to become a medium available to trees and other plants as food. In this way, trees and fungi are dependent on each other.

Yet in their dependency they are remarkably different. The trees (and other green plants) manufacture food from carbon dioxide and water and simple inorganic materials in the soil, in part provided by fungi. They have structured bodies consisting of roots, trunks, leaves, and flowers. Chlorophyll is present and light is necessary for growth. On the other hand, fungi require organic matter to survive. They exist in many forms and habitats. They contain no chlorophyll and they thrive in the dark. Therefore, in their separate niches, fungi and trees create a balance in the forest community such that one could not exist for long without the other.

But it's hard to believe that a delicate, short-lived mushroom is working away at the base of an enormous tree. Actually, what we see above the soil or attached to the side of a tree and call a mushroom, is only the fruiting body of the fungus plant. This structure can be considered step number one in the life of the fungus plant. It releases microscopic spores into the air, which are carried far away by wind, birds, animals, and insects. These single-celled spores—ever present in the air around us—are so minute that millions of them must be seen together to be visible

by the naked eye.

Once the spores have settled into a new location, and conditions are warm and wet enough for growth, the cell expands as it absorbs food and then divides. This process is repeated until tiny chains of cells form hyphae. A mass of intertwined hyphae is called the mycelium. Mycelia are the actual fungi plants that are responsible for breaking down matter.

Mycelia? Where are they? How big are they? When do they produce a mushroom? In the forest, mycelia are everywhere. They thrive underneath layers of damp leaves. They are almost every fallen stump and branch. They spread like delicate spider webs under the bark of living trees. They are close to the surface of the soil in dead, matted grass. These mycelia—some microscopically small, and some big enough to rest in the palm of the hand—draw their nourishment from the plant they live on. Some live for years and never produce a mushroom. But eventually most do.

When the mycelium is mature and there have been warm rains to encourage significant growth, they sprout little buttons, or bumps, which push rapidly through the soil to become mushrooms. Once the mushroom has started to grow, there is no stopping it. They have been known to push through sidewalks, erupt through cellar floors, and to thrust through the walls of bank barns. And despite the shortness of their lives, they disperse countless numbers of spores into the air, to repeat the cycle again and again.

But let's back up and stay with the fruiting body, the mushroom, because this is what attracts the eye when walking through the woods. If we look at the structure of the common supermarket mushroom, *Agaricus campestris*, we see that it consists of a cap and a stem. Cut off the stem where it connects with the cap and look at the underside of the cap. Radiating from the center like spokes on a wheel are the fragile, fleshy gills that hold the spores.

To see the spores, place the mushroom cap, gill side down (make sure you have a mature sample—one with brown gills, not pink), on a white piece of paper and cover it with a glass jar. Remove the jar in



*Amanita virosa*: Destroying Angel, deadly poisonous

about one day and carefully lift the cap. The spores will be grouped exactly as they fell from the gills, creating rays of brown spores that lead from a white spot. The color of the spores, different in individual species, helps to determine the mushroom's identity. Some mushrooms have white spores, some pink spores, some green, black, and even purple. Spore color aids mycologists—people who study fungi—in the identification of mushroom specimens.

Even though all mushrooms send out spores, not all have gills. Some have an underside that looks like a pincushion, with spores are concealed in narrow tubes. Some have structures which look like teeth hanging from the cap from which spores are released. And, as mentioned earlier, not all mushrooms have cap and stem, therefore, spores are located in different places on different species. For instance, some hold spores in bright orange cups, some in brownish horns, and some, like coral fungi, carry spores on tiny antlerlike branches. The well-known edible morel carries its spores in the

Continued on page 32



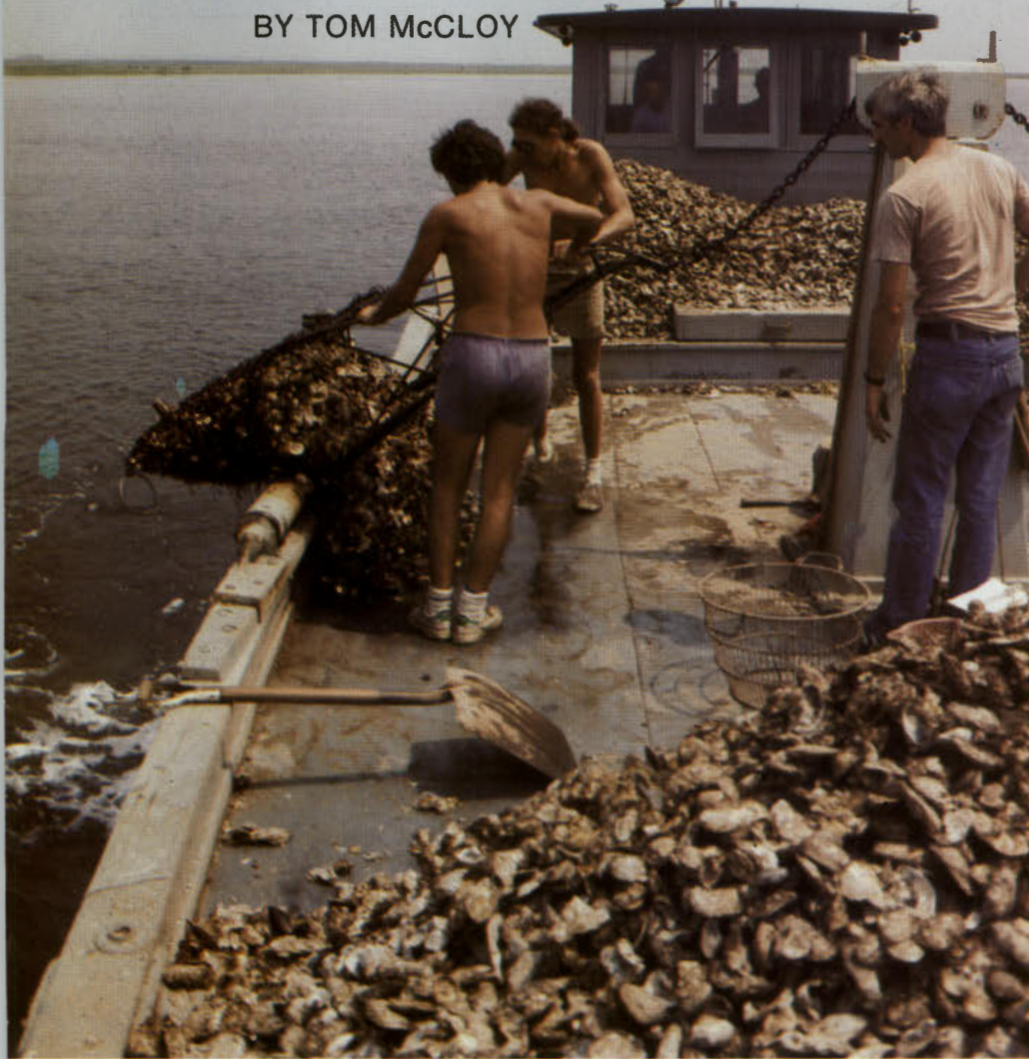
*Clitocybe illudens*: Jack O'Lantern, it glows in the dark

*Lycoperdon perlatum*: Gem-studded puffballs, edible



# MULLICA RIVER OYSTER PROGRAM

BY TOM McCLOY



Dredging seed oysters from the natural seed beds in the Mullica River.

During the summer of 1980 the Division of Fish, Game and Wildlife conducted a seed oyster transplant in the Mullica River—Great Bay estuary. This management program utilizes a valuable natural resource by producing market-size oysters for both commercial and recreational shellfishermen.

To fully understand the program it is helpful to be familiar with some basic aspects of oyster biology. Oysters reach sexual maturity after the first year. Spawning commences in response to a rise in water temperature during the summer. The gametes (eggs and sperm) are shed into the water, where the fertilized

eggs develop into free-swimming larvae. The larvae drift about with the prevailing currents for approximately two weeks. Near the end of this period the larvae settle to the bottom and attach to a clean, hard substrate such as shells or other oysters. Natural oyster beds, such as those in the Mullica River, have been built up by successive settlement and growth of young oysters.

Oysters inhabit a relatively wide salinity range wherever there is a suitable substrate. Although oysters may occur throughout an estuary, the vast majority of the seed oysters (young oysters) produced come from the lower-salinity water. The

primary reason is the better survival of spat (newly attached oysters) in these areas, attributed to low predation pressure. Following settlement, the spat are extremely thin-shelled and thus easy prey for their number one enemy, the oyster drill. The oyster drill is a small snail which feeds by rasping a hole through the oyster's shell and then ingesting the meat. The natural seed beds in the Mullica River have a salinity which is regularly below that which the oyster drill can tolerate, greatly enhancing the survival of young oysters. Unfortunately, in the low-salinity water the oysters grow rather slowly. By transplanting the oysters to the higher-salinity water of the market beds, growth is accelerated, allowing the oysters to attain market size in a shorter period of time.

The seed oyster program involves the dredging of seed by the state dredge boat, the *Senator Sharp*, from the natural seed beds in the Mullica River. The *Sharp* transports the daily catch to the desired market bed where the oysters are planted. At the present time there are three market beds in Great Bay which are scheduled for planting on a rotating basis. This practice allows certain beds to remain open to harvest while others are closed. After the seed oysters have reached market size, the beds are opened for harvest.

Hand-tonging is the only legal method of harvest from the market beds. Hand tongs have two wooden handles held together in scissors fashion. The heads of the tongs consist of a row of teeth and a wire frame that form a basket when closed. The oysters are scooped into the tongs by a back-and-forth motion and lifted to the surface with the tongs in the closed position.

During the 1980 program more than 7500 bushels of seed oysters were planted on the Reef Bed in Great Bay. It is anticipated that this bed will be opened for harvesting in the spring of 1981, probably in April.

So if you enjoy fresh oysters and hard work, clean up your tongs and get ready for some oystering!

For licenses, specific harvest seasons, and other shellfishing information, contact:

**Nacote Creek Shellfish Office**  
Route 9  
Absecon, NJ 08201  
(609) 441-3284



Photo supplied by Nacote Creek Shellfish Office

# Open House At the Fish Hatchery

**WHAT:**  
Open House

**WHEN:**  
Sunday, March 29 10 A.M. to  
4 P.M. (Rain Date: April 5)

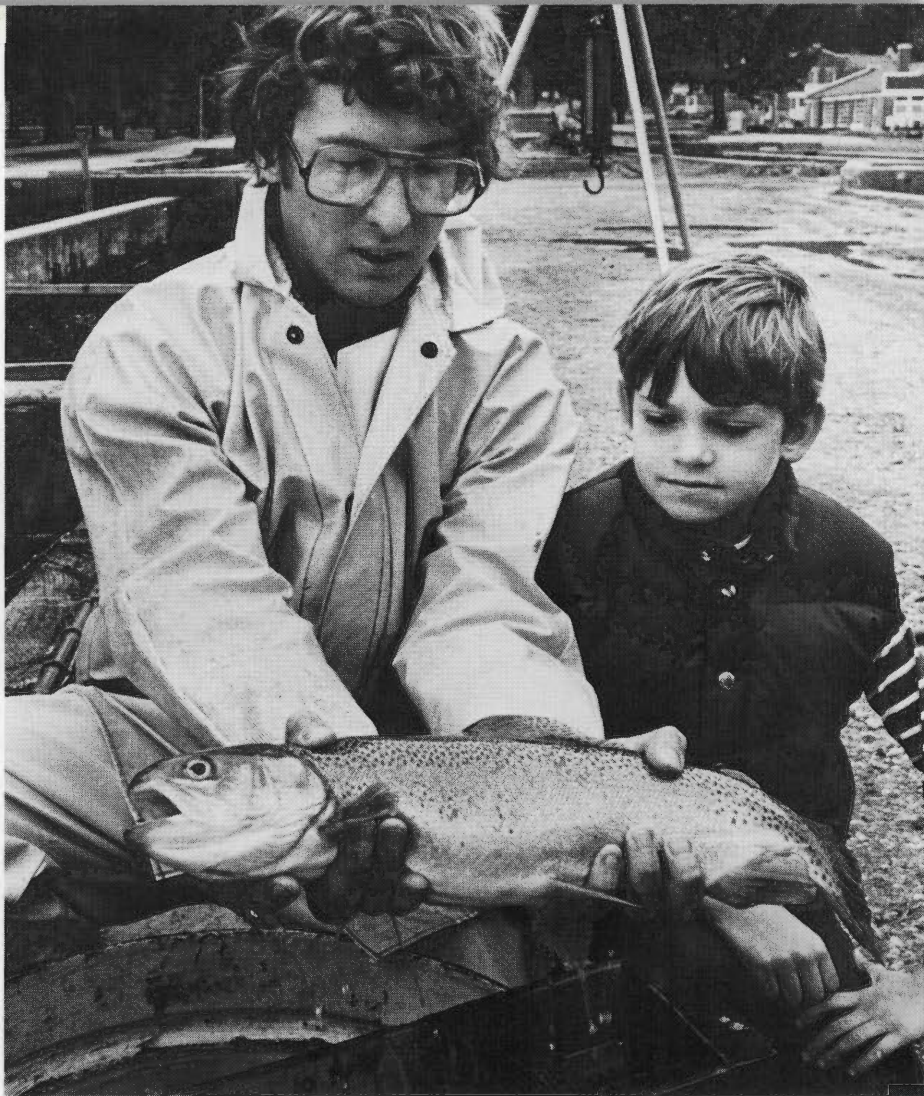
**WHERE:**  
State Fish Hatchery—Hackettstown\*

**WHY:**  
A Family Fun Day Outdoors

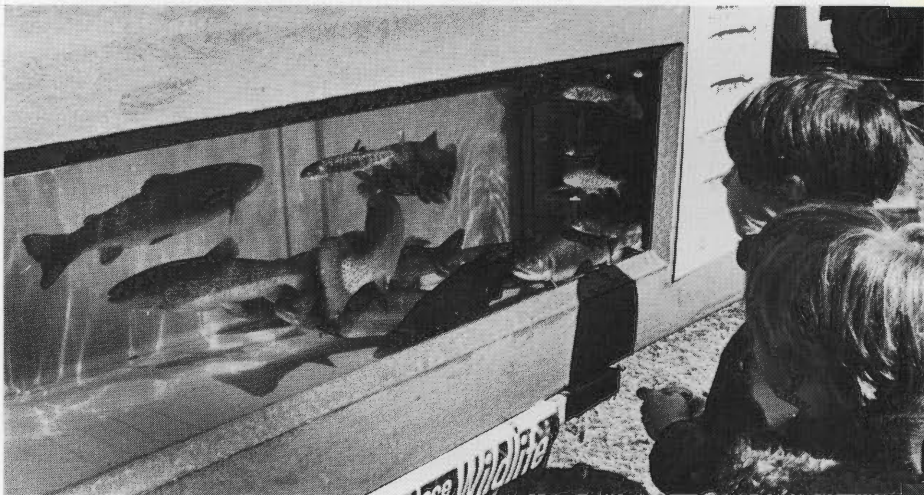
**ACTIVITIES:**  
For the Young and the Young-at-Heart

- Free bags of fish food to youngsters so they can feed the fish in the raceways.
- Free issues of New Jersey Outdoors magazines.
- Guided tours of the Fish Hatchery.
- See the tens of thousands of fish of all sizes in the raceways.
- Display tanks of Brown, Brook, Rainbow and Lake trout for viewing and photography.
- Display tank of Tiger Muskies and Striper Bass.
- Artist's Concept of the New Fish Hatchery at Pequest; also fact sheets on the new hatchery. And a short trip west on Rt. 46 will reward you with the new hatchery buildings in progress.
- The place to purchase your 1980 fishing license, trout stamp, etc.
- The place to find out everything you wanted to know about fish, fishing, and wildlife in New Jersey.

\*The Fish Hatchery is located one mile south of Route 46 from the center of Hackettstown on Rockport Road.



Division of Fish, Game, and Wildlife Fisheries Worker Pat Heun shows off a real "sugar fish" to hatchery visitor Keith Isakson of West Orange.



# ON THE BEACH

By Robert J. McDonnell



During a typical Atlantic storm, the commercial fishing craft "CHRISSEY JAMES" encountered steering problems upon entering the Manasquan Inlet, N.J. The craft unable to negotiate the inlet came to rest on the south jetty. Not long after graffiti artists went to work on the wreck.

PHOTOS BY AUTHOR



The commercial fishing boat, ARISTOCRAT, couldn't navigate the Manasquan Inlet during a storm—due to mechanical problems. The vessel came to rest approximately 1/2 mile south of the inlet. The ship was re-floated by transporting it to the inlet where it was lifted into the water by crane. Transportation of the craft along the beach is a story in itself!



This cabin cruiser appeared aground in the Shark River on the Neptune, New Jersey side. No one claimed the craft and eventually it was removed via an October fire.



Drawbridges are another hazard encountered by boaters. The owner of this beautiful sailboat discovered this while waiting for the drawbridge at Shark River Inlet, N.J. Something went amiss and the boat—on one of its first voyages—missed the inlet and went aground on Belmar's beach. The owner hired guards to protect his craft from looters. Here we see one guard watching the valuables on a moist, foggy morning.



On the northern tip of Long Beach Island, New Jersey stands Barnegat Lighthouse, "Old Barney". The lighthouse was commissioned in 1859 and is the second oldest lighthouse in the U.S. It is 172 feet tall. The lighthouse was darkened in 1943.



Jetties are always a hazard especially during storms. This craft struck a jetty in Bradley Beach, N.J. The boat was brought to the beach and eventually salvaged. In the interim children enjoyed the new found diversion.



This large vessel went aground in the Shark River. It was removed within a few days, apparently none the worse from its ordeal.



Sandy Hook Lighthouse—the oldest working lighthouse in the U.S. The lighthouse is 103 feet tall and went into service in June 1764.



A fairly common scene along coastal regions—a boat stationed in front of a bait and tackle shop. How did it get there? Was it ever to be used again? Who knows?



Dead swan on ice at Musconetcong

PHOTOS BY AUTHOR

## THE MYSTERY OF THE MUSCONETCONG

BY DR. DOUGLAS E. ROSCOE

In the fall of 1977, the newly organized pathology unit of the Division of Fish, Game and Wildlife received a phone call from a resident of Netcong. That call precipitated a three-year-long investigation into persistently occurring mute swan deaths on Lake Musconetcong. Located in the northwest corner of Morris County, this lake was created by damming the overflow from Lake Hopatcong to the north.

A resident on the eastern shore of Musconetcong reported three dead swans washed up on the beach. Interviews with this person, with Division personnel, and with other residents about the lake soon established that these recent deaths represented only a small portion of an estimated 180 mute swans which had died during the past 10 years. Interestingly, only the mute swans were involved—other species of waterfowl which shared the lake experienced no losses.

Before their death, affected swans appeared weak. They lacked the strength to fight the winds on the lake and as a result were blown against the ice or the shore. Unable to hold their necks up, they could be seen slowly bobbing their heads back and forth. In their terminal stages some drowned, while others crawled onto the ice or shore and died in convulsive seizures with wings flapping.

At first, the bloodstains seen near the dead swans or on their feathers suggested that the birds were being shot illegally; however, early autopsies revealed that the birds were bleeding internally into their intestines. This blood was discharged from the intestine at death.

In some ways the lesions on the heart and intestine of affected birds resembled those seen in duck virus enteritis (DVE), an exotic disease introduced from Europe, which threat-

ens our native waterfowl; however, that virus could not be isolated from swan tissues. Furthermore, DVE most certainly would have affected other species of waterfowl on the lake.

The first swan deaths occurred at about the time that chemical weed control was begun, so herbicide toxicity was suspected. Most of the herbicides used in recent years are short-lived and are applied in the late spring and summer, a time of year when no swans died on the lake. However, arsenic-based herbicides may have been applied to Musconetcong in 1969. Arsenicals are persistent, and livestock poisonings have been reported on soils sprayed 20 years earlier. Toxicologic tests, however, failed to detect any arsenic in the livers of affected swans.

Tests for avian cholera bacteria or avian influenza virus were also negative.

These repeated dead-ends and continuing swan deaths stimulated a more intensive surveillance of the lake. Press coverage of the situation elicited greater public participation, resulting in the sighting and capture of terminally ill swans. Although they could not be saved, these captives were useful in that blood and serum samples could be collected and fresh carcasses, unaltered by de-



Lake Musconetcong parasite. Pin-head size. Big sucker at top attaches to intestine.



Bloody discharge staining feathers of swan.



Diseased swans were weak and easily approached and captured.

composition, could be examined.

Examinations of blood samples indicated that all the swans were extremely anemic just prior to death and that the symptoms of weakness observed could be directly linked to the anemia. One bird was infected with avian malaria which could cause anemia, but this disease was not evident in all the birds tested. Obviously, the primary cause of the anemia was the massive bleeding into the intestine.

Careful dissections of the intestines from recently killed swans revealed pinhead-size white granules in the center of tiny ulcers. These granules, upon microscopic examination, were revealed to be a flatworm parasite or fluke with the scientific name *Sphaeridiotrema*

*globulus*.

The parasite draws the lining of the swan's intestine into a relatively large ventral sucker, damaging blood vessels and feeding on the blood. Swan blood cells could actually be seen in the stomachs of the parasites when magnified under the microscope. Each infected bird contained from 465 to 870 parasites.

This tiny parasite is an efficient killer. Twice, the entire transient population of 12 to 15 swans was wiped out within two weeks by these literally blood thirsty creatures.

The only previous recorded incidents of waterfowl mortality from *Sphaeridiotrema* infection involved lesser scaup ducks in the Potomac River just north of Washington, D.C. More than 50 birds were lost during late-fall outbreaks in 1928, 1930, and 1931.

The Lake Musconetcong parasite wasn't detected in swans earlier because the original birds had been dead for some time prior to examination and the parasites had died, releasing their hold on the intestine. The pin-head-size flukes were then lost in the bloody fluid filling the intestine. This illustrates the need for prompt recovery and submission on specimens when a wildlife disease is suspect.

*Sphaeridiotrema globulus* has a life cycle which involves any of various waterfowl species and a single species of freshwater snail. A susceptible host such as the swan is infected with the parasite, which releases eggs into the intestine. The eggs are carried into the lake water with the feces of the swan. The eggs hatch, releasing larval parasites which penetrate an appropriate species of snail. The swan feeding on aquatic vegetation inadvertently consumes infected snails. The larval parasite escapes from the snail in the stomach of the swan and attaches to the intestine to complete the cycle.

This cycle may account for why the disease has been largely restricted to swans on Lake Musconetcong. If the appropriate snail only occurs in Musconetcong then that is where the disease will occur. The occasional swan found dead in neighboring lakes probably contracted the infection from Lake Musconetcong snails. A search for the snail is currently

underway.

In order to prevent parasitic diseases, the parasite's life cycle must be interrupted. This can best be accompanied either by eliminating the intermediate host, a snail in this case, or by eliminating the definitive host, the swan.

Chemical treatments of the lake, which would kill the infected snails are nonselective and would kill other species of snails as well. This is probably not an ecologically sound approach, since snails are a food source for a wide variety of waterfowl which inhabit the lake. An alternative approach might involve the hazing or scaring of mute swans away from the lake for a period of years so that the infected snails have time to die or lose their infection. When the lake harbors only harmless, uninfected snails, the swans could be allowed to return. This plan assumes that the swans are the only species of waterfowl on the lake which are involved in the life cycle of the parasite. Since the scientific literature contains accounts of *Sphaeridiotrema* being found in greater and lesser scaup, pintail, mergansers, and domestic ducks, it is important to establish which, if any, of these species on Musconetcong may harbor an inapparent infection. This is being accomplished through collections and autopsies of waterfowl from the lake at various times of year.

There exists no threat to human health from this disease, since it is restricted to waterfowl and snails.

Autopsies of swans killed at the lake have provided evidence as to the origin of these birds. One bird examined during a recent disease outbreak had swallowed a steel shot pellet, which was lodged in its gizzard. Hunters are required to use nontoxic steel shot in areas determined to be potential sites for waterfowl lead poisoning. The nearest such "steel shot zones" to Lake Musconetcong are on coastal Long Island and on the Atlantic coast of New Jersey south of Shark River. It seems likely that the swans came from one of those locations. An infection with *Sphaeridiotrema* is not possible in saltwater environments, since the intermediate host of the parasite is a freshwater snail. This fact combined with the nearly complete restriction of swan deaths to

*Continued on page 32*



PHOTOS BY AUTHOR

## BACKYARD PREDATOR

BY ELEANOR GILMAN

It happens every year as soon as the weather gets warm. Just as sure as the crocuses bloom and the trees begin to bud, my orange tabby begins to terrorize the wildlife in our backyard.

When we first adopted Morris (who resembles his namesake), I was not accustomed to feline habits; so when my docile, innocent-looking cat dropped his first mouse outside the kitchen door, I supposed that he thought he had accomplished something worthwhile, and perhaps he had—no one wanted mice around

the house. But shortly afterward, when we heard the frantic shrieking of birds in the middle of the night, it was another matter. My husband ran out of the house in his pajamas, carrying a broom. Morris was standing over a quivering bird, while its nestmates were making the commotion we heard. It took a few broom swats to separate Morris from his prize. I took the bird inside and placed it in a shoebox on a high shelf away from the cat. In the morning, I called the nearby Wildlife Center for advice. The naturalist there told me to keep the bird warm and quiet. As for the cat, she said it was "nature's way." It was a phrase I tried to remember when the bird died a couple of days later.

I repeated it again when our next door neighbors quietly removed their bird feeder, under which Morris sat waiting early every morning. With the feeder gone, he then began sitting patiently under our own bird house. I could hear the babies chirping while the mother flew back and forth to feed them. Morris, also, watched all this activity with interest. We reluctantly took down the bird house this year.

It is "nature's way," I say, as the children erect a sign which reads, "Here lies a dead mouse." Angered, when they found out that I had been throwing dead birds into the storm sewer, they elicited a promise from me to bury all Morris' victims properly, from then on. They felt that even a mouse deserved a proper burial. I kept a shoebox and eye dropper for any victims that still showed some life. Some had a chance, for I usually found them without a scratch. It seemed that when they died, it was literally from fright.

Although Morris is undoubtedly an outdoor cat, and this cannot be changed, I have tried to give the birds a fighting chance by putting a large bell on him. I'm sure it has saved some birds; however, he is very patient, and has learned to wait quietly for his prey, pouncing suddenly so that his victim doesn't have time to hear the bell.

The squirrels seem to stand a better chance than the birds. They warn each other with a distinctive chattering when danger (Morris) is near, and although he tries very hard, to date he has killed only one squirrel.

A wild rabbit suffered a similar fate in Morris' clutches. Morris was chasing him around the yard. I was able to catch the rabbit—a small brown creature, probably a baby. I didn't quite know what to do with him since wild rabbits cannot live in captivity. I kept him in a cage overnight and released him the next morning, hoping that he would find his home, wherever that was. Unfortunately, that afternoon, the cat had the rabbit in his claws again. I put him back in his cage, and when I looked at him a little while later, he was dead. I suppose the ordeal was just too much.

I must say that Morris is smart enough never to attack an animal larger than himself. We keep a domestic rabbit, whom he is afraid of. And the raccoons regularly invade the garbage pails without worrying about Morris. In fact, the blue jays, those aggressive birds, fly freely around the yard, without feeling threatened. I wouldn't mind seeing one peck this bully on his head!

Sometimes in my daydreams, I see a flock of eagles, rushing to attack Morris. That would be justice! Meanwhile, Spring is coming, and I must remember, it's "nature's way."



Although the day was geared toward the younger generation, it was enjoyed by many of the "old-timers" in attendance. During the registration period, a display of old and antique decoys was available for inspection.

# GREENWING DAY

BY HENRY R. HEGEMAN

Ask the average duck hunter to define the word "greenwing," and he'll probably tell you it's a small, swift-flying duck usually found to be one of the harbingers of the fall migration. Naturally he's referring to the Green-winged Teal. Ask the same question of a duck hunter who is also a member of Ducks Unlimited (DU) and there's a good chance he'll tell you a greenwing is a junior member of DU, ranging in age from birth to 17 years, who will someday take over the reins of the Ducks Unlimited Organization.

The members of the Burlington County Chapter of Ducks Unlimited recognize that the future of this nation's waterfowl lies in the hands of the next generation and for the past two years have held a special "Greenwing Day" designed to kindle a lifelong interest in waterfowling and waterfowl conservation.

This special day has been held each April at the Conservation and Environmental Studies Center located at Whitesbog, NJ, and offers youngsters a chance to learn about waterfowl conservation, decoys and decoy carving, waterfowl identification, duck boats and their construction, duck and goose calling, blind construction, safe firearms handling both in the marsh and on the water, and retrievers and retriever training. Strong emphasis is placed on the fact that there's more to duck and goose hunting than merely taking your gun down to the local pond and killing a few ducks. The different events held throughout the day convey the attitude that the boats, the decoys, the dogs, the guns, and the companionship of others is really what waterfowling is all about.

According to Fred Schletter, chairman of the Burlington County Chapter, "The future of waterfowl conservation depends on the next generation. Our hope is that we can instill a sense of sportmanship and responsibility in these kids that goes along with the use of this most precious natural resource."



Youngsters were taught waterfowl identification both on the wing and in the hand.



After the models, the move was made to the real thing. Here, three youngsters prepare to make way for the gunning grounds.



Coupled with the safe handling of firearms and boats, each child was given the opportunity to learn proper gun handling techniques.

Listed below are two names and phone numbers of members to call for current information on this year's event including the date and time. Call after 6 PM the following:

**Fred Schletter (609) 461-3812**  
**Henry Hegeman (609) 893-9218**



KEN ORAVSKY

The proper use of a sighting device: the user lines up slot and hair sight on case with an object, while the magnifier allows her to read compass scale. The compass used is a lensatic type, similar to U.S. Army compasses and is quite accurate.

# Navigation Methods For Outdoorsmen

BY KEN ORAVSKY

When the word navigation is mentioned, most people try to avoid thinking about it, feeling that it is either only necessary for long expeditions, or when one is lost. In truth, navigation is a tool that greatly decreases your chances of ever getting lost, and should be in use whenever you are in the woods.

The first and most important rule of navigation is to always try to have some idea of where you are, and to stop and think as soon as you are not sure, not an hour later. In New Jersey alone, I have met long-distance backpackers who had no idea where they were, a hunter wandering around after dark because he couldn't find his car, and many others who kept blundering along aimlessly, long past the last point that they recognized, and rather far off course.

The simplest way to keep track of where you are is to obtain a map of the area you plan to be in. The map needn't be a topographic map if you are going to be in any of the state parks or state forests, because park maps showing roads, streams, trails, and other features are available free at all park offices. If you are planning on venturing into areas for which you cannot obtain these maps, then U.S. Geological Survey (USGS)

topographic maps might prove helpful. When you feel that the walk you want to take is too short to warrant purchase of these maps, then you should at least bring along a compass. Even if you don't know where you are in terms of map location, you will know in which direction you have walked, and therefore in which direction you should return. Finally, if you have neglected all these aids, there are still several other navigational methods available to you, which will be discussed later.

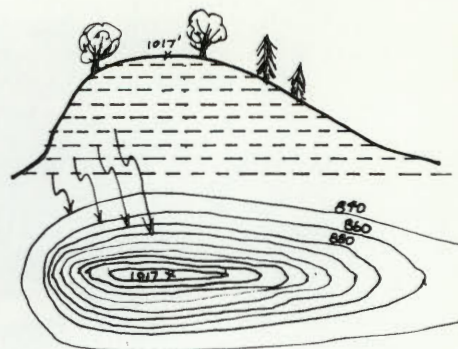
## MAPS

First, though, we will discuss maps, since proper use of a map can eliminate the need for other methods. The maps available at park offices are very similar to standard road maps, except that their scale is enlarged to show more detail, and more attention is given to trails, streams, and sometimes ridgetops. Each map will have a north arrow on it. Since these maps cover only a specific parcel of land, the land is often positioned to allow for the best orientation on the paper, and north is not always at the top. Therefore, don't assume, always look for the north arrow.

All worthwhile maps include a scale, which shows the user how to correlate maps distances to actual distances. Don't trust a map that has no scale on it, since it might not even be drawn to scale, and it will probably give you the wrong idea about certain critical distances.

When you are walking, pull out the map often, and look ahead on the map for the next feature you should pass. When you reach the feature, look at the scale to determine how far you have walked. In this manner, you will know exactly where you are on the map, and you will also learn to judge distances in the woods. Even when you are not exactly sure of your position, you will still have a good idea where you are. By remembering the last feature that you identified, and the approximate distance that you have walked, you will know that you are within that radius of that feature. Your idea of location would be further improved if you had an idea of which direction you had proceeded.

USGS topographic maps offer an even more detailed representation of the land, as they show three dimensions by means of *contour lines*. Contour lines are imaginary lines on the earth's surface along which all points are at the same elevation above sea level. The patterns formed by these lines indicate the relief of the land (topography). The pattern of contour lines can represent slopes, valleys, cliffs, plains, and many other features. The detail of these maps is excellent, and in addition to streams, swamps, and barren rock, even individual buildings are shown in rural areas.

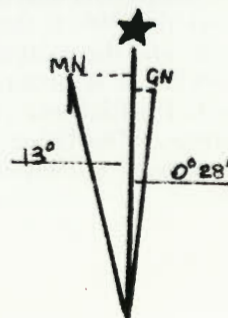


Landforms can be visualized by understanding contour line patterns. Notice how the lines are closer together where the slope is greater.

There are several important elements to look for when you are going to use a topographic map. First, check the date of survey on the map. Even though the topography will not change in 30 years, roads and trails will. Look for the most up-to-date maps, and even then, if the last survey was 12 years ago, don't be surprised to find a few changes.

The *contour interval* is also of great importance to the map user. This interval represents the vertical difference between two consecutive contour lines. The contour interval is 20 ft. for most maps in the eastern U.S., but many vary for other areas. If you fail to pay attention to the contour, you might interpret the topography as being steeper or flatter than it really is.

Each map covers an area of equal size, called a *quadrangle*, and north is at the top of the map. This is true north, though, and is not the direction in which your compass will point. The compass points to magnetic north (MN) which is somewhat near true north (GN), but far enough away to be of significance. The difference between these two directions is called *magnetic declination*. Declination varies depending upon geographic location, and is indicated on the map by the following symbol: Since true (grid) north and the north star differ by only 1/2 degree, they can be assumed to be the same for virtually all navigation. However, these differ from magnetic north by about 13° in New Jersey, which is something to be concerned about. The solution is to always use magnetic north when orienting the map by compass,



and ignore true north. True north should be used when navigating by sun or stars.

In addition to their value in navigating, topo maps can be instrumental in determining where to go in the first place. They are an excellent source of information about springs, good camping spots, prime game habitats and many more, once the user learns to recognize these areas on the map.

Maps can be ordered by quadrangle name from:

1028 G.S.A. Building  
18th and F Streets, NW  
Washington, D.C. 20242

They can also be viewed and copied at several libraries in the state, but it is essential that good quality copies be made, as every detail is important. Upon request, USGS will send an index map of all quadrangles in a given state, and also a guide to map use and symbols.

## THE COMPASS

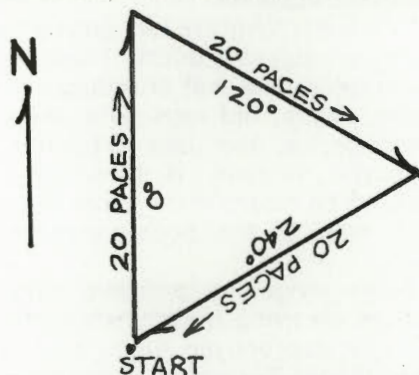
Many types of compasses are available today, and in a wide price range. While some have centimeter scales, magnifiers, and many other convenience features, the most important feature to look for is some sort of sighting device, preferably one that will allow you to read the bearing and sight simultaneously.

Both liquid-filled and dry models are available, both of which have proven to be quite reliable. If you opt for one that is liquid filled, one without a bubble, or with only a very small bubble is preferable. On certain models, the degree scale will rotate (usually on the liquid-filled models); on others, a needle will rotate to indicate north, and the degree scale will remain stationary (usually on the dry models). Again since both types work well, it is up to the prospective buyer to decide which will be more comfortable to use.

Once the compass user understands the difference between magnetic north and true north, it is time to practice following a bearing. The actual bearing to be followed in the outdoors will be determined by map reading, by knowledge of the area, or by knowledge of what bearing was previously used. Once the bearing is chosen, the user will orient the compass index so that it agrees with the bearing. Then, without moving the compass, the user looks through the sight, and notices the most distinguishable object that is in line with the sight. He then proceeds to this object, and when he arrives, he stands in line with the exact line of sight, and repeats the procedure. While it may sound rather time-consuming, with a little practice you will be able to move quickly, without sacrificing accuracy.

A good practice task is to find an open area, and drop a small object in one spot. From this point, you walk 20 paces on a 0° bearing, stop, walk 20 paces on

a 120° bearing, stop, and walk 20 paces on a 240° bearing. With some practice, you should end up within reach of the object. For further practice, distances can be increased, or the whole practice can be moved into the woods.



As well as being a good test of skills, this procedure will also demonstrate the value of accuracy. Accuracy is very important in navigation, and can be improved in several ways. First of all, wait until the needle comes to rest before taking a bearing. When sighting an object, try to choose a narrow object or a very distinct point. Also, try to read the compass to at least one or two degrees. (Even though many compasses only have 5° gradations, they can usually be interpolated to one or two degrees.) Remember that if you are 5° off a bearing, and you walk for a mile, you will be off course by 460 feet at the end of the mile. Finally, watch out for large metal belt buckles, cameras, guns, and other large metallic objects. Even though the compass will probably not point directly at them, they will influence it somewhat if they are closer than 5 to 10 feet (depending on their size). The best method to overcome this problem is either to set the object down and take the bearing a few feet away from it, or to turn the compass chokes over to a "metal free" member of the group.

## OTHER METHODS

All this knowledge will not help much if you find yourself in the woods without map and compass. Do not despair, though, for there are still other methods of navigation. While most everyone has heard stories of persons who found their way out by searching for the mossy side of trees, this method is very unreliable, and at best is probably only accurate to within 90°.

The best navigation method is still to maintain an idea in which direction you are traveling, even if you lack a compass. Also, make note of any features you might pass, and even look backward occasionally, since the trail will appear surprisingly different when you are walking the other way. The direction of stream flow is a good indicator of the direction of the nearest rise in elevation,

as streams always originate on higher ground. If you are totally unsure of your course, you can proceed downstream, and it will almost always lead to something recognizable.

If you take along pencil and a small note pad, written notes such as "crossed stream flowing to the left 1/2 mile after dirt road" are much more reliable than memory. In addition to being useful for returning on that trip, they will often prove valuable in finding that great fishing spot two years from now.

The actual finding of direction can be accomplished in several ways, all of which involve either the sun or the stars. If you are wearing a watch, you can find due south by lining up the hourhand with the sun (this can be checked by casting a shadow with a small stick), and then sighting halfway between the hourhand and the twelve. While this method may be off by as much as 20°, it will give you a fair idea of direction.

If you find yourself wandering the woods at night, you can navigate by the stars. All stars appear to revolve around Polaris, the North Star, because of the earth's rotation. Polaris is not the brightest star in the sky, but instead is only one of the brighter stars in the northern sky. Therefore, it is almost always impossible to find Polaris without the help of "pointer" stars. The two best known pointer stars are part of the Big Dipper, and are very easily found. If for some reason the big dipper is obscured, you can look for Cassiopeia, a "W"-shaped constellation on the other side of Polaris from the big dipper.

Another useful constellation is Orion, the hunter. Orion appears in the southern sky, but is most helpful because the third star in Orion's belt rises due east and sets due west.

If you look for these constellations on a clear night at home, they will be easily remembered and easily located when needed.

One final point about celestial navigation to remember is that it is extremely accurate. While a compass user must always consider magnetic declination, and the navigator who uses the sun can only hope to be reasonably accurate, the navigator who uses the stars can be assured that his bearings will be accurate to within 1/2 degree.

Of course, you might still end up out in the woods on a cloudy day or night, and then none of these methods will be of any use. You will then have to rely on the observations that you were making as you went along. This, I hope, emphasizes the main point of this article: Navigation is a practice that should be employed everywhere, all the time. If you always try to maintain some idea of where you are or which way you have come, you should never have to contend with the problem of being lost. □

Continued from page 21

## Forest Fungi

crevices of its wrinkled surface.

But why are fungi so variable? Why so many modes of spore dispersal? Like everything in the forest, and the natural world, fungi are adapted to their habitats. Each mycelium plant sends up its own unique fruiting body that is best suited for disseminating spores in its environment. Shelf fungi—those fungi that protrude horizontally from a tree—send spores down to the ground. A puffball on the ground sends spores up into the air when punctured or kicked. And from sticky, gelatinous fungi, insects carry spores away to new locations. Birds, and rodents sometimes disturb mushrooms on the ground and scatter spores. Each plant has its special characteristics to ensure survival of the species.

Fungi are not only interesting for their various forms, however. Many mushroom hunters are familiar with the wide range of edible species, the most common of which are the puffball, *Lycoperdon* spp., shaggy mane, *Coprinus comatus*, morel, *Morchella esculenta*, and meadow mushroom, *Psalliota campestris*. On the other hand, most people are also aware that some mushrooms are poisonous. Among these are the beautiful but deadly *Amanita virosa*,

commonly known as the destroying angel, and *Amanita phalloides*, or death cap. The fly agaric, *Amanita muscaria*, is known for its hallucinogenic qualities.

And some fungi are recognized by their unmistakable odors. These include odors like that of rotting fish, garlic, skunk, old rags, and anise. One species, the Jack O'Lantern, *Clitocybe illudens*, is bioluminescent, which means that it glows in the dark with a dim phosphorescent light.

Some fungi, the parasitic fungi, survive on living matter, while others, the saprophytic fungi, live on dead matter. For example, the parasitic birch polypore, *Polyporus betulinus*, breaks down the sapwood of living gray birch trees, clearing the forest for younger, stronger trees. In humans we recognize ringworm and athlete's foot as parasitic fungi. Many crops and cultivated trees are destroyed by rusts, smuts, and scabs, all parasitic fungi. But antibiotics derive from saprophytic fungi, and most fungi on the forest floor are saprophytic. This is not to say that all parasitic fungi are "harmful" and all saprophytic fungi are "good." In a well balanced forest, both are desirable. It is important that live trees are parasitized by fungi.

But why? And how does an invisible spore invade the tough bark

of a giant tree? How does it penetrate the resin and sap? Trees, like all living plants, are hosts for many living creatures. Insects lay eggs in the grooves of the bark. Woodpeckers drill holes to get at the eggs. This hole then becomes a perfect entrance for spores, and a protected spot for future fungi plants to grow. But woodpecker holes are only a small contribution to weakening a tree. Wind tears off branches, exposing the heartwood. Large mammals such as deer and bears strip off bark. Even lichens and mosses do their share in readying a tree for fungi.

Once the tree is down, fungi take over. Whole branches may be covered by groups of dainty purple parasols, stubby brownish toadstools, bright orange ruffles, or white woody brackets. Old beaver swamps are ideal places to see fungi. Great ghosts of once-stately trees stand in water ornamented in every conceivable type of fungi. Yet fungi exist everywhere, in our lawns, the back woodlot, and in pastures.

And in the forest, it is only a matter of time before a tree is invaded by colonies of fungi. But then, too, it is only a matter of time before new life springs from the soil provided in part by fungi. Trees and fungi are inextricably bound, the beginning and the end of a natural cycle of life and death. □

Continued from page 27

## MYSTERY

Lake Musconetcong and the acute nature of the disease suggests that the infection was contracted at the lake and not brought in with the transient swans.

Mute swans are an exotic species of waterfowl originally introduced from Europe into Long Island and Rhode Island. Their range in the United States now extends from

Massachusetts to New Jersey, with a sizeable flock in northwestern Michigan. Normally parasites which have evolved with their hosts do not kill them, since that means the parasite's death as well. However, an exotic species such as the mute swan, which has not experienced such coevolution, may be more vulnerable to the parasite than are native waterfowl.

Although considerable progress has been made in identifying the

cause of mute swan deaths on Lake Musconetcong, additional questions remain to be answered. Does the diseased snail species occur only in Musconetcong and not neighboring lakes, if so, why? Where in the lake are they located? Why has the parasite been reported elsewhere in mute swans and other waterfowl with no apparent ill effects? These are some of the questions which may be resolved as the investigation into the mystery of Musconetcong continues.

### FRONT COVER

*Early Spring in the Jersey Pines—Photographed by Thomas A. Carey.*

### INSIDE BACK COVER

*The Eastern Bluebird—Illustration by Carol Decker (See article on page 6.)*

### BACK COVER

*Sea otter symbolizes the "We Care About Oceans" theme of National Wildlife Week, March 15-21, 1981. The National Wildlife Federation and its state affiliates have been sponsoring this event since 1938, and this is the 44th time.*

© Carol Feder



New Jersey State Library



**National  
Wildlife  
Week**

**March 15-21, 1981**

**We care about  
OCEANS**



Join and Support the National Wildlife Federation and State Affiliates