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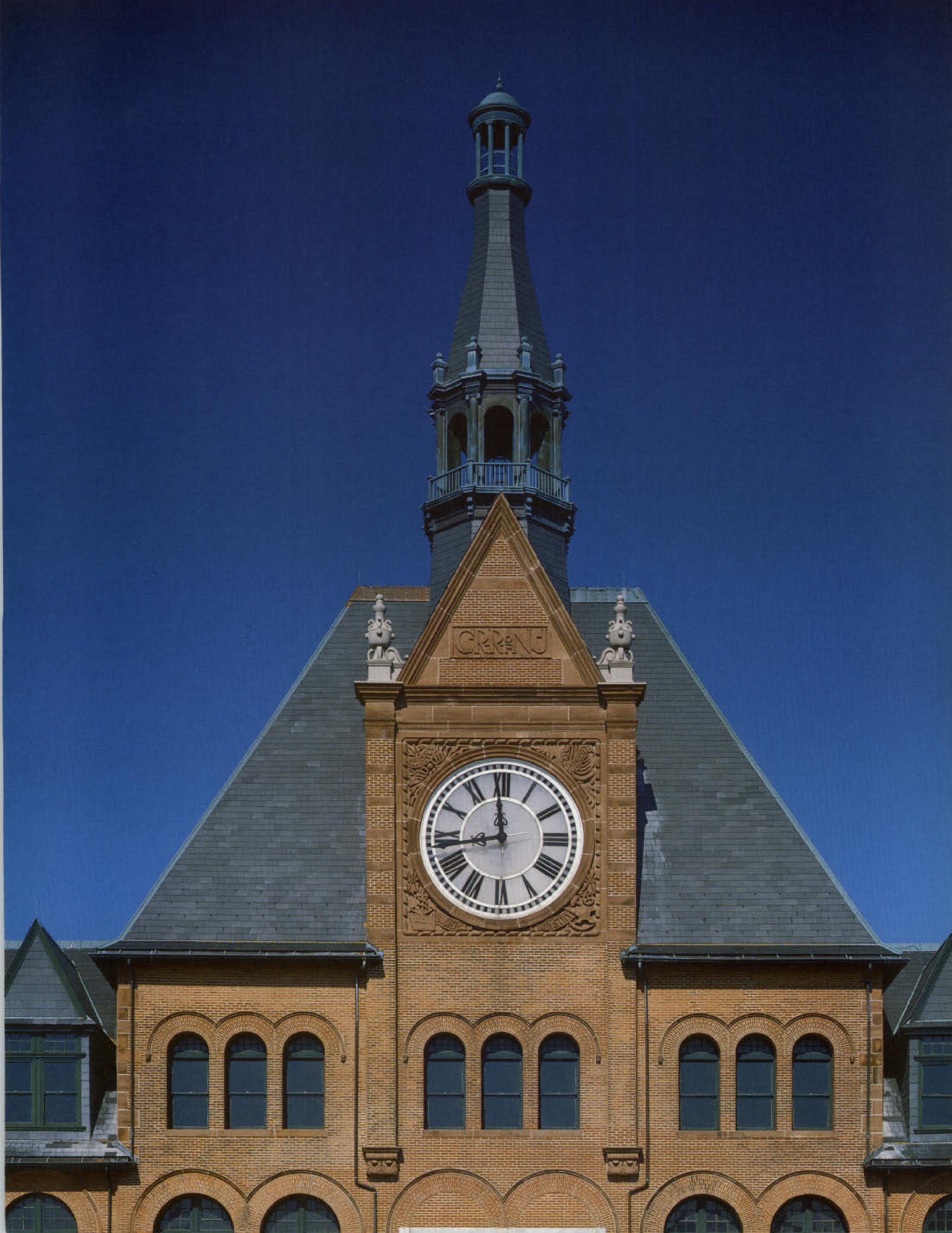
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New Jersey Outdoors

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Front: Untitled original oil painting by Barry Bichler.
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Inside Back: Wood Turtle. Original acrylic painting by Carol Decker.
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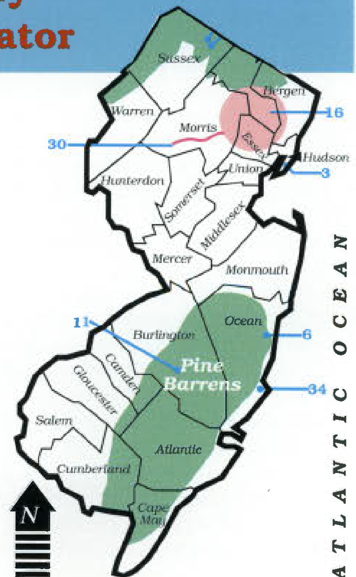

Editorial

Preserving large, contiguous tracts of open space, as Karl Anderson and Tony Petrongolo state in their articles, will provide untold numbers and kinds of wildlife and flora with habitat. But its impact on millions of New Jersey residents may be immeasurable. How do we quantify the value of recreation, wildlife-associated activities or the chance to just get away?

Legislation has been introduced to create a 10-member bistate task force to study strategies to preserve natural and scenic resources and open space along the New Jersey—New York border area. Tracts such as the Skylands or the Sterling Forest must be preserved not only for their watershed and wildlife values but also for the outdoor opportunities they offer us. Preservation projects of regional significance are encouraged by the DEP Green Acres Program, as are acquisition and land-use initiatives that create greenway networks.

The shortfall of more than 600,000 acres of recreational real estate has already been well documented. Much of the parkland that we presently enjoy is at or above its carrying capacity. Between Memorial Day and Labor Day 1988, our state park facilities were closed to the public more than 130 times because of being filled to capacity. More than 138,000 people were turned away. In addition, almost 10,000 family campers were greeted by "closed" signs as all available campsites were filled.

Wildlife refuges, protected forested tracts and open space recreational areas cost local taxpayers very little. They do not require millions of tax dollars being poured into new roads, sewer collection systems and massive publicly owned treatment works to handle the added wasteflow. Additionally, if the land is not developed, no new schools need be built. Local residents save tax dollars that would have been spent for teacher and staff salaries or to pay for increased local services like police, fire and trash disposal.

The myopic reach for immediate tax ratables overlooks the long-term financial drain the local tax base may experience due to increased services and infrastructure. Open space and the recreation it provides is an investment in the future. Recreational real estate means billions of dollars to New Jersey's economy.

From data collected by the U.S. Fish and Wildlife Service in 1985, it was estimated that 77 percent of the U.S. population 16 years of age or older enjoyed some form of wildlife-related recreation. These 140 million Americans spent nearly $56 billion for wildlife-associated activities including equipment purchase and rental, food, travel, lodging, membership in conservation organizations and license fees. Seventy-one percent of New Jersey adults participate in these activities.

In his feature on preserving and protecting waterfowl habitat, author Pete McLain states that the waterfowl resource generates about $7 billion per year from birders, hunters and naturalists. These individuals boost local economies when they buy gasoline, stop for meals and stay in hotels. The ripple effect from their purchase of binoculars, field guides, cameras, film, tents, clothing and other equipment reaches other corners of the state's economy as well.

Expenditures for sportfishing in New Jersey in 1985 totaled $855 million. Those expenditures in turn created an economic output of $1.4 billion. Wages and salaries due to sportfishing's impact were estimated in excess of $400 million. An estimated 26,000 jobs were created and $51.4 million collected in state sales and income taxes.

An economic study surveying 1,000 of last year's birding visitors was done by the Cape May Bird Observatory. According to David Wiedner and Paul Kerlinger, observatory staff members, these visitors paid for accommodations at 96 hotels, bed and breakfast inns, and campgrounds. With an average stay of four days and three nights, these 1,000 birders poured $100,000 into the local Cape May economy during one visit. With more than 75,000 birders frequenting this hot spot annually, the economic contribution to Cape May and New Jersey is in the millions of dollars.

There is economic wealth in undeveloped open spaces. Millions of anglers, birders, hikers, hunters and campers mean billions of bucks.

Preserving open space is more than preserving the diversity of species. It is an investment. Carefully planned development and conservation of recreational real estate will provide the acreage millions of us want and need for wildlife-related and outdoor activities. It also ensures that our children in their own lifetime will have a park or forest where they can get out and "eNJOy!"

GK

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Joyce M. Albanezi
Assistant to the Editor

Jackie Fisher
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Mark Suloff
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New Jersey Outdoors Credo
This publication is dedicated to the wise management and conservation of our natural resources and to the fostering of greater appreciation of the outdoors. The purpose of this publication is to promote proper use and appreciation of our natural, cultural, and recreational resources, and to provide information that will help protect and improve the environment of New Jersey.

Cent' Anni

By Frank Gallagher and Debra Kindervatter

Division of Parks and Forestry

It was a cool April morning. Suzanna Minarcik came up to the ship's deck from below, accompanied by several other voyagers whom she had recently met.

The journey from her central European village had begun several weeks earlier. Since leaving, she had grown increasingly tired and scared. She was also anxious this clear 1914 morning. It would not be much longer before she was reunited with her older sister who had already made America her home.

Suzanna peered at the land. Ahead she could see the statue that she had heard so much about, a beautiful sight on such a fine morning. For her, this lady of liberty was a sign of hope for a better way of life.

The stories of rejection and deportation, circulating among the steerage passengers since the ocean-going "Shedliks" had left port, had made her apprehensive about Ellis Island. Still, Suzanna was confident. She was young, healthy and willing to work hard. This intense work ethic, a common denominator among the vast majority of immigrants, would become the fuel which fired an industrial revolution in their new nation.

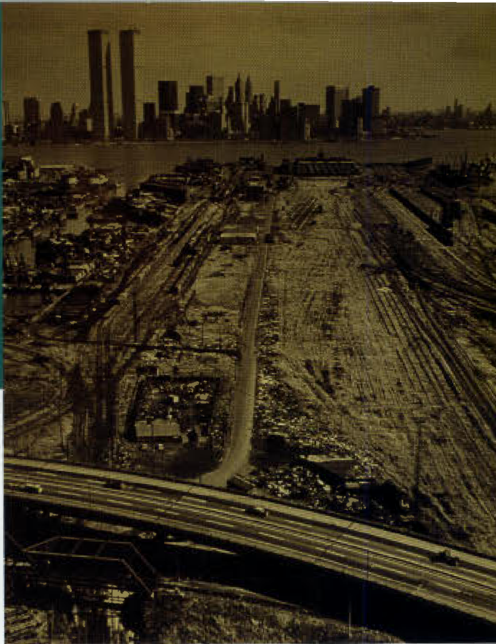
Hours later, Suzanna gathered her few belongings and breathed a sigh of relief. She had been allowed to enter America. Now, as she tied her babushka around her head and waited for the ferry that would take her to the railroad terminal, her thoughts were full of hopeful anticipation. She was about to begin a new life in America.

The ferry ride to the Central Railroad of New Jersey (CRRNJ) Terminal was short. The maritime passenger terminal, built in 1889, was only a few hundred feet from Ellis Island. Suzanna stepped into the building and looked upward. Its 85-foot gabled ceiling, exposed ironwork with star-like decorations and shining brass gave her the feeling she had entered a cathedral.

Suzanna was amazed by the traffic and bustle generated at the terminal. She tried to count the people, but there were too many. In addition to the thousands of immigrants arriving from Ellis Island, as many as 5,000 each day, there were tens of thousands of commuters and workers hurrying between the trains and ferries. The CRRNJ Terminal would serve between 30,000 and 50,000 people daily in 1914. These first moments in search of her new life were unlike anything she had ever experienced in the small European village of Usanovshe, in the region we recognize now as Czechoslovakia.

On an important site for the transportation industry, the CRRNJ had constructed a smaller waterfront terminal in 1864. This

During the terminal's abandonment period, the railroad tracks leading to it were removed. In the foreground is the New Jersey Turnpike extension to the Holland Tunnel.



Division of Parks and Forestry

From a balcony visitors, at eye-level with the restored ironwork and "star-like" decorations, can view the central waiting room below, illuminated by skylights along the terminal building's ridge line.

Richard Scanlan

wooden structure, which played a significant role in the transportation of soldiers and goods during the Civil War, had become inadequate by the 1880s. The new complex, designed by the Boston architectural firm of Peabody and Stearns, included 12 covered tracks, an enormous three-story headhouse and a ferry house with three docking slips.

In the middle of this transportation hub stood Suzanna, who, like many immigrants, did not speak a word of English. Her sister, who lived in Pennsylvania, could not come to meet her, leaving this 19-year-old sojourner with the problem of finding her way across a strange land.

Uniformed workers were everywhere. The railroad had thousands of employees: people to move luggage; people to sell tickets; others to check tickets; and many more to move freight. The CRRNJ was such a large organization that it even had its own police force and doctor, indicative of how the rails had also become the social and economic fabric of the surrounding communities. Yet few, if any, of these spoke Suzanna's native Slavik language or could translate for this confused, anxiety-filled foreigner.

Fate watched over Suzanna on her journey. She made the rail connections necessary to get to Pennsylvania and found work there scrubbing floors. Two years later Suzanna married Michael Babinchak, a coal miner who had immigrated in 1900, also from the central European area that later became Czechoslovakia.

Together they raised a family of eight. These "first generation Americans" assimilated to the American culture more completely than either Suzanna or Michael.One of the daughters eventually settled in Elizabeth, a few miles from the terminal where her mother first set foot in this country.

The waterfront terminal served as a migration route for millions of Suzannas. Between 1892, when the U.S. government established Ellis Island as a central immigration entry point, and 1954, two-thirds of the 12 million immigrants processed at Ellis passed through the terminal to look for a new life in America.

There are many stories like Suzanna's, each unique and a contribution to both our past and present. Some of those who waited anxiously in the terminal journeyed to the heartlands of America; others, not as far. From the waiting room, bright with sunshine from skylights high above, a German family set out to reach relatives in Amsterdam, New York, but departed instead on a short ride to Amsterdam Avenue in New York City. Having little money left, they settled there and became productive members of that neighborhood community. Originally from County Cork, Margaret found herself passing through the cavernous headhouse at the age of 22. Her saga had begun nine years earlier when she left Ireland to milk cows in Scotland and ended when she settled in Bayonne, not five miles from the terminal, to raise a family.

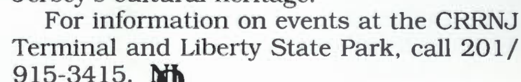
Many of the "new Americans," the eight million who embarked from the terminal for family, homes and a chance to be free, did not, in fact, travel far. New Jersey's expanding industrial centers provided the opportunities these courageous people sought.

The age of rails, except for a brief resurgence during World War II, bowed to the modern modes of transportation. Ribbons of iron gave way to concrete arteries pulsing cars, trucks and airplanes. Fifty years and two bankruptcies later, the CRRNJ Terminal finally closed its doors in April 1967.

By 1972, the state had purchased the property and several hundred acres of derelict waterfront, beginning the massive cleanup and process to restore the historic complex to the condition it was in when Suzanna set foot there. In 1976, the partially restored CRRNJ Terminal, a new visitor's center and green lawns opened to the public as Liberty State Park. The eastern terminus for the Jersey Central Line, whose centennial is being celebrated on September 30th, was listed on the New Jersey Register of Historic Places and the National Register in 1975.

The ferry house is gone. The largest gable shed ever erected was replaced in 1914 with the Bush-type, 20-track train shed we see today. But the restored French Chateaux-styled headhouse proudly stands with the Statue of Liberty and Ellis Island as an historic trilogy, commemorating a unique era from our nation's past. With special events and exhibits throughout the year, the terminal actively plays a major role in reliving America's past and preserving New Jersey's cultural heritage.

For information on events at the CRRNJ Terminal and Liberty State Park, call 201/ 915-3415.



Frank Gallagher, chief of interpretive services at Liberty State Park, has been employed by the Division of Parks and Forestry for nine years. **Debra Kindervatter** is in her first year of state service as an historic preservation specialist at Liberty.

Fly-fishing the Toms
... Is Not By the Book

By Joseph S. Bobinis

Pamela Bobinis

You approach the stream and begin formulating your plan of attack. It's early fall, and although you've had good success fishing the river all summer, you hadn't bothered to fish during the early part of the season. The number of spring anglers fishing the river has doubled in recent years, and fly-fishing the Toms is not a social affair for you.

You enjoy fishing the section of the Toms in Riverwood Park, Dover Township. Is it because this summer you landed and released several brookies measuring 15 inches or better? The Toms River, one of New Jersey's most underrated trout streams, is also one of the most unique. Smooth-flowing pools and riffles add to the mystique of these central Jersey waters.

The Toms is probably fished from less than 10 percent of its 20 miles of riverbank. The most accessible and fishable waters are the 2.5 miles flowing through Riverwood Park. And now a one-half mile stretch, running through the lower park, has been proposed as "Trout Conservation Waters."

Trout conservation waters have the capacity to sustain trout year-round, and there have been claims that trout live and reproduce in the Toms. The proposed regulations, announced by the DEP Division of Fish, Game and Wildlife earlier this year, call for the river stretch from Route 70 downstream to Route 571 to be managed as a Trout Conservation Area.

If adopted as proposed, the regulations would allow year-round fishing with artificial lures only and a daily creel limit of one fish, 15 inches or larger. The state will stock this portion of the Toms, believed capable of supporting a quality year-round fishery, in the pre-season, twice in season and again in the fall. No trout may be kept during the pre-season and in-season stocking closures.

Remember when nobody fished the river during the week and it boasted very few anglers on weekends? Since the Toms River Chapter of Trout Unlimited began stocking the river, improving access, and working with the DEP Bureau of Freshwater Fisheries to improve its trout-holding potential, that has all changed.

You try reading the stream to rethink your game plan. The water will tell you what needs to be tied to the end of your tippet. Amber-tinted, the Toms is typical of the cedar-colored, acidic waters of central and south Jersey streams and similar in color to Adirondack hemlock streams.

The Toms' riverbanks, however, have no hemlock but are thickly protected by mountain laurel and scrub pine. A canopy of red maple and oak protects the stream and its trout from high water temperatures caused by strong sunlight. You know from experience you can wade the stream without worrying about getting sunburned.

The water is a bit low and clear, typical for this time of year. Thousands of caddisflies skim the surface of the translucent, amber water. Are they hatching or dropping egg sacs? If they were hatching, you assume they would head straight for the bank cover instead of skimming the surface. Your observation is important; if they are hatching, a caddis pupa imitation is usually successful.

Just as you attempt to capture a specimen, one is courteous enough to land on your vest. About the size of a #18 hook, it has a tan body with tent-like, light-brown wings. You can't really tell if it's a dun or an egg-laying female. If the trout are taking flies with splashing "rises," chances are the caddisflies are laying eggs.

Caddisflies, unlike mayflies, midges or terrestrials, spend little time on the water's surface, and the trout will sometimes tell you by their rises what they are taking. When feeding on mayfly duns, trout rises tend to be rhythmical and deliberate, often accompanied by a "slurping" sound and a bubble on the surface. If the trout are feeding on midges, terrestrials such as ants, or spent-wing mayfly spinners, their rises barely dimple the surface.

If the trout are feeding on caddisflies, are they taking adults or the pupae? Stalking along the bank cover, you happily find several trout frantically rising where the riffle water glides into a pool and swirls along a large fallen oak. Surprised again when a good-sized brookie goes airborne, you now conclude the trout are taking the egg-laying, tan caddisflies.

Whoever said brook trout prefer not to rise for surface food has never fished the Toms. I remember also being told as a kid that brook trout do not feed on other fish. So why do they hit a Mickey Finn Streamer so well in early spring? Of all the streams I fish, the Toms River brookies are the most opportunistic feeders encountered.

Although most of the brookies (and sometimes rainbows) caught are stuffed with caddisfly larvae, pupae and adults, they readily take mayfly, stonefly, leech and minnow imitations. Starting around July, many of the fish are also caught on terrestrial imitations of black and cinnamon ants, leafhoppers, inchworms and crickets. The Toms provides a fine smorgasbord of trout delectables.

One of the most successful anglers in the Toms' amber-colored waters, Joe Studier lands a brook trout.

Try a #18 light tan caddis dry imitation tied to your 6X (two-pound test) tippet.You will have greater success with this cut-wing than with an elk-hair pattern, probably because there are only a few stretches of very fast water on the Toms. Since most of the river has a constant, meandering flow, trout get a real good look at your dry fly imitations, and the cut-wing pattern does have a more realistic body form.

Crouched as you enter the water, you hope that the stream-side brush will break up your silhouette as you position yourself 30 feet upstream and across from the rising trout. Unlike the usual practice of fishing a dry fly upstream and dead drift, you're going to "skitter" the fly downstream and across.

Because the naturals are skimming the surface, so should your imitation. You forget where you learned this method. Perhaps it was one of those times you made a bad presentation downstream, unintentionally allowing your fly to "drag" like a little motorboat, only to be punished by the trout with a jarring strike. All that matters now is that it has worked before.

You glance over your shoulder to be sure there is a casting lane. It's a type of "back-cast paranoia" you've developed fly-fishing this river. The Toms is very unforgiving to those who fish with long rods and long lines.

Your fly lands near the far bank, barely missing the overhanging vegetation. Immediately you lift the rod tip to an 11 o'clock position as the fly begins its swing. As you lower the rod tip to 9 o'clock, you create a bit of slack and a foot or two of drag-free float.

Just before the fly reaches the trout's lie, lift again and jiggle the rod tip. The fly "skates" on the surface. Suddenly the trout's body shatters the surface to grab your fly. There's hardly enough time to take up the slack or get your heart beating again, as you feel the throb of a beautiful brook trout.

You and the trout are attached by 10 feet of gossamer thread. Flies buzz about, landing occasionally on your vest, as the river current on the back of your legs urges you downstream.

After a few minutes the trout, now sideways in the current, begins to tire. You notice a light-blue tag, labeled "TRTU470 23," behind the trout's dorsal fin. If you were keeping this trout, you would remove the tag and deposit it at one of the six collection stations located along the riverbank in the park. Against your fly rod, this brookie measures about 13 inches.

As you release the trout, you immediately search the surface for more riseforms. You catch one smaller trout using the skittering method but are unable to coax a larger brookie into taking a skittered fly or one that was dead-drifted. You wonder if the selectivity of some trout is what makes fly-fishing so interesting.

There is no "fly-fishing by the book" on the Toms. Although fly-fishermen have been fishing the river successfully for years, the Toms demands innovation from its anglers. Given a little patience, proper equipment and the experience of several fishing trips, fly-fishermen new to its waters can be quite successful, too.

The Toms dictates short-rod fishing. Most of the regulars use five- to six-foot rods. I prefer the line control that a little longer rod (seven-foot, four-weight) provides. Many of the veterans have converted old, ultralight spinning rods into "shortie" fly rods.

A good double-tapered, floating fly line, three- to five-weight, works nicely. Because you will be doing a lot of short-line roll casting, a double-tapered fly line is recommended. Much of the river flowing through the park is only 30 feet wide and lined with thick brush.

Leader lengths should range from five to nine feet. Remember you're using short rods and a lot of roll casting. The longest leader I use during midge hatches runs about nine feet. When fishing Wooly Buggers or streamer patterns in late fall and early spring, I sometimes go down to a five-foot leader. Because of the extra short leaders, go down one size on the diameter of the tippets normally used, and you'll get more hits by doing so.

I strongly recommend chest waders and wading the stream instead of fishing from the bank. Due to the extremely thick vegetative cover, very little water is fishable from the bank, and many pools are too deep for hip boots. Water temperatures on the Toms range from the high 30s in the coldest of winter to the upper 60s in the heat of summer. The mean water temperature for the year is 59° F.

The obvious question you should be asking is what patterns should I use? The hatch chart was developed from the stream notebooks of the Toms River's "Riverkeeper" and most successful fly-fisher, Joe Studier. Joe has conducted his own aquatic insect studies and water quality monitoring for the last six years. He has also developed an arsenal of fly patterns just for the Toms. Like many of its more devoted fly-fishermen, I was introduced to the river by Joe.

Spring, a time of great expectations, is often the most difficult for fly-fishing. Most freestone streams are much too high to fish

Toms River Hatches		Seasonal Emergence					Hatching Time	Hook Size
Common Name	**Biological Name**	Apr	May	Jun	Jul	Aug		
blue wing olive	*Baetis vagans*						midday	16-18
speckled lake olive	*Siphloplecton bisale*						midday	8-10
early blue quill	*Paraleptophlebia sp.*						midday	16-18
dark dun caddis	*Brachycentrus sp.*						midday	12-14
dun olive caddis	*Hydropsyche sp.*						midday	14-16
black willow stonefly	*Aconeucia nigrita*						sporadic	8-10
gray fox	*Stenonema fuscum*						sporadic	12-14
blue wing olive	*Ephemerella lata*						mid-morning	18-20
light cahill	*Stenonema canadense*						evening	14-16
brown caddis	*Brachycentrus sp.*						sporadic	10-12
little olive sedge	*Rhyaciphilia basalis*						sporadic	16-18
little pale fox	*Stenonema pallidum*						evening	18-20
litlle yellow stone	*Isoperla bilineata*						evening	16-18
little green stone	*Alloperla imbecilla*						evening	16-18
blue wing olive	*Baetis hiemalis*						afternoon	20-24
tan caddis	different families						sporadic	14-22
midges	*Chironomus sp.*						all day	16-28

Hatch chart prepared from the notes of Joe Studier.

consistently. Not so for the Toms. It is very "fishable" in early spring, even with a floating line. My two favorite season openers are Wooly Buggers and Muddler or Mickey Finn streamers.

My April and early May notebooks indicate about 70 percent of my fish are caught on black or olive Wooly Buggers. I tie my own and add marabou tails mixed with some crystal flash. Heavily weighted affairs on #6 or #8 4X long hooks, with bead-chain eyes, they imitate leeches or cranefly larvae, both present in great numbers on the Toms.

The muddler I tie is just like the Whitlock Sculpin pattern, except tied in a light-amber color. There are a lot of johnny darters, an amber sculpin-like minnow, which inhabit the Toms' shallow waters.

In April *Siphloplecton bisale*, a large olive-gray mayfly, hatches on rocks or logs and immediately flies into the nearest brush. It is usually unavailable to the trout in the dun form. However, the nymph, a very good swimmer, is available to the trout near hatching time, and an *Isonychia* imitation works fine.

By mid-May there is a cornucopia of insect activity. The year-long, tan caddis hatches seem especially heavy in May and are usually larger (sizes #14 and #16) than later in the year. There are also two major dun caddis hatches in May, the smaller #14 or #16 olive dun caddis and the #12 or #14 dark dun caddis. Both of these hatches supply outstanding dry-fly action in the afternoons.

The gray fox hatch, very sporadic on the Toms, does supply some terrific evening fishing to the spinners. The spinners, a size #14, are an opaque amber color. In the morning you may also come across a small blue-wing olive and have occasional success fishing this hatch.

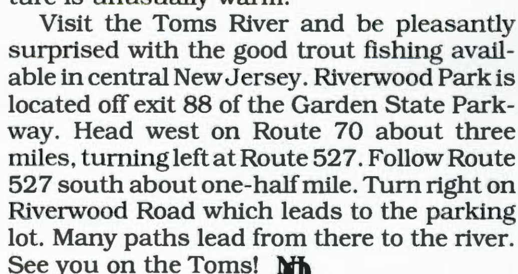
June is good for fishing the evening spinner falls of the light cahill and the little pale fox. For the entire month, the evenings will be filled with the spinners of one or the other, or both. When fully spent, the spinners are an opaque cream color. However, both spinner falls provide good dry fly-fishing with a traditional light cahill pattern in sizes #14 thru #20.

In June there is also a sporadic daytime hatch of a huge brown caddis which the trout chase like crazy. This large brown caddis is best imitated using a #10 or #12 elk-hair caddis imitation and "skittered." It's almost like bass fishing.

July through September are terrestrial months on the Toms, although minnow imitations can be very successful. There is also the occasional tan caddis hatch in the smaller #18 to #22 sizes through October. I've had most of my success fishing large carpenter ant imitations in sizes #14 and #16, although once in a while the fish prefer a smaller #18 cinnamon ant. Cricket imitations, like the Letort Cricket sizes #14 and #16, can work magic in the middle of the afternoon.

I return to fishing Wooly Buggers and minnow imitations from October through March. There is, however, a big needle stonefly hatch in February. Many anglers have good success fishing stonefly nymph imitations during fall and winter. Stonefly patterns range from #4 4X long (great stone), to #8 4X long (willow stone), and down to #16 2X long (needle stone). Occasional midge hatches during the winter sometimes bring smaller fish to the surface to feed, if the air temperature is unusually warm.

Visit the Toms River and be pleasantly surprised with the good trout fishing available in central New Jersey. Riverwood Park is located off exit 88 of the Garden State Parkway. Head west on Route 70 about three miles, turning left at Route 527. Follow Route 527 south about one-half mile. Turn right on Riverwood Road which leads to the parking lot. Many paths lead from there to the river. See you on the Toms!



An upstate New York native, **Joseph S. Bobinis** is an aerospace industry technical writer and active TRTU member. Joe is making another writing debut this fall in *Lines and Leader*, Trout Unlimited's national newsletter.

The late spring canopy adds to the fullness of the Toms' thick bank cover. (inset) This 12-inch brook trout carries a blue TRTU tag behind its dorsal fin.

Aggressively Conserving Trout

By Joseph S. Bobinis
Photographs by author

An aggressive trout conservation project on the Toms River has been initiated by the Toms River Chapter of Trout Unlimited (TRTU) with the help of the DEP Division of Fish, Game and Wildlife.

The three-phased project would establish the one-half mile stretch of trout conservation waters proposed by the division early in 1989, supported by the chapter's stocking and tagging endeavors and TRTU's stream enhancement, trout-habitat improvement program.

TRTU raised over $4,000 for its 1989 agenda to restore and improve the Toms River trout fishery. Although one of the state's smallest chapters, its membership includes some of New Jersey's most devoted conservationists, who have dubbed themselves "The Working Chapter."

The keystone of the project is the adoption and implementation of the one-half mile stretch of trout conservation waters that state biologists believe can sustain trout year-round. The Bureau of Freshwater Fisheries conducted field studies last year, "electroshocking" the river to verify the trout-holding potential of the Toms. Currently, the Ocean County river's most accessible waters are "put-and-take."

The bureau has recommended protecting a stretch of the river against the over-harvesting of trout, from which the resource now suffers, and stabilizing a year-round population through the establishment of trout conservation waters. The trout stocking and habitat improvement programs, without the protection of these waters, would be useless.

The chapter's stocking program began with the introduction of about 2,000 brook trout fingerlings this spring. Depending on the results of a second river-shocking, to be conducted by the bureau later this year, TRTU plans to double the number of stocked fingerlings next year. Protection of the waters should allow the fingerlings to mature to spawning size; otherwise, the promise of establishing a native brook trout population in the Toms is empty.

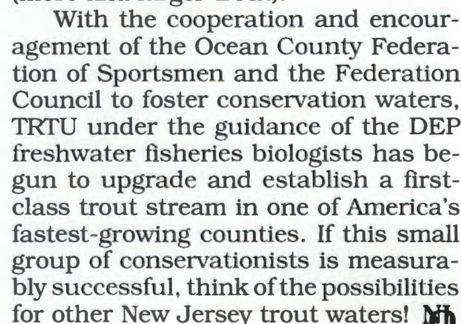
TRTU has raised funds to stock as many as 600 adult brook trout in 1989. Those stocked by the chapter, as well as state-stocked trout caught and released by TRTU members, are tagged and given identification numbers.

The tagging information is important for many reasons. From monitoring the trout migrational patterns, the biologists and conservationists can tell which sections of the Toms River have potential spawning sites, the best holding and feeding waters, and the best winter-holdover waters.

With the sportsmen's cooperation, an accurate creel census can be obtained. Anglers place the light-blue tags from fish caught into the nearest tag collection station. There are six in all, located along two miles of riverbank through Riverwood Park. Noting the condition of tagged fish along stretches of the river will enable the chapter to understand better the trout-holding capacities of different river sections, the brook trout's growth rate, and food sources.

For trout-habitat improvement and maintenance, the third part of the program, TRTU hired Aquatic Resources, a private, trout-habitat consulting firm. Aquatic Resources will make recommendations about aquatic insect populations from river invertebrate studies, habitat restoration employing stream devices or trout-feeding stations, and the creation and improvement of spawning grounds. The placement and maintenance of structures, through a stream enhancement program, will allow the Toms to support a larger trout biomass (more and larger trout).

With the cooperation and encouragement of the Ocean County Federation of Sportsmen and the Federation Council to foster conservation waters, TRTU under the guidance of the DEP freshwater fisheries biologists has begun to upgrade and establish a first-class trout stream in one of America's fastest-growing counties. If this small group of conservationists is measurably successful, think of the possibilities for other New Jersey trout waters!



Red Gold

Author of several *New Jersey Outdoors* features, **Robert E. Birdsall** likes to fish, hunt and photograph New Jersey.

By August this berry, one of more than 20 different varieties of cranberries, is nearly vine ripened. (bottom) What would a cranberry festival be without cranberry ice?

By Robert E. Birdsall
Photographs by author

In 1630, a New Jersey resident wrote his brother in England, "We have . . . great store of very good wild fruits such as . . . cranberries . . . brought to our houses by the Indians in great plenty." This 17th-century writer unknowingly was speaking of what was to become a major agricultural crop.

Originally, cranberries grew wild in low, damp bog areas or along streams in the Pine Barrens. Even today they can be found in the wild, growing along waterways that flow through the Pines. Cultivation of cranberries started near Pemberton around 1835. However, it was not until 1845 that growing cranberries commercially was attempted.

Legend has it that "Peg-leg" John Webb of Cassville, Jackson Township, planted wild cranberry vines in holes he had made using his wooden leg. Webb used the control of the water supply to raise and lower levels in the bog as a key ingredient in his commercial operation. Credited with "bouncing the berries" for sorting, "Peg-leg" John had a successful venture, and by 1863 cranberries were in demand nationwide. With 4,000 bogs from New Brunswick to Cape May, the New Jersey cranberry industry was here to stay.

New Jersey today ranks third, behind Massachusetts and Wisconsin, in U.S. cranberry production. Improvements in harvesting techniques have offset the loss of farmed acreage which had peaked at 11,200 acres in the early 1920s. Since 1964, about 3,000 to 3,300 acres have been harvested annually.

The 3,300 acres farmed in 1988 yielded a record harvest of over 370,000 barrels. Among berries and fruits, the cranberry's $16.7 million crop value made these 37 million pounds the Garden State's third most important produce after blueberries and peaches.

Unlike many agricultural crops, cranberry farming involves year-round field work. The bogs are flooded during the winter months to prevent winterkill and frostbite to the plants. Allowing flooded bogs to freeze over sounds like a strange way to prevent winterkill; yet the water temperature beneath an ice sheet rarely drops below 32° F, thus protecting the plants.

Traditionally on May 10th, the water is drawn from the bogs. Pale pink blossoms appear on the plants in late June. These blossoms, which have recurved petals and stamens resembling a beak, led to the early name of "crane berry," now contracted to cranberry. The berries ripen during the summer, and the harvest begins in September and usually ends in late October.

At harvest the bogs are again flooded. Crews of laborers using motorized "egg-beaters" separate the berries from the vines. The buoyant berries float to the surface, are pushed to one corner of the bog, and are loaded into trucks using conveyor equipment. This is a far cry from the not-too-distant past when large numbers of laborers were bused to the bogs to hand-pick berries using wooden scoops. Working in a productive bog, a good picker then earned up to $25 per day.

As the harvest draws to a close, the cranberry-growing region turns its attention to the Chatsworth Cranberry Festival. Now in its sixth year, this two-day event, held the third weekend in October, draws over 50,000 visitors and combines the best of the harvest atmosphere with the roots of the Pine Barrens past. It gives visitors an opportunity to sample cranberry ice cream, juices, pies and cakes, observe cranberry nostalgia and antiques, or see and hear Piney folklore, music and legends, which often include the Jersey Devil.

Cranberry agriculture is closely woven into the history and present economy of the Pine Barrens region. Its future is dependent upon successfully addressing the problems associated with increased development, population encroachment and preservation of the Pinelands water quality and supply.

One of the most beautiful sights in New Jersey, driving south from Chatsworth on Route 563 in September and October, is the crimson spectacle of harvesting these rubies of the Pines. It is worth the trip. NJO

The mineral wealth of the Skylands supported an iron industry which helped supply Continental and Union armies.
(bottom) The black bear is a species whose survival requires large, undisturbed tracts of habitat protected from fragmentation by development.

Nick Zungoli

William S. Lea

world. Over 300 species of birds have been recorded, of which at least 120 species have nested there. The Skylands provides suitable habitat for 24 amphibian and 22 reptilian species, and the fauna also includes 39 species of mammals.

As one might expect, the Skylands is home to plants and animals that are not found, or are not common, elsewhere in our state. There are breeding populations of some birds that have a distinctly northern range but find the Skylands' conifer groves and cool ravines congenial territory. This includes the winter wren and Blackburnian, Nashville, black-throated blue and magnolia warblers. Other resident birds and animals, such as the black bear, porcupine, bobcat, Cooper's hawk and barred owl, are creatures of the deep forest.

As with the birds, a number of plants here are northern species at or near the eastern and southern limit of their range (some may be found farther south in the Appalachians at higher elevations than are found in New Jersey). Among these are the bog rosemary, black spruce, small cranberry, canoe birch, hobblebush, and the three-toothed cinquefoil. There are also plants that grow only on limestone, and New Jersey's only natural limestone is in the valleys of the Skylands. A few examples include the walking fern, grass-of-parnassus, and wall-rue spleenwort. Some of these species, and many others both plant and animal, are endangered in New Jersey. Others would likely become so if present development trends continue.

Superimpose the human element on this natural mosaic, and we get yet another level of diversity. Native Americans occupied this area from an early date, and major settlements existed along the Delaware River and smaller streams. European settlement began late in the 17th century, and the remains of old stone walls and foundations in even the most unlikely locations show that in early times the area was quite well-settled. Even the thinnest, poorest soils were farmed.

The mineral wealth of the region was discovered quite early. Iron ore was mined from 1710 right up to 1956. In the mid-1800s, more than 100 mines, forges, and furnaces were in operation in the Skylands.

The iron industry declined at the end of the 19th century, at least in part because of the depletion of the forests, the source of charcoal for fuel in the early furnaces. With the opening of the American west, the full advent of the industrial revolution, and a series of economic depressions, marginal farmlands were abandoned as their owners moved to cities or better land. Areas once cleared reverted to woodland. Traces of this period remain throughout the Skylands, however, as overgrown "lost-towns," abandoned railroad beds, water- and trash-filled mine holes, bramble-covered farmsteads, and the crumbled foundations of half-forgotten industries.

One way or another, the temporary depopulation of the Skylands in the early 20th century made possible the acquisition of large tracts of land for recreation and conservation by the state and other governmental agencies. Some of the state-owned lands include High Point, Stokes, Norvin Green, Abram S. Hewitt, Ringwood Manor, Wawayanda, Jenny Jump, Voorhees, Allamuchy, and Worthington state parks and forests. There are also the Hamburg, Wanaque, Berkshire Valley, Whittingham, Flatbrook-Roy, and Pequest wildlife management areas.

The federally owned Delaware Water Gap National Recreation Area is a relatively recent open space addition in the Skylands. The 6,000-acre Picatinny Arsenal, located astride Copperas Mountain in Morris County, is not open to the public but remains protected from development. There are also several thousand acres of county and municipal parks. Altogether, public land in the Skylands totals about 165,000 acres. That's a lot of land — but not enough — given the population of New Jersey and the need for recreational space.

Other lands in the Skylands became watersheds, providing pure water for the growing cities of the Piedmont. The North Jersey Water Supply Commission's Wanaque Reservoir and its surrounding land in Ringwood total 6,650 acres. There are smaller watershed areas belonging to Jersey City and to several Skylands communities. The biggest of all is the City of Newark's Pequannock Watershed located on the headwaters of that stream in Passaic and Morris counties. Totaling 34,100 acres, it is the largest, contiguous, nonstate-owned tract of land in New Jersey.

Twenty or more years ago, there was also privately owned open space — farms, woodlots and summer camps — to link the pieces of public land in the Skylands together into some kind of ecological whole. But that is no longer true. The population of the Skylands is increasing. Sussex County had 78,000 people in 1970 and today more than 125,000. Morris County's population has risen from 383,000 in 1970 to 420,000, while Warren County was growing from 74,000 residents

Nick Zungoli

A number of New Jersey rivers have headwaters and minor tributaries in the Skylands. Watersheds in the region may be located in both New Jersey and New York.

in1970 to the present 88,000.

The rapid growth of the northwestern New Jersey counties means that development will soon take place right up to the edges of each piece of open space, isolating them from one another. For the sake of history, conservation and recreation, a sample of this region as it once was must be preserved. This requires preservation or, at the very least, protection of areas along ecologic lines — an entire watershed or an entire mountain — rather than the fragmented retention of bits and pieces of land.

Why should any of it be preserved? Even apart from the protection of a unique area as a natural laboratory or the preservation of plant and animal species that are, or soon will be, endangered in New Jersey, there is a need for open space for human needs. It's something called the quality of life — and it entails recreation that is more than watching football, golf, or wild animals on television.

Two-thirds of New Jersey's population lives in about one-fifth of the state's area, in a belt about 15 miles wide from Bergen and Hudson counties southwest to Mercer. Compare Sussex County's population density of 217 people per square mile or Hunterdon's 199 to Bergen County's 3,400 or Hudson's astounding density of almost 12,000 people per square mile.

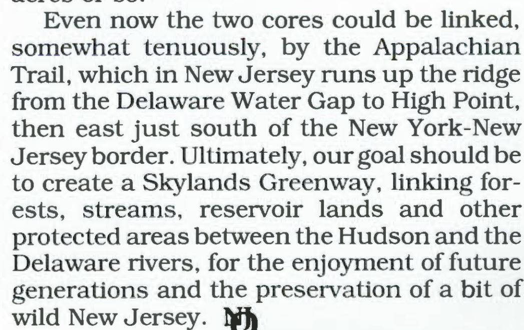
All these residents need room for recreation, even if it is just a chance to get away from the neighborhood or from each other. A change of scenery or the chance to commune with nature, as the saying goes, is always restful, even if this means nothing more than a chance to walk on grass-covered fields or in a forest and listen to songbirds in a tree.

Of course, individuals with a more intense interest in the out-of-doors — the campers, hunters, hikers, anglers, students of the fauna and flora, the canoers and the rock climbers — need (or want, anyhow) real open space for their recreation. Ballfields can be engineered to be built almost anywhere, but no one wants to camp in a highly developed park or in one measuring only half an acre.

What's needed to preserve the Skylands? Nobody is suggesting that the state or the counties buy up large amounts of the remaining open space. Land values are much higher than they were, for instance, in the Pine Barrens when the Pinelands Commission was created; and many of the areas between the public lands in the Skylands are already quite densely populated and threaded with highways. Areas such as wetlands, that can't be developed under current laws, might well be acquired.

One logical approach to Skylands protection would be the acquisition of key properties to link areas that are already publicly owned, creating large core areas under some kind of uniform management. One such core, totalling 100,000 acres, already exists, in the combination of the Delaware Water Gap National Recreation Area, Stokes State Forest, High Point State Park, Worthington State Forest, and the Flatbrook-Roy and Walpack wildlife management areas. The Pequannock Watershed is the key to the preservation of the eastern Highlands. If it could be kept as open space, it would, with the adjoining Wawayanda and Farney state parks and Hamburg Wildlife Management Area, make up a second core area of 50,000 acres or so.

Even now the two cores could be linked, somewhat tenuously, by the Appalachian Trail, which in New Jersey runs up the ridge from the Delaware Water Gap to High Point, then east just south of the New York-New Jersey border. Ultimately, our goal should be to create a Skylands Greenway, linking forests, streams, reservoir lands and other protected areas between the Hudson and the Delaware rivers, for the enjoyment of future generations and the preservation of a bit of wild New Jersey.



Karl Anderson, sanctuary director of the New Jersey Audubon's Rancocas Nature Center since 1977, is a former editor of *NJ Audubon* magazine. He was previously the sanctuary director of the Lorrimer Sanctuary.

Barry Bichler

Nick Rochester (inset)

220 Million Years Ago

Dinosaurs at the First Jersey Shore

By Fred Young and Eva Young

Bordering a large freshwater lake with seasonally rising and falling water levels, it was a basin-type environment. Farther back from the sandy coastline were rows of tan-colored dunes. A small stream, flowing out of high mountains nearby, paralled the lake for a short distance and then emptied into it.

Beyond the dunes was a swamp. Cycads and conifer trees grew around its wet, grassless border. It had the appearance of an oasis, as colonies of broad-leaved ferns and tall horsetails grew in shallow water near the edges of the swamp.

"When these dinosaurs lived here, that was how this site looked," the New Jersey geologist stated.

The temperature in the quarry was close to 90° F in the roped-off excavation area. Although he had been digging for five hours, his enthusiasm was undiminished. Walking through the site with Nick Rochester, the Curator of Geology for the Morris Museum, it is not difficult to imagine oneself standing along an ancient New Jersey coastline.

The hard, reddish sandstone layer in one section of the excavation shows ripple marks identifying the high and low water levels of a very large lake. Close by, dune-like mounds form a border to the channel marks of a stream that flowed into the lake.

Farther from the lake bed, a sandstone layer clearly reveals raindrop impressions; another shows mud dried by the sun, cracked into angular pieces. One almost feels the gentle rain and the long days of penetrating sunlight that followed.

At a greater distance from the water's edge, the sandstone layers tilt down into a low area that becomes a gray shale. Here, the imprints of reeds and plants in many different patterns are seen as they fell. Some of the plants are carbonized; most are mineralized in bright tints of green, red and blue.

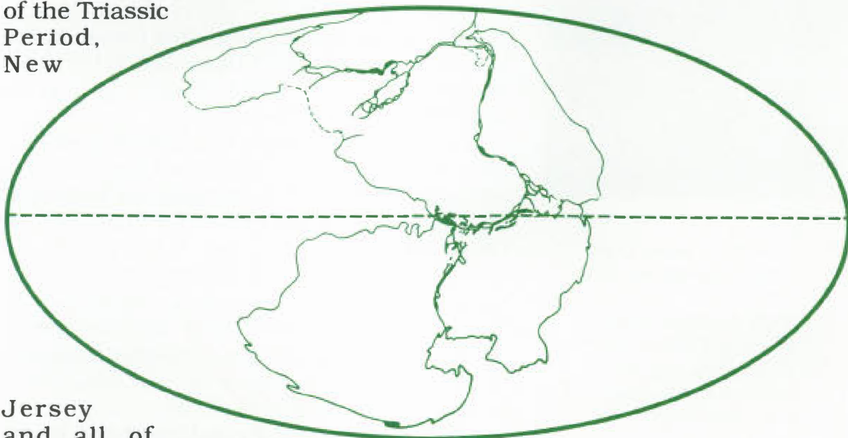
Running through this entire area are the dinosaur tracks. "Standing among all these tracks, you suddenly realize that something here was important to have attracted them in such numbers," Rochester said.

These early New Jersey dinosaurs, or the evidence of their existence, were only discovered in a 200 million year-old sandstone deposit exposed by quarrying activities. The landowners of the site, realizing the educational and scientific value of the fossils, wanted a safe, professional exploration. They allowed Rochester, a former oil company geologist, to supervise an excavation.

From December 1987 through April 1989 Nick Rochester, assisted by amateur paleontologist Donald Carter and several enthusiastic geology students, worked in this New Jersey quarry. They excavated the walkways from hundreds of tracks left by two of the earliest known species of carnivorous dinosaurs: *Grallator (Anchisauripus)* and *Eubrontes*. The tracks of a crocodile-like reptile called *Batrachopus* also cover the site. These animals are named for their tracks, since the bones that would positively identify their species have not been found yet.

According to Rochester, the dinosaur tracks typically occur in a formation of thin sandstone layers interbedded with shale. Formed by powerful forces within the earth, geologists call this the Uppermost Passaic Formation of the Newark Super Group.

Two hundred and twenty million years ago, at the beginning of the Triassic Period, New Jersey and all of North America were part of one supercontinent. Called Pangea, it lay just 15 degrees north of the equator. North America, Africa and Eurasia were not yet continents separated by vast oceans.



Pangea. Paul Olsen

Tectonic plate movement, the pushing and pulling of fractured pieces of the earth's crust, stressed this land mass to the breaking point. The great supercontinent began to tear and separate a few centimeters each year. Over geologic time new continents would be created out of the old land mass.

During the early phase of this plate movement, North America and Africa began to pull apart. The earth's crust thinned and fractured into blocks. Some rose; the resultant plate movement and upheaval directing what we know as the Appalachian Mountains slowly toward what is now Scotland. Others fell, creating long linear valleys that extended from Nova Scotia to Virginia and on into Morocco on Africa's northwestern coast.

New Jersey, located on the border of one of these rift valleys, was given its first major coastline. This coastline is part of what ge-

(facing page) Gentle Triassic raindrops fell more than 200 million years ago and were preserved in red sandstone. (inset) A tough leathery-looking fern, Clathropteris has been found mineralized in bright colors.

Winds blowing across the enormous lake created shoreline ripple marks.

Ken Card

millions of years

3,000 2,000 1,000 900 800 700 600 500 400 300 200 100 90

earliest known life: blue-green algae

earth's crust formed

no life

primitive life

early life

first amphibians

bony fishes

first dinosaurs

first reptiles

Nick Rochester

Nick Rochester

This Eubrontes track was collected in June 1988.
(bottom) Paul Boyer of Fairleigh Dickinson University studies various trackways with Don Carter and John Driscol.

ologists call the Triassic Rift System, a series of fault valleys extending along the eastern edge of North America.

Open and flat with lush vegetation, these tropical valleys were bordered by large, freshwater lakes. They were a natural habitat for the evolving dinosaur. Food and water were plentiful. Few obstacles blocked the dinosaur's travel, and the giant reptiles moved freely up and down the sandy shoreline.

Long-legged and fast moving, the dinosaurs could have walked from what is now Africa to New Jersey. In fact, their footprints provide an accurate record of a dinosaur colony on the move. Similar tracks have been found from Nova Scotia to Africa and the southwestern United States.

Over the course of thousands of years, rivers poured out of alpine-like elevations to the west. The result of this erosion by water covered the fossil-filled basins with layer upon layer of sediments.

The Lamont Doherty Geological Observatory, a 40-year-old Columbia University institution dedicated to research in the earth sciences, is a major center for the study of this geologic time period. Paul Olsen, an assistant professor of geology at the Palisades, New York, observatory, explained, "A rift in the earth's crust that occurred while North America and Africa were splitting apart spewed forth huge lakes of lava near what was to become the New Jersey coastline.

"The lava covered the sediment and hardened into a rock called basalt, locking in place the fossilized remains of life from this era," Professor Olsen stated.

"Many geologists have painstakingly worked to establish a nearly precise date for this lava flow. Using two different radiometric systems to estimate the age of the lava by measuring the argon to potassium and uranium to lead ratios, we are sure that the lava flowed directly on top of the sediments 200 million years ago. These tracks, being only a few feet beneath the flow, can be given an equivalent age plus a few thousand years."

Dinosaur tracks, first discovered in 1866 in Holland Township, Hunterdon County, by C. H. Hitchcock, have been repeatedly found throughout the red sandstone beds of New Jersey.

However, it is from this new site in a section of sandstone, preserved from erosion by the covering of the weather-resistant basalt, that large quantities of some of the finest, most detailed tracks ever found are being studied by Rochester at his laboratory at the Morris Museum. Eventually, they will become part of the museum's popular dinosaur exhibit.

Some of these tracks are so well preserved that toe nails and details of the skin pattern on the soles of the feet are clearly shown, Rochester explained. "In fact," he said, "I predict that this site will eventually produce more tracks than any other locality in North America."

Considering the fact that one surface area, measuring six by eight meters, yielded over 170 tracks and that 10 times that area has now been excavated, producing several hundred more footprints, the New Jersey site is rapidly becoming a major focus of scientific interest.

In May 1988 the Buffalo Museum of Science sent Richard S. Laub, its Curator of Geology, to investigate the site. Rochester, Laub and four volunteers examined more than 100 tracks, including many trackways of various species. They made plaster casts of some prints too fragile to move and were able to remove two large slabs containing numerous other prints. These prints are now being prepared in the Buffalo Museum's paleontology lab for permanent display in the dinosaur exhibit.

Because of the variety of sizes and shapes and the unequalled clarity of these prints, Rochester has proposed that the animals who made them were groups from at least three species — *Grallator*, *Eubrontes* and *Batrachopus* — interacting in a herd environment.

Trackways made by *Grallator* varied in size from one and-a-half to nine inches. This would seem to indicate that large males and smaller females, possibly including juvenile or baby dinosaurs as well, were moving through this valley.

"On one section we had three *Grallator* trackways all going in the same direction, and they were made about the same time," Rochester noted. He went on to say, "Other trackways show the *Grallator* and *Eubrontes* walking in parallel paths, then crisscrossing each other, tracks on top of tracks, in herd-type movement."

At 14 to 16 inches, the prints of *Eubrontes* are the largest found so far. Rochester explained he has uncovered paces that measure about two and-a-half feet, indicating the dinosaur had a body length of about 12 feet. *Grallator* was half that size. The two species were tridactyl (three-toed) and bipedal (two-footed). The *Batrachopus*, however, presents an interesting set of scientific puzzles.

According to paleontologists at the Smith-

New Jersey Outdoors

Explorer

September / October 1989 Issue Number One

Oh Give Me a Home Where the Dinosaurs Roamed

Imagine living in New Jersey 220 million years ago. The land was covered with tropical plants and enormous freshwater lakes. Africa was connected to the United States, and herds of dinosaurs roamed the land. How do we know so much about life so long ago? — FOSSILS.

Fossils are the remains or evidence of living things preserved in rock or some other material, such as tar or permafrost (soil that is always frozen).

Two years ago fossils of three dinosaurs were discovered at a quarry in northeastern New Jersey. The fossils were not teeth or bones but hundreds of tracks. Scientists believe the tracks were made by three species of dinosaurs —*Grallator* (Gral-lay-tor), *Eubrontes* (You-bron-tees) and *Batrachopus* (Ba-track-o-pus).

Dinosaur tracks are called ichnofossils (ick-no-fossils). The tracks were made in a split second 220 million years ago when the dinosaurs walked in the shallow water that covered the area. But it took millions of years to make the ichnofossils. Scientists believe that the tracks were slowly filled in with sediment, tiny bits of soil that are carried by water. The layers of sediment were then covered by the lava that spewed out of the earth's crust when North America and Africa split apart. The lava cooled and became a rock called basalt. Millions of years passed. Under great pressure the sediment turned into sandstone, and the dinosaur tracks became ichnofossils.

You can make your own ichnofossils! You will need a small milk carton, modeling clay, petroleum jelly, one cup of sand, 1/2 cup of plaster of Paris, water, a mixing spoon and a stick. Now follow these steps:

1. Look at the shaded tracks of the *Grallator (this page)* and *Eubrontes* *(turn to NJO page 23)*. Mold the modeling clay into one of their feet. Push the stick into the middle of the clay foot.

2. Clean and dry the milk carton. Coat the inside of the carton with petroleum jelly.

3. Moisten 1/2 cup of the sand with water. Spoon the mixture into the milk carton and make it level.

4. Using the stick handle, gently press the clay foot into the sand and then carefully remove it. This is your track.

5. Mix the remaining sand and the plaster of Paris. Add just enough water to make the mixture as thick as soft-serve ice cream. Carefully spoon the plaster into the milk carton by first filling the track, then covering the rest of the sand.

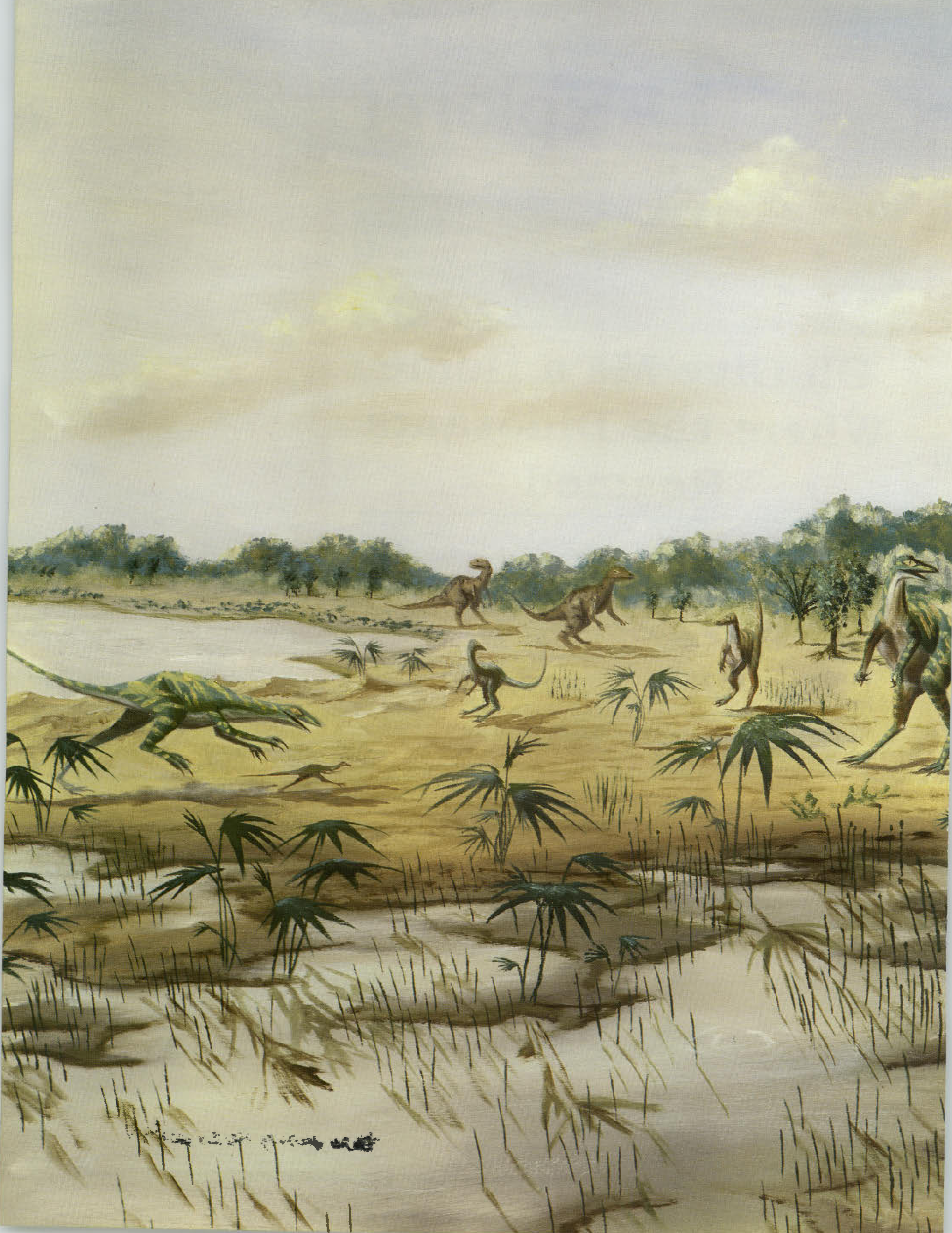
6. Let the plaster dry thoroughly (at least 24 hours). Then remove the ichnofossil from the milk carton.

Dinomath Facts

• Tracks of *Grallator* vary in size from 1 1/2 to 9 inches (3.8 to 22.9 centimeters). This indicates that large males and smaller females, possibly even baby dinosaurs were moving through the valley. *Grallator* had a body length of 6 feet (183 centimeters or 1.8 meters).

• Tracks of *Eubrontes* are 14 to 16 inches (35.6 to 40.6 centimeters). The distance between each step was two and-a-half feet (76.2 centimeters). This indicates that the dinosaur had a body length of 12 feet (365.8 centimeters or 3.7 meters).

• Tracks of the *Batrachopus* measure from 3/8 to 2 inches (1 to 5.1 centimeters).



New Jersey State Library

DINOMATH

Created for NJO by **Barry Bichler,** this painting is based on the fossil evidence at the site and the artist's and scientists' intuition. It depicts the *Grallator* (foreground), *Eubrontes* (right background) and *Batrachopus* (right and left) at dawn. The Fairlawn resident's work has appeared in *Popular Science* and *Insight* magazines. The 1983 Pratt Institute graduate has received international recognition for his aviation paintings, displayed at the Smithsonian Air and Space Museum, the Air Force Museum and the Paris Air Show.

Here is a game to play with your family and friends. As many as four people can play. You will need a large sheet of construction paper, crayons, glue, scissors, one set of dice, index cards, and scratch paper and pencils for each player. Everyone must be able to see the Dinomath Facts. Draw your game board. Make any pattern you like, but there must be 30 to 60 spaces and a start and finish line. Color and decorate the game board with pictures of dinosaurs, their tracks and their habitats. Photocopy the playing cards and cut them out or copy them onto index cards. Use your plaster ichnofossils as playing pieces. Each player rolls the dice once. Whoever rolls the greatest number will go first, followed by the person with the next greatest number and so on.

The game is played by each player rolling the dice and moving their piece the rolled number of spaces. The player then selects a card with a question on it. If they answer the question correctly, they stay on that space. If they answer it incorrectly, they go back to their last position on the game board. Whoever lands on or passes the finish line first WINS! If you run out of cards, just shuffle the used cards and start over. You can also make your own cards.

1
Two of the smallest *Grallator* tracks would equal ______ cm.

2
Two of the largest *Grallator* tracks would equal ________ cm.

3
The average length of a *Grallator* track is ______ cm.

4
Two of the smallest *Eubrontes* tracks would equal ______ cm.

5
Two of the largest *Eubrontes* tracks would equal ______ cm.

6
The average length of a *Eubrontes* track is ______ cm.

7
Two of the smallest *Batrachopus* tracks would equal ____ cm.

8
Two of the largest *Batrachopus* tracks would equal ______ cm.

9
The average length of a *Batrachopus* track is ______ cm.

10
If a *Eubrontes* walked the body length of two *Grallators*, he walked ______ meters.

11
If a *Batrachopus* walked the body length of two *Grallators* and one *Eubrontes*, he walked ____ meters.

12
How long would an insect have moved if it walked 10 times the average length of a Batrachopus track? _____ cm.

13
Fossils of ferns were found that were a little longer than half the body length of a *Grallator*. Approximately how tall were these ferns? _____ meters

14
How many times greater is the body length of an *Eubrontes* to the body length of a *Grallator* ? ________ times

15
If a scientist discovered 10, 13 and 19 tracks in three separate square meters of sandstone, how many tracks would he estimate he would find in a fourth square meter of sandstone? _______ tracks

Wild Card
Move Ahead 5 Spaces.

Dinomath Answers: 1- 7.6 cm; 2- 45.7 cm; 3-13.3 cm; 4-71 cm; 5- 81.3 cm; 6- 38.1 cm; 7-1.9 cm; 8- 10.2 cm; 9- 3 cm; 10- 3.6 meters; 11- 7.3 meters; 12- 30.2 cm; 13- 0.9 meters; 14- 2 times; 15- 14 tracks.

millions of years

80 70 60 50 40 30 20 10

Pangea breaks up

dinosaurs become extinct

first apes

major ice ages

modern man

EARTH'S HISTORY (not to scale)

Bergen County residents **Fred Young** and daughter **Eva Young** bring to *New Jersey Outdoors* the first published account of this new dinosaur discovery. Eva, a 1989 Pace University journalism graduate, and Fred, a printing executive, are first-time contributors who enjoy the diverse geology of New Jersey's highlands and lowlands.

sonian Museum in Washington, D.C., all dinosaurs were reptiles, but not all reptiles were dinosaurs. A reptile was not a dinosaur if it had a sprawling posture or if it was adapted to swimming or flying. Some large reptiles were contemporaries of the dinosaurs during the Triassic Period but became extinct as dinosaurs grew larger and more abundant.

Tracks of *Batrachopus*, measuring from about three-eighths of an inch to two inches in length, form quadrapedal (four-footed) trackways, indicating a posture like a crocodile. However, notes Rochester, there is no fossil evidence of a tail and belly being dragged as a crocodile would do as it walked. In fact, the geologist believes that *Batrachopus* probably used its tail for balance while running.

This animal is not quite a crocodile and not quite a dinosaur. Until its bones are found at this site, Rochester explained, it will be called a "crocodilomorph."

Several fossil skeletons have been found nearby, but none have yet been excavated at the site. "Bones do not preserve well," Olsen said. "They are a food source for other organisms. Having low density, bones are easily washed away or otherwise crushed and destroyed. Without the bones of these track-making animals, they cannot be positively identified."

This would seem to halt further interpretation of the fossils discovered. However, in May of this year the focus of the excavation changed. Acting on intuition based upon education and experience, Rochester began to excavate a layer of gray shale very close to the contact zone of the basalt, slightly below the level that contained the footprints. This layer was found to contain many fossilized fragments of several different plant forms.

"We now have not only footprints but also plants which are just as important for research of the site," stated Rochester.

In July Bruce Cornet, a post-doctoral research associate paleobotanist with the Lamont Doherty observatory, visited the quarry. Known for his research in plant pollen and spore assemblages of the Triassic Period and, in particular, for his discovery of the first complete remains of the Triassic flower *Sanmiguelia lewisii*, he is a recognized plant fossil expert.

"Because of the type of sediments and the changing groundwater conditions at this site," said Cornet, "the plants should have disappeared. Having them show up in this swampy area is a very rare occurrence."

Plant spores found here indicate the presence of a variety of ferns. Actual leaf, stem and trunk impressions and carbonized remains show that conifer-type trees, cycads and horsetails covered the landscape.

Dense colonies of *Clathropteris*, a tough leathery-looking fern that grew to heights of one meter, covered the ground. Having also been found in other Upper Passaic sediments, this plant was apparently well suited to the environment.

Further excavation of the shale has produced fragments that have turned to carbon. This mineralized plant matter indicates that in this swamp the plants were buried rapidly in what is called an oxygen-reduction zone. All of the oxygen was used up, and the plants were carbonized in the same way that coal is formed in similar environments. The oxygen-reduction zone preserved everything that was deposited there, because without oxygen there is very little decay.

Rochester, with a gleam in his eye, suggested, "It is possible that there are bones preserved in this layer."

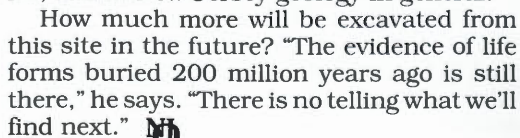
Knowing the exact age of the sandstone and now having greater fossil evidence with which to interpret the facts, Nick Rochester feels he has a window in time through which he can see the site as it was.

"The sediments I'm excavating, the section with the tracks and plants, represent less than a 10,000-year time span. That's longer than the written history of man but still only a fraction in geologic time. All of this happened right at the Uppermost Passaic Formation, about 200 million years ago."

For this perceptive geologist, the site has become a prehistoric still life. Rochester has pride in his voice as he describes the progress made on the excavation. However, a sense of urgency is noted as he explains, "The number of sites available for exploration is decreasing as the quarries are being closed up and built over. We have had excellent support from the owners and managers of this quarry, but there is a definite time limit on our efforts here. Because of that, there is a concerted effort to save the fossils worth saving."

We look to geologists like Nick Rochester and the continued cooperation of the landowners of the various fossil sites for the study of dinosaurs in New Jersey, in particular, and of New Jersey geology in general.

How much more will be excavated from this site in the future? "The evidence of life forms buried 200 million years ago is still there," he says. "There is no telling what we'll find next." NJO



Nick Rochester

Still in place, this Grallator impression became a keeper. (bottom) Never before published, this delicate Batrachopus print preservation clearly details the skin pattern on the sole of the foot.

Where Do We Stand on the North American Waterfowl Management Plan?

By Pete McLain

It is no secret to anyone interested in waterfowl that the nation's duck populations nose-dived during the 1980s. By 1988, the fall duck flight had dwindled from more than 100 million birds in the 1970s to 66 million.

The U.S. Fish and Wildlife Service responded by reducing hunting seasons and bag limits in a desperate attempt to save breeding birds. However, the prolonged drought of the 1980s, disastrous changes in farming practices, acid rain and the acidification of ponds and wetlands, disease from overcrowding due to shrinking wetlands,the loss of quality wintering grounds, and other factors appeared to be pushing continental duck populations to a point of no recovery from habitat loss.

In the 1970s there were 62 million nesting pairs of ducks; today, fewer than 32 million. The closer waterfowl biologists looked at the duck dilemma, the more convinced they were that the major problem was waterfowl habitat, or rather the lack of it.

The facts were clear. The United States had over 215 million acres of wetlands in colonial times. Today fewer than half of those remain, and we continue to lose an estimated 500,000 acres a year. In the "duck factory" prairie nesting grounds of North Dakota, the region producing about 80 percent of the ducks bred in the U.S., only two million of the original five million wetlands acres are left. Minnesota has just 1.4 of its original 8.7 million acres of wetlands; and merely 70,000 of the former 1.1 million acres remain in Iowa.

In the prairie provinces, grazing and mowing practices, the draining of prairie potholes to create more agricultural lands, burning, and the prolonged 1980s drought, which may have reduced waterfowl levels even lower than during the "dust bowl" years of the 1930s, have eliminated millions of acres of prime nesting and brooding habitat.

East of the Mississippi, the black duck has shown a steady decline for almost 30 years. Once one of the more common waterfowl species in the east, black duck populations declined more than 15 percent from 1987 to 1988 and now may be less than half of what they were in the 1950s. The loss of quality wintering habitat, acid rain destroying the insect life required by young ducks, and the intrusion of mallards into black duck populations are major factors in the steady disappearance of the species.

The continued downward trend in duck populations and the prolonged drought of the 1980s have resulted in the United States and Canada joining forces in a monumental, cooperative international plan for the acquisition, protection and enhancement of waterfowl habitat. It has been described as "the largest single effort ever undertaken to protect wetlands and waterfowl."

The North American Waterfowl Management Plan was signed by Canada and the United States in May 1986, with the intent of protecting and improving six million acres of waterfowl and other wildlife habitat in the two countries. The ultimate goal of restoring the fall flights of ducks to the 100-million bird level carries an estimated cost of $1.5 billion through the year 2000.

In the plan, it was recognized that neither the American or Canadian governments could muster the funding, personnel and support for what appeared to be an impossible dream. However, wisely included in the plan was the concept of looking to the individual states, provinces, conservation organizations and the private sector for active support and full participation. A coalition of almost every major conservation organization, state and federal wildlife agencies, and private landowners was forged to focus the combined energies and resources on acquiring, enhancing, protecting and managing waterfowl

William D. Griffin

Michael Baytoff

habitat on a continental basis.

As the plan gained momentum, The Nature Conservancy, the International Association of Fish and Wildlife Agencies, National Audubon Society, National Wildlife Federation, National Association of Conservation Districts, American Forest Foundation, Wildlife Society, National Rifle Association, National Fish and Wildlife Foundation, U.S. Forest Service "Taking Wing" Program, Soil Conservation Service, Wildlife Management Institute, American Farm Trust, Land Trust Exchange, Berry B. Brooks Foundation, Wildlife Legislative Fund, U.S. Department of Defense, Ducks Unlimited, and other organizations placed their collective shoulders to the wheel to make the North American Waterfowl Management Plan fly.

In addition to New Jersey, the participating states are Arkansas, California, Illinois, Iowa, Louisiana, Maine, Missouri, North Carolina, North Dakota, Ohio, Oklahoma, Rhode Island, South Carolina, South Dakota, Tennessee and Texas.

Ducks Unlimited's "MARSH Program" has assisted with 80 wetlands restoration projects in the Atlantic Flyway and contributed over $5 million to match $5 million in state funding. Since its establishment in 1937, Ducks Unlimited has raised nearly half a billion dollars for wetlands protection and restoration in Canada, Mexico and the U.S.

With this feeling of participation and partnership, the "Joint Venture" approach developed. Representatives from public and private organizations combined their technical knowledge, experience, "know-how" and willingness to participate into four regional priority "Joint Ventures" in Canada and six in the lower 48 states.

Peter-Michael Zanetti

Because of steadily declining population numbers, the black duck will receive special consideration under the plan's habitat and wetlands protection. (right) Six American and four Canadian joint ventures will protect migratory waterfowl like Canadian geese.

The American Joint Ventures are the Atlantic Coast, Central Valley, Gulf Coast, Lower Great Lakes — St. Lawrence Basin, Lower Mississippi Valley and the Prairie Pothole. The Canadian Joint Ventures are the Arctic Geese, Black Duck, Prairie Habitat and the Eastern Habitat.

The North American Waterfowl Management Plan has been operational for over three years. Those who have heard about the plan and been following its progress might now be asking, "How is the North American Waterfowl Management Plan doing in the United States?"

The Atlantic Coast Joint Venture includes all the coastal states from Maine to South Carolina, where the goal is to protect 880,000 acres of wetlands and upland buffer by the year 2000. An additional 170,000 acres of federal and state lands will be enhanced. State fish and wildlife agencies, The Nature Conservancy, Ducks Unlimited, private conservation groups and landowners are work-

Phil Moylan

The protection of 1.1 million acres in the "great duck factory" will benefit the piping plover, an endangered species in New Jersey.

ing as a coalition to achieve the plan's goals.

The black duck, whose present numbers are far below its 10-year population average,will be given special consideration. Habitat and wetlands protection not only benefits the black duck but also directly affects bald eagles, woodcock, rails, shorebirds, reptiles, amphibians and other wildlife and plants whose continued survival depends on clean, undisturbed environments.

The Atlantic Coast's loss of more than 500,00 acres of wetlands since the 1950s parallels the 50 percent decline in black duck populations in the same period. The remaining Atlantic Coast wetlands need immediate attention to protect critical wintering, migrating and nesting habitats.

Toward this end, the Cape May National Wildlife Refuge in New Jersey became a "Flagship Project" that will serve as a model for future joint ventures. The DEP Division of Fish, Game and Wildlife, in cooperation with the U.S. Fish and Wildlife Service, The Nature Conservancy, The Ruffed Grouse Society, Ducks Unlimited, and the National Fish and Wildlife Foundation, joined to encourage the acquisition of the Cape May National Wildlife Refuge. The first 90 acres of the refuge were dedicated on May 13, 1989 (see "Cape May — Flagship Project of North America," NJO J/A 1989).

Plans ultimately call for a 15,000-acre national wildlife refuge. The acquisition of these first 90 acres was made possible by the efforts of The Nature Conservancy, which purchased and then transferred this land to the U.S. Fish and Wildlife Service.

The Division of Fish, Game and Wildlife has targeted an additional 4,600 acres of wetlands to link the state's Dennis Creek Wildlife Management Area with the Cape May National Wildlife Refuge. In addition, the State Duck Stamp Committee has added an additional 1,924 acres of Delaware Bay and Atlantic Coast wetlands.

The proposed Cape May refuge will include five miles of Delaware Bay shoreline, where the second largest concentration of shorebirds in the Western Hemisphere rest and feed every spring. The wetlands are prime black duck habitat, and the uplands support large flights of woodcock and millions of songbirds on their spring and fall migrations. The fall raptor flights at the Jersey Cape are internationally recognized (see "Cape May — Birding Hot Spot," NJO S/O 1988).

Expected to cost about $10 million, this refuge will help ensure the protection of Cape May's critical upland, woodland-edge and coastal habitats essential to migratory bird and resident wildlife populations.

New Jerseyans can be proud of the timely and aggressive initiative by the Division of Fish, Game and Wildlife to make the Cape May National Wildlife Refuge a reality. The New Jersey Fish and Game Council, the Duck Stamp Committee, and Division Director George Howard provided the leadership and support to establish the refuge and participate in the Atlantic Coast Joint Venture of the North American Waterfowl Management Plan.

Elsewhere in the Atlantic Coast Joint Venture, high priority wetlands have been identified for protection and enhancement in every state, from Cobscook Bay in Maine to South Carolina's ACE Basin.

Another flagship project under the Atlantic Coast Joint Venture is in South Carolina, where The Nature Conservancy has obtained a permanent easement protecting 5,200 acres of the Hope Plantation. The Nature Conservancy has also acquired title to two islands in the ACE Basin (Ashepoo, Combahee and Edisto rivers). This is the last major, undeveloped coastal complex remaining in the state, where 14 percent of the Atlantic Flyway dabbling ducks winter. South Carolina is presently developing a management plan to protect and enhance other wetlands within the 90,000-acre ACE Basin.

The Lower Great Lakes — St. Lawrence Basin Joint Venture comprises Michigan, New York, Ohio, Pennsylvania, and Vermont. Wetlands in these states provide one of the most diverse and abundant fish and wildlife resources in the country. The principal goal of this joint venture is to provide wetland

habitat and the management necessary to benefit black ducks and other waterfowl, including mallards, blue-winged teal and wood ducks. This area is a major corridor for migrating snow geese, brant and Canada geese.

Every year over 20,000 acres of wetlands are lost in the lower Great Lakes — St. Lawrence Basin. Less than 10 percent of the 300,000 acres of wetlands present when the European settlers arrived remain along the shores of Lake Erie. The Ohio Division of Wildlife is leading a program involving several agencies and conservation organizations to protect 5,200 acres of the lake's freshwater coastal marshes and shoreline estuaries. Wetlands will be acquired and cooperative management agreements obtained. The division is also planning to develop 1,300 acres of wetlands and enhance an additional 2,600 acres of state-owned waterfowl habitat.

Through its Division of Fish and Wildlife and in cooperation with the U.S. Fish and Wildlife Service, Ducks Unlimited, The Nature Conservancy and landowners, New York is working to unify the management of wetlands in a 35,000-acre study area. This cooperative program includes the Montezuma National Wildlife Refuge, Howlands Island, Crusoe Lake and Cayuga Lake state wildlife management areas and two privately owned wetlands. Other areas with wetlands in need of protection are the St. Lawrence Valley, Buffalo Harbor, the Niagara River, the Tonawanda — Oak Orchard — Iroquois complex in western New York, and marshes along the Fingers Lakes and Lake Ontario.

The Prairie Pothole Joint Venture proposes protection for 1.1 million acres of habitat from south-central Canada through the north-central U.S. About one-third of the American prairie potholes are in Iowa, Minnesota, Montana, South Dakota and North Dakota. This region is the great "duck factory," where 14 percent of the dabbling and diving ducks nest and raise their young. It's also the home for over 225 species of birds, including the bald eagle, whooping crane, peregrine falcon and piping plover, and many other wildlife species.

The prairie wetlands have suffered from years of severe drought and widespread habitat loss due to intensive agriculture practices and drainage of wetlands. Ninety-nine percent of the nesting potholes are gone in Iowa; in Minnesota only 44 percent remain intact; and more than 53 percent of the potholes in North Dakota have been destroyed.

A major step forward was taken on September 27, 1988, when representatives of American and Canadian federal, state and provincial governments, conservation groups, and individuals gathered in Saskatchewan for ceremonies opening the Quill Lake Project. The Quill Lake region, 7,000 square miles near Wynyard, has been one of the continent's most productive waterfowl breeding areas. A five-year, $5 million plan is designed to restore waterfowl to previous levels.

Quill Lake and other projects are being partially funded from cooperating private and governmental organizations. Several states, including New Jersey, have contributed a total of $1 million, and another $1 million was matched by Ducks Unlimited. The National Fish and Wildlife Foundation, a private group established by Congress, has provided another $2 million, and Canada is supplying another $4 million, for a total of $8 million dollars. The Canadian government had already earmarked $1.7 million for its 1988-89 North American Plan projects. These millions of dollars pale in comparison with the plan's estimated total cost of $1.5 billion.

The Gulf Coast Joint Venture encompasses states from Texas to Florida where over one-quarter of the nation's dabbling ducks and a large number of diving ducks and geese winter. The joint venture has identified 4.3 million acres of waterfowl habitat along the Gulf Coast and targeted about 386,000 acres in seven projects for protection. Four projects have been identified in Texas and one each in Louisiana, Mississippi and Alabama. The 1,400-acre Little Pelican Island in Louisiana has been acquired as a national wildlife refuge. It is anticipated that hundreds of thousands of acres of public and private lands will be restored, enhanced or protected. The Scott Paper Company has already modified its timber management land use, and Amoco has leased 7,000 acres for a mini-wildlife refuge.

The Central Valley Joint Venture comprises California's unique Central Valley Ecosystem, where 60 percent of the Pacific Flyway waterfowl population winter. Nowhere else in America are so many waterfowl dependent

William D. Griffin

The survival of species like the wood duck may depend on the regional restoration of nesting sites through wetland habitat management. (bottom) The American bald eagle will benefit substantially from the protection of large, contiguous tracts of nesting habitat.

Robert E. Birdsall

William D. Griffin

Protecting coastal marshes like this one near Stone Harbor will provide critical wintering grounds for a host of waterfowl and wildlife species.

on so few remaining wetlands. In the last century, more than 95 percent of the Central Valley's four million wetland acres have been lost to agriculture, industry and urbanization. During the last 30 years there has been a 50 percent decline in duck numbers.

In Colusa County, the National Audubon Society and the National Fish and Wildlife Foundation have provided over $5 million for the acquisition and restoration of 550 acres of wetlands, between Butte Creek and the Sacramento River, from the Behring Ranch. This project was supported by the California Waterfowl Association, Ducks Unlimited, The Nature Conservancy, the U.S. Fish and Wildlife Service and the California Department of Fish and Game.

The partnership in this joint venture intends to protect 80,000 acres of existing wetlands through fee title or easement acquisition. They also plan to create 120,000 acres of new wetlands and improve waterfowl habitat on existing public and private lands. A new California Waterfowl Habitat Program has been established, which authorizes California Fish and Game to compensate landowners for restoring and protecting waterfowl habitat. Proposed extension work will teach the rice farmers how grain left on flooded lands after the waterfowl season benefits waterfowl.

Arkansas, Illinois, Indiana, Kentucky, Louisiana, Mississippi, Tennessee, Oklahoma and Texas make up the Lower Mississippi Valley Joint Venture. Its goal to protect an additional 300,000 acres of the lower Mississippi River Valley habitat will eventually sustain a fall flight of 3.2 million mallards.

To accomplish their goal, the Lower Mississippi Valley state wildlife agencies, federal land management agencies, and cooperating private conservation organizations designated six project areas. Their projects are the Yazoo Delta in western Mississippi; the Cache/Lower White River in Arkansas; Three Rivers in Louisiana; New Madrid in Illinois, Indiana, Kentucky, Missouri and Tennessee; the Neches-Angelina River in eastern Texas; and Deep Fork in central Oklahoma.

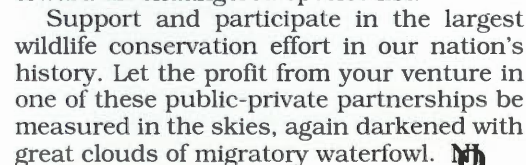
The North American Waterfowl Management Plan's far-reaching habitat protection and enhancement objective is estimated to cost about $1.5 billion over the next 15 years. However, considering that the waterfowl resource generates about $7 billion per year in direct expenditures to our economy from birders, hunters, and naturalists and through the sales of books, lodging, cameras and binoculars, the $1.5 billion to be spent protecting the waterfowl resources is an excellent investment in the future. Aside from its economic value, the esthetic importance of our waterfowl resource and our moral duty to preserve this priceless inheritance for future generations is at least as important.

It's generally agreed that habitat protection by acquisition and easement and the habitat enhancement of existing public and private lands are the only ways to reverse the waterfowl populations' downward spiral and achieve the 15-year goal of 100 million ducks heading south every fall.

Whether the plan's present momentum and the joint ventures' positive actions can be sustained as the newness wears off and the work becomes more difficult and frustrating is not known. The American and Canadian governments, their respective wildlife services, and the state wildlife agencies simply cannot go it alone.

This program is not a governmental budget item but rather a moving force of conservation organizations, public interest groups and private citizens helping to shoulder the financial load, maintain public interest, lobby for special funding, and direct their full attention to implementing the North American Waterfowl Management Plan. Any lesser effort will probably see the plan fail and our waterfowl resources continue their decline toward an endangered species list.

Support and participate in the largest wildlife conservation effort in our nation's history. Let the profit from your venture in one of these public-private partnerships be measured in the skies, again darkened with great clouds of migratory waterfowl. NJ



Pete McLain is a former assistant director of the Division of Fish, Game and Wildlife and a frequent contributor. Retirement for this outdoorsman includes fishing, hunting, travel and freelance writing.

A Place For Us and Wild Denizens, Too

The Proposed Wallkill River National Wildlife Refuge

Tony Petrongolo journeys from the Cape May National Wildlife Refuge, his feature in the July/August issue, to a distant corner of the state. Liaison to state and federal land regulatory agencies, Tony develops the management plans for lands administered by the Division of Fish, Game and Wildlife and takes this opportunity to update our readers.

By Tony Petrongolo

In May 1988, the DEP Division of Fish, Game and Wildlife proposed to the U.S. Fish and Wildlife Service that a 7,500-acre national wildlife refuge be established in the Wallkill River Valley to protect its unique habitats. As proposed, the Sussex County refuge would encompass 4,200 acres of wetlands and 3,300 upland acres in Hardyston, Vernon and Wantage townships.

The number one industry in Sussex is tourism, and 30 percent of the county's acreage is farmland. Because of the metropolitan New York area's proximity, there are growing development pressures which threaten to degrade significantly the area's natural resource values. Seventeen million people live within one hour's drive of the Wallkill Valley, and the population of Sussex County is projected to increase 62 percent by the year 2000.

The Wallkill River Bottomlands, among New Jersey's top five priority wetland areas meriting protection, represent one of the few, high-quality waterfowl concentration areas remaining in the northwestern portion of the state. The lowlands straddle two major migration corridors for waterfowl moving between eastern Canada and the Atlantic Coast and between the Delaware River and Hudson River corridors.

Mallards, black, wood and ruddy ducks, blue- and green-winged teal, American and hooded mergansers and Canada geese are some of the species that stop to rest and feed along the Wallkill River. An excellent freshwater fishery for large- and smallmouth bass, pickerel, perch, sunfish and bullheads exists within the river.

This region is also unique in the great diversity of wildlife it supports. At least eight of the state's endangered and threatened species, including the bog turtle, barred owl, red-shouldered hawk, savannah sparrow and the great blue heron, utilize the area. Sedge wrens and breeding red-headed woodpeckers have recently been reported. Two species on New Jersey's list of rare plants, slender cotton grass and the spreading globe flower, are found within the proposed refuge.

The Wallkill Bottomlands support a diversity of wildlife unparalleled in northern New Jersey. Wide-ranging species such as black bear, bobcat and river otter still thrive in and around these productive wetlands. A wide variety of game and nongame populations inhabit the proposed refuge area, and the tract offers tremendous potential to develop into a birding "hot spot." During years of prey scarcity in the far north, snowy owls winter there. If this faunal diversity is to survive, large, contiguous tracts like the Wallkill Bottomlands must be protected before they are fragmented by development.

The refuge project supports the North American Waterfowl Management Plan by protecting, in particular, black duck, pintail and wood duck migration and breeding habitats. Consistent with DEP greenway initiatives to protect natural resources and offer recreational opportunities, it will fill a key gap in the developing Skylands Greenway.

A "Draft Environmental Assessment" was released by the federal agency on July 21, 1989. Later this year, a final decision on whether or not a new national wildlife refuge will be designated on the Wallkill is expected. A favorable decision will result in the U.S. Fish and Wildlife Service seeking federal appropriations to begin purchasing parcels within the refuge boundaries from willing sellers.

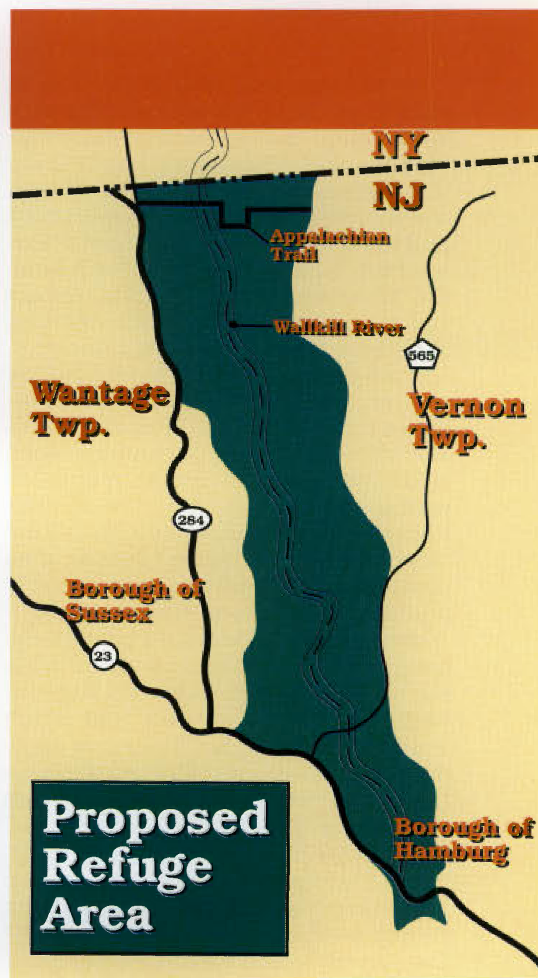
While providing high quality opportunities for environmental education and fishing, hunting, hiking, birding and numerous outdoor recreation activities, a Wallkill River National Wildlife Refuge would ensure that the valley's scenic beauty remains intact and that a place for its wild denizens is preserved in perpetuity.

Breck P. Kent

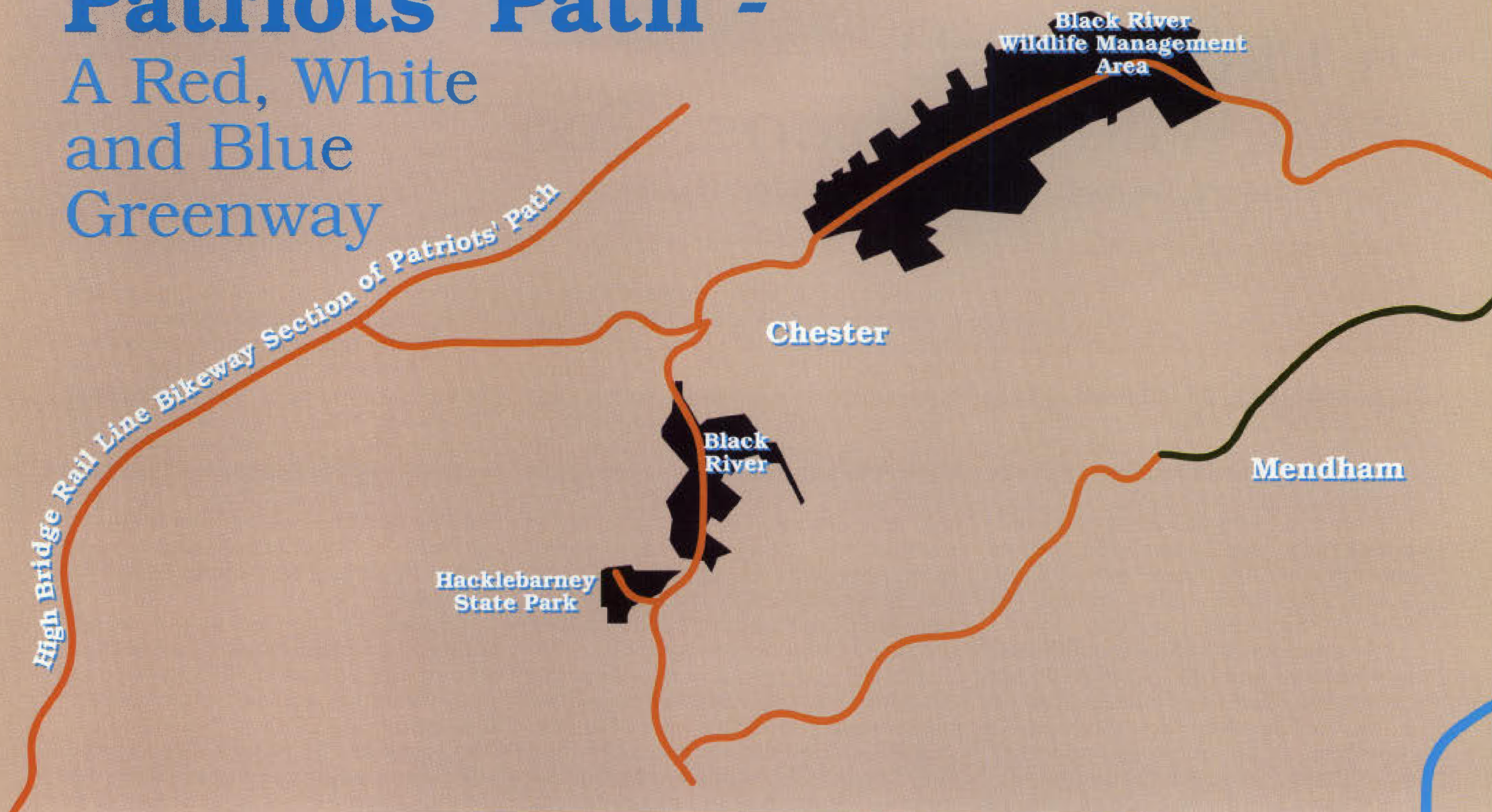
Largemouth bass.

William S. Lea

Red-shouldered hawk.



Patriots' Path - A Red, White and Blue Greenway



By Isobel Ritter

Would you and your family like to walk in the footsteps of General George Washington and his Continental Army? Perhaps you would enjoy strolling the Vail Homestead at Speedwell Village, where steam-powered transportation and the telegraph were invented. Patriots' Path, a linear greenway that follows the Whippany River corridor, invites you to explore history while enjoying the scenic beauty of Morris County.

Trail systems in America often follow old transportation routes such as abandoned railroad lines or natural features like rivers. Few trails combine open space walking and public recreation with a step back in time. The 27-mile linear Patriots' Path stands apart from other trails in the region because of its proximity to so many national, county and private historical sites.

Originally conceived to protect the integrity of the Whippany River from the pressures of development, Patriots' Path was envisioned as a trail which would not only follow the stream corridor but also serve as a link with recreational and historical places in municipalities surrounding Morristown.

In 1966 Helen C. Fenske, then director of the North Jersey Conservation Foundation and now DEP Assistant Commissioner for Natural and Historic Resources, joined with Russell Myers, the secretary-director of the Morris County Park Commission, to establish a linear corridor linking the outstanding scenic parklands and historic sites from Mendham Township through Morristown. Because of the remarkable history such a corridor would encompass, noted historian John T. Cunningham suggested the name "Patriots' Path" as being appropriate.

Working with the Morristown Rotary and the Junior League of Morristown, the North Jersey Conservation Foundation (now the New Jersey Conservation Foundation) in 1972 hired a project director and formed the Friends of Patriots' Path. Plans evolved to have Patriots' Path meet on the east with Essex County's Lenape Trail and link up with paths to the west, eventually to lead to the Appalachian Trail and the Delaware River.

Meetings with county and municipal officials generated easements for the route in significant locations, and the idea of an historic travelway became a reality. However, the success of the project was dependent upon the cooperation of local governments and the concept of home rule. While everyone acknowledged the validity of a plan to protect the Whippany and its wetlands, progress toward a unified effort involved the intricacies of conservation easements, outright donations and state funding for land acquisition.

One year after being hired, project director James Roberts expressed his frustration with the political problems in creating a linear park. "Unfortunately, rivers are the product of nature, not legislatures, so stream valleys can cross many municipalities. It is this discrepancy between political subdivisions and natural systems which makes the preservation of rivers as linear parks such a difficult task."

Some of the same problems exist today in extending the path to other areas. Because coordinating trail expansion and maintenance is complex, the Morris County Park Commission agreed to accept a major role in developing the route of Patriots' Path, so that there eventually will be a continuous route throughout Morris County.

The park commission hired Albert Kent in 1988 to serve as the Patriots' Path Coordinator. As the Sierra Club, New Jersey Chapter, Urban Trails Committee chairman, Kent is a knowledgeable advocate of hiking and cross-country skiing trails. He was instrumental in creating the 15-mile Lenape Trail that traverses Essex County through Military and Branch Brook parks, Eagle Rock and South Mountain reservations and West Essex Park. There, the Lenape Trail ends at the Passaic River, the eastern terminus of Patriots' Path.

Plans call for branch trails of Patriots' Path to extend through Randolph, Chester and Washington townships. These connections will involve the cooperation of the Southeast Morris Municipal Utilities Authority, the DEP Division of Fish, Game and Wildlife, the

Troy Meadows
202
287
Whippany
East Hanover
Speedwell Village
Dismal Harmony Brooks Natural Area
Frelinghuysen Arboretum
Foster Fields
Washington's Headquarters
Passaic River
Morristown
Lewis Morris
202
Morristown Historic Park (Jockey Hollow)
N
green-existing path
red-conceptually proposed sections
Great Swamp National Wildlife Refuge

Hunterdon County Park Commission, and the DEP Division of Parks and Forestry.

It is hoped that a section of the path will pass through county-owned property at Schooley's Mountain, follow the abandoned High Bridge rail line, and continue into Hunterdon County to Voorhees State Park and Spruce Run Reservoir. Another branch will follow the Black River, which crosses Route 24 in Chester Township at the restored, historic Cooper Mill, a county park commission facility.

At present, the most continuous route of Patriots' Path extends from the historic Speedwell Village section of Morristown westward into the Washington Valley near Fosterfields. It goes through the county's 230-acre, 19th-century, living historical farm and follows the Whippany through Mendham Borough. There is a spur to the 1,154-acre Lewis Morris County Park and to the Jockey Hollow Area of the Morristown National Historic Park. This trail section ends at the Cross Estate adjacent to New Jersey Audubon Society property.

Side trails extend to the 128-acre Frelinghuysen Arboretum and to the Dismal Harmony Brooks Natural Area, 500 acres of heavily wooded, steep, rocky cliffs in an undisturbed state.

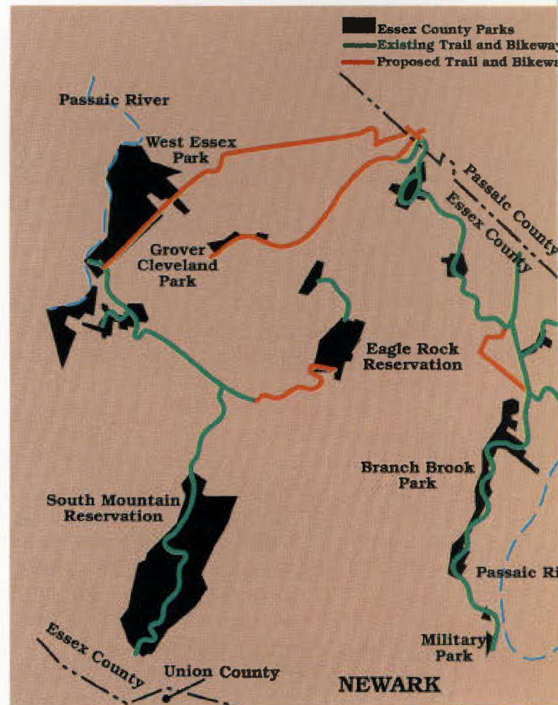
Several completed sections of Patriots' Path were granted National Recreational Trail status in 1980 by the U.S. Department of the Interior. That national trail designation will be sought for all of Patriots' Path upon completion of the entire trail system.

Trail surfaces vary from smooth blacktop eight-feet wide, suitable for biking, to gravel pathways or narrow woodland paths on bare earth or rock. Some sections in low-lying areas or in the Whippany flood plain are muddy in wet weather. Motorized vehicles are prohibited on the trails at all times.

Newly rekindled efforts of the Morris County Park Commission on behalf of Patriots' Path have been welcomed by local environmental commissions and the New Jersey Conservation Foundation. Recently enacted wetlands legislation will greatly enhance the opportunities for state funding of acquisitions along stream corridors, provided New Jersey residents continue to be supportive of recreational open space.

At election time this November, voters statewide have the opportunity to increase the funding for open space projects, such as Patriots' Path, by supporting the $300 million Green Acres bond issue. This ballot question earmarks $230 million for state, local and nonprofit organization projects for open space acquisition and protection.

More than $300,000 in Green Acres grants and loans have already been awarded to Morris County and local municipalities for Patriots' Path projects. In addition, the county received $221,000 in federal Land and Water Conservation funds for acquisition of property for the greenway.



Dedicated and proposed segments of Patriots' Path (top) and Essex County's Lenape Trail illustrate a successful "greenway" approach to public recreation.

Isobel Ritter, public relations coordinator for the Morris County Park Commission, is editor of *Ranger*, a park commission publication. She chaired an earlier county parks bond referendum and sits on the Harding Township planning board. Welcome to *NJO*.

Morris County Park Commission

Morris County Park Commission

A cross-country skier, pausing near a Patriots' Path trail marker, enjoys one of the many recreational opportunities this greenway offers. (right) A section of the path passes through the Jockey Hollow Area of the Morristown National Historic Park.

DEP Assistant Commissioner Helen C. Fenske said that a "greenway project like Patriots' Path should have priority funding from the state's resources because it links recreational and historic sites together while protecting wetlands."

In Morris County, the park commission's $10 million referendum to increase their bonding capacity for acquiring additional acreage also appears on the ballot. These funds would be used for developing existing county parkland, including more stretches of Patriots' Path and for trails at Pyramid Mountain Recreational Wilderness Area which the county acquired last year.

In a recent interview, David F. Moore, Executive Director of the New Jersey Conservation Foundation, asserted, "People in a densely populated state like New Jersey want, need and will demand places they don't have to share with an automobile." He went on to say, "Patriots' Path, with its remarkable historic features, is a vital link in the state's trail network connecting eastern urban areas with rural regions."

Walking for pleasure has become one of the most popular recreational pursuits for people of all ages. The expansion of trail and greenway systems to accommodate hiking and biking enthusiasts of the metropolitan region will happen only when the public supports and joins the efforts of diverse environmental groups, including the New Jersey Trails Council, the New York-New Jersey Trails Conference, the New Jersey Conservation Foundation and the Association of New Jersey Environmental Commissions (ANJEC), and governmental agencies like the Morris County Park Commission.

For Patriots' Path the future seems brighter than ever. As a greenway with red, white and blue branches, it links scenic and urban areas with historic places. Its unique character — the chance to commune with nature and our past — is a special enticement for exploration.

For information on Patriots' Path or trail locations, contact:

Division of Visitor Services
The Morris County Park Commission
PO Box 1295
Morristown, NJ 07962-1295
201/326-7600

Noted New Jersey historian **John T. Cunningham** returns to *New Jersey Outdoors*. His last feature, about southern New Jersey when iron was king, appeared in 1984. Works by the Morris County author include *New Jersey: A Scenic Discovery*, *Capsules of New Jersey History*, and *This is New Jersey: From High Point to Cape May*.

Genius Recalled

By John T. Cunningham

J. Ranney Huber

My suggestion that a system of connected trails and abandoned railbeds in Morris County be called "Patriots' Path" could be hailed as a triumph of great genius or magnificent inspiration.

The title came from neither genius nor inspiration. It was coined because it fit into a space approximately three and-a-half-inches wide. If genius were involved, it belonged to Helen Fenske, then so young and inexperienced she believed zeal could overcome anything. In Helen's case, it could.

She conceived the notion of linked trails. She needed money, and she needed a brochure — *immediately* — to lure prospective donors. Would I plan and write the brochure, and, oh yes, would I get a friend and colleague, nationally known artist Homer Hill, to design and illustrate it?

Of course. Then Helen mentioned the fee: nothing. That was just right for Homer and me, for we believed in the vision.

We could have an 8.5 by 11-inch sheet (both sides) for the message. I suggested that we fold it in thirds so that it at least look like a brochure. That accounts for the width of three and-one-half inches mentioned above.

Helen had a title, long enough and obscure enough so that grant agencies and foundations would be impressed. I told Helen:

"It won't fit."

Did I have any suggestions?

It was buzz time. My first suggestion, about to be followed by a dozen more that also would fit, was "Patriots' Path." Short and alliterative.

"Perfect!" exclaimed Helen, as only Helen can exclaim.

The name had been born. Somewhere, stillborn in my mind, likely was something better. Still, a path by any name was just as sweet. I was a believer.

I believed in the concept because even then New Jersey was losing ground in the cruel war with developers. I believed because the idea was the genius, not the name. I believed because Morris County had ample claim to revolutionary war glory.

Perhaps most important, I believed because I grew up within three feet of

William D. Griffin

the aborning path.

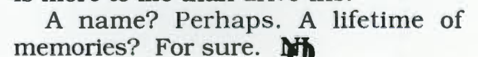
My family and I had lived in the old Brookside freight station of the long-abandoned Rockaway Valley Railroad, the storied little line that once ran from Peapack almost to Morristown. Some of the old right-of-way would be in Patriots' Path.

When we became tenants in the remodeled freight station, the rails had been removed for scrap iron. My brothers and I spent each winter innocently vandalizing the roadbed for railroad ties and bridge timbers so that our woodstove could fend off the chills of both winter and the deepening depression. Credit us, in a way, with being the path's trailblazers.

That old roadbed was ours, on permanent loan. We hiked forever on the cinders. We picked blueberries by the bucket. We fished in the rapidly flowing brook beside the old route where the "Rockabye Baby" steamed into history.

Some of the roadbed is in Patriots' Path, along with much of me. Now it belongs to everybody who believes there is more to life than drive-ins.

A name? Perhaps. A lifetime of memories? For sure. NJ



More Than Laying Plank to Hull

By Carol J. Suplee

Dennis McDonald

The tangy, clean scent of Atlantic white cedar permeates the old boat shop. Every footstep stirs more fragrance from the shavings on the floor.

From the wall, the framed visage of J. Howard Perrine looks down benignly on the familiar clutter of a boatwright's shop — his shop. Here in Barnegat his heir, John Chadwick, builds boats the old way, handcrafted one at a time. No other boatbuilder's name is spoken with such respect as J. Howard Perrine's, especially when the conversation is about sneakboxes.

Certainly, shallow-draft, wooden gunning boats existed in these coastal waters for many years. Most historians credit Captain Hazleton Seaman for refining the indigenous gunning boat around 1836. He fashioned a craft that could be used as a sailboat and fishing boat in summer, as a duck boat in fall, and as an ice runner during winter. The result was the Barnegat Sneakbox, a perfect marriage of nature, necessity and ingenuity.

A snug boat for a man and his son, the traditional sneakbox was usually about 12 feet long and four feet wide, with a shallow draft to negotiate the boggy shoreline areas that sometimes were marked on coastal maps as land. It needed so little water, the folklore goes, that it could "follow a mule as it sweats up a dusty road."

Weighing about 200 pounds, it could easily be pulled across strips of land between estuaries. Its low freeboard necessitated a planked deck surrounding a hatch, just big enough for a hunter to slip into with his feet extending toward the bow.

Forward of the hatch, a canvas "dodger" was rigged to ward off the worst of duck-hunting weather. On deck were the folding oarlocks; inside, a place to stow the oars. In tight places, the boat could be rowed as well backward as forward. The hunter's gun and supplies could be stowed inside, along with sail and mast. A large number of hand-carved decoys could be stacked along the stern deck, held in by removable sides.

Some propelled the boat by oar; others, by sail. With the sail up, a jab board was inserted into the centerboard well to serve as a keel, and a removable rudder was added for sailing. Copper-clad runners were fastened to the bottom for running on ice or for dragging over sandbars.

It was Perrine, near the turn of the century, who took up where Captain Seaman left off, creating the 15-foot classic "Diamond Class" sailing sneakbox that was to assure his fame. His boat yard also turned out 18- and 20-foot sailers, as well as some 12-

footers in the "Butterfly Class." But no Perrine boat was to capture the imagination as much as the graceful, feather-edged sailing Barnegat Bay Sneakbox that J. Howard produced.

Perrine was descended from a long line of shipwrights and men of the sea. His grandfather built commercial boats and was one of the state's first volunteer lifeboatmen. Perrine's father was among the first paid captains of the young Coast Guard. John Chadwick Sr. was Perrine's heir, and John Jr. later inherited the works from his father. He grew up in Perrine's home and lives there today. Having no children, Perrine looked on the Chadwick family as his own.

At Perrine's elbow, John Sr. learned the shipwright's craft, working side-by-side with him at the boat cradle and workbench. As he grew up, John Jr. watched and learned from the two mentors.

He learned exceedingly well. Chadwick has won first place for his sailing sneakbox in the Old Time Barnegat Bay Decoy and Gunning Show four years in a row. Last year, a photographer recorded the event for the Philadelphia Maritime Museum.

The memories are as rich as the scent of Jersey cedar. "I remember going over to the boat works," Chadwick said, "and getting into all kinds of trouble. I'd play in the sail loft while my mother, Carolyn, sewed sails. She worked hard. Sometimes I would fall asleep up there in the piles of canvas."

Chadwick also remembers his paternal grandmother, Jennie, sewing sails in the same loft. He learned that skill, too, and today hand-sews and finishes each natural, canvas sail. Dacron, a synthetic fabric, is never a consideration.

Chadwick uses Perrine's original sneakbox patterns and treasures the well-worn tools his father and Perrine used. Among them is a set of matched planes, one for each side, used to fashion the boat's most distinguishing feature — the compound curves of the deck and hull. The sneakbox has been described as watermelon-seed shaped, curving in every direction.

"I still wish I could plane the way my father and Mr. Perrine did," said Chadwick. "They used to eyeball it. They'd just roll the plane along the edge of the plank, knowing just when the curve was right. My father could plane a boat in one day."

He ran his hand over the hull of a boat in progress, checking his own work against his memory of the master's craft. Like Perrine and his father, Chadwick makes his own tongue-and-groove planks, an extra touch that makes his sneakboxes unique. It may be one of the reasons he wins first place so often.

Starting with plain cedar boards, he carefully cuts each groove and crafts by hand a matching tongue for the next plank. Other builders butt the seams, pulling the planks tight with clamps or "plank pullers."

The essential element of the boatbuilder's craft — the fragrant, supple and strong Atlantic white cedar — is almost an extinct species. "They've cut down the bogs," Chadwick said. "Any kid who thought he could make a quick dollar would steal a log but only cut about eight feet of it. No one could use it and the tree was lost."

Around the turn of the century and for about four decades thereafter, the sneakbox was at its peak of popularity, and the busy Perrine Boat Works employed builders throughout the area to fill its orders. The basic frame of the boat would be cut according to Perrine's patterns and "set" at the shop. Then builders would take the skeleton of the hull and complete the planking according to Perrine's directions. The boat would be finished back at the boat works under Perrine's supervision.

In a 1942 newspaper story, Perrine was quoted as saying he had produced about 2,500 sneakboxes. Chadwick estimates the final number might have been closer to 3,000. No other builder has matched that remarkable record.

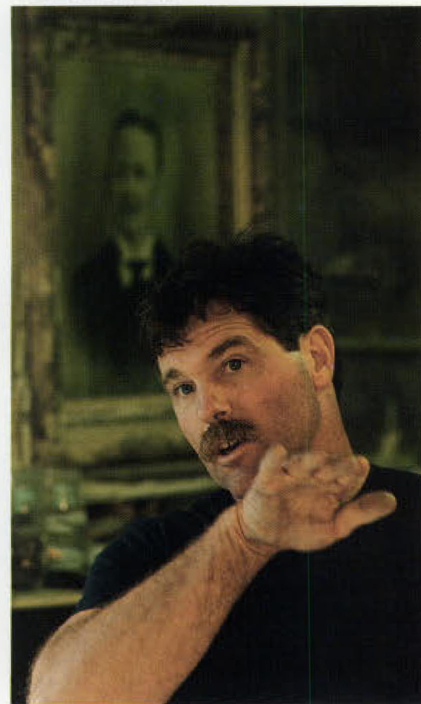
An old flyer that shows Chadwick's father as a little boy, peeping above the hatch, advertises a complete sailing "Butterfly" with copper-clad runners, handmade sail, esprit pole (a type of movable gaff) and mast for $200. Today, even at about 10 times that price, a hand-crafted sneakbox would be a bargain.

During World War II, after almost a half-century of boatbuilding, the Perrine Boat Works turned out sailing sneakboxes for the government, to be used in training young sailors.

In its heyday, the sneakbox was used as a floating blind, nestled into a stern-shaped cut made by the hunter in the tall grasses at the edge of the marsh. Men hunted the abundant black ducks, geese, broadbills and canvasbacks that settled down in the New Jersey wetlands to nest, rest and feed. Hunting was an important part of life, whether for table, market or sport.

Many hunters were members of gentlemen's clubs. They would start out for a weekend of hunting with their little sneakboxes all in a row like ducklings, in tow

Dennis McDonald



J. Howard Perrine looks over the shoulder of his heir, John Chadwick, in the Barnegat boat works where the mentor's sailing sneakboxes are still carefully crafted by hand.

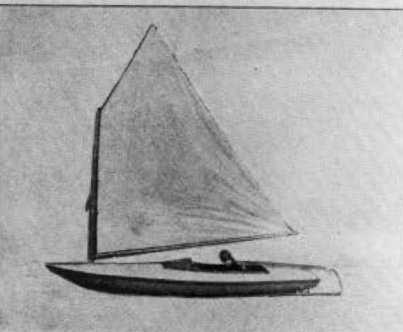
(facing page) The perfect marriage of nature, necessity and ingenuity, this Barnegat Bay Sneakbox was built by John Chadwick.

"Pure of line, its beauty is found in its utilitarian simplicity honed by skillful, knowing hands."

BARNEGAT SNEAK-BOX

BUTTERFLY TYPE

12 Feet Long 5 Feet Beam



COMPLETE AS SHOWN

Price - - - - $200.00

J. H. PERRINE

BARNEGAT, NEW JERSEY

John Chadwick Sr. peeps above the hatch in this advertisement for a J. Howard Perrine sailing "Butterfly."

behind another indigenous New Jersey boat, the sturdy garvey.

In those days, Chadwick explained, market hunting was allowed. Around the turn of the century, a hunter could get $5 for a pair of canvasbacks from any good restaurant. "This bay area was considered the best for ducks. From here, they were shipped all over the world," he said.

It was profitable — too profitable — and duck populations inevitably dwindled. The loss of habitat, development and pollution have done the rest. Now, market hunting is not allowed and hunting for the table strictly regulated.

The sneakbox needs neither hunter nor duck to justify its existence. Pure of line, its beauty is found in its utilitarian simplicity honed by skillful, knowing hands. The sneakbox exists as an example of a true folk art. Builders who were preparing to retire are now busier than ever, after discovering a new wave of popularity for this beautiful, little, no-frills boat.

Chadwick's feeling for this tradition is almost palpable, ever present in his life. Though the Perrine blood does not flow in his veins, it is in his heart. Every day he works to keep the legacy alive. With the old man gazing down from the wall and his own father's tools in his hand, he could hardly do otherwise.

Many New Jersey boatwrights, like the Chadwicks, have handed down their knowledge and craft to the next generation. Their skills and tradition live on in the multitude of variations on Captain Seaman's original sneakbox design found all along the Jersey Shore. The Heinrichs sneakbox is another example of a living art that refuses to yield to modern mass production.

Although he's now a third generation boatbuilder, George Heinrichs of New Gretna, Burlington County, never expected to follow in the footsteps of his father, Gus Heinrichs Sr., a noted Tuckerton boatbuilder.

"My father didn't have a lot of patience. He was quick-tempered, and when I would be in the shop while he was setting up a boat, he'd shoo me away. He never took the time to show me," Heinrichs recalled.

It was only in 1970, when Gus Sr. was ailing, that he called sons Gus Jr., George and Millard together and asked that they carry on the Heinrichs sneakbox tradition. Gus Sr. extracted a promise that if none of the brothers wanted to build Heinrichs sneakboxes, the old man's patterns would be destroyed.

"It would have been foolish to let the tradition die," George said. "No one had ever duplicated the Heinrichs sneakbox."

So George decided to build his family's version of the graceful, spoon-bowed gunning boat, even though he had spent his adult life in other pursuits. Eventually, he persuaded his brother Gus, a carpenter by trade, to build them too. Brother Millard keeps his hand in by making miniatures.

The brothers would have made their father and grandfather proud. Gus won first place, his third in a row, for his feather-edged sneakbox at the Tuckerton competition last year. It is similar to the Chadwick-Perrine boats but without the sail rig. George explained they are sometimes called planing sneakboxes, adding almost as an afterthought that he had come home with a third-place ribbon in his class.

The feel of plank and hull is familiar enough to George and his brothers, even though they started their craft late in life. Their grandfather, also named Gus, had established the Heinrichs Rail Yard in Tuckerton around 1920. There his four sons, Eddie, Joseph, Francis and Gus (George's father), learned the shipwright's trade.

As a lad, George used to hang around the rail yard, corking seams, doing odd jobs and learning skills from his grandfather. He still has a sneakbox built for him by the elder Heinrichs. As a young man of 20, George said, there were few pleasures to compare with sailing one's own boat, hunting ducks alone on the marsh or, occasionally, impressing the young ladies.

George finished his first sneakbox in 1971, just about a year before his father died. "My father wrote it all down, gave me the patterns and said, 'Go build it.' So I did. When I got stuck, he'd help me out," George recalled. "The biggest problem was the compound curve. It's a concave-convex plane. Very tricky. I'd get a plank with a hump in it and not know what to do."

For years, George worked as a foreman in a Great Bay fish factory until area waters were depleted of fish. He also used his shipwright's skill to build yachts for a local firm. He has long viewed boatbuilding as an avocation, producing about one a year since he first picked up his father's notebook. Gus builds them at about the same rate, he said.

Their skill is undisputed, and the Heinrichs sneakbox design is safe in their hands. Although true to tradition, it is just a little different. The bottom is flatter, creating more stability and allowing the boat to plane.

Carol Suplee, former editorial page editor for the *Burlington County Times*, has been a New Jersey journalist for more than 20 years. She continues to write a regular commentary column, freelances for other East Coast publications, and is the Public Information Officer for a Quaker boarding school in Pennsylvania. In her first NJO feature, she writes about her favorite state and her life-long fascination with wooden boats.

Neither George nor Gus Jr. build sailers, catering mainly to motorboat aficionados.

The brothers do play variations on the Heinrichs theme. George constructs what he calls a "trip-chine" or flat-sided hull. The bow, shaped very much like the bill of a spoonbill duck, is feather-edged, but the side deck-to-hull seams are joined by using a tarpon, a two-inch board running the length of the boat. Gus, on the other hand, builds a boat that is completely feather-edged from stem to stern.

George uses a "plank-puller," one of his father's special tools, to hold flush seams together during construction. He does not use the tongue-and-groove method. In either version, Heinrichs sneakboxes are built for speed.

George is a quiet, almost shy man who downplays his skill, admitting that he's made a few mistakes along the way. Yet his first boat was pronounced a success by the most severe critic of all — his father. The 20-odd boats he's built since then have secured his place among New Jersey's master sneakbox builders.

He starts them in his basement, and soon the whole house is scented with the cedar fragrance. When the time comes to "glass" (fiberglass) the hull, as most builders now do, the boat must be taken out to the yard.

"That would drive us both out," George grins, paying tribute to his wife Catherine's forbearance with the regular course of dust and noise below the house.

George said he has seen dramatic changes in the old way of life. Atlantic white cedar is scarce and expensive. Ducks are dwindling, and the sea has been overfished. Even the clamming isn't what it used to be. But as long as he and his brother are building Heinrichs sneakboxes, that one thing, at least, is exactly as it used to be.

Another master sneakbox builder is Joe Reid, of Waretown, a name all New Jersey boatbuilders honor. His skill in making New Jersey wooden boats, especially garveys, has made him somewhat of a folk hero.

He's made a few sneakboxes, too. But it was Reid's hand-crafted garvey that made boat buffs beat a path to his humble door. That recognition has always surprised him. Now retired, he sets his gentle, skillful hands to making exquisite miniatures, complete with minuscule decoys for the sneakboxes. Once again, those who treasure craftsmanship and tradition are finding their way to Joe Reid's door.

Dennis McDonald

In his basement workshop, George Heinrichs stands with his family's version of the spoon-bowed gunning boat. Heinrichs sneakboxes are built for speed.

He never used a pattern, so he never built two boats exactly the same. His unerring eye and feel for the personality of the wood have built his reputation as one of the masters.

Raised on the Great Bay, he spent his youth clamming and, once in a while, building a boat. At first, he built the boats out of necessity. Then people began to notice he had a knack, so he built in the winter and worked the bay in the summer.

Finally, when he gave up clamming, he began to build garveys full time in the boat shed out back. No one ever taught him, and he never set it down on paper. So the accolades surprise him. After all, he just followed his instincts, did what he loved, and took pleasure and pride in the work of his hands.

For those who own a Joe Reid boat or covet one of his miniatures, there is no surprise. He is the kind of builder — the kind of man — who deserves the admiration of his peers.

Only a few steps down the road from Joe Reid's house is the yard where Sam Hunt was working on a sneakbox. Hunt and Reid, both sharing a "Piney" heritage and passion

Dennis McDonald

Dennis McDonald

Sam Hunt's yard is his workshop, and he never builds any two sneakboxes exactly alike. (bottom) Amid the jumbled hulls, machines, tools and assorted vehicles in his outdoor boat shop, Sam fondly recalls his being a featured craftsman in the 1983 Smithsonian Festival of American Folklife.

for boatbuilding, have been neighbors for more than 40 years. Whereas Joe Reid is quiet and self-effacing, Sam Hunt is garrulous, even bombastic. He is rough-hewn, weathered and salty — just like the boats he builds.

Out of the jumbled hulls, machines, lumber and tools stepped forward a wizened little man. Wiping his gnarled hands on a paint rag, Hunt beckoned us back to his outdoor boat shop. When he learned we wanted to talk, he launched into a rambling, disjointed story of his childhood, accomplishments and interests, not necessarily in that order or, indeed, any order.

He accented his tales, the more drama he could weave in the better, by jabbing his finger or locking his blue eyes with the listener's. A walking, talking kaleidoscope, Hunt savored stories plucked from the gaggle of experiences he has collected over 77 years.

"I was building a boat right over there," he said pointing, "when Pearl Harbor broke out. Reid was helping me." Both left their boatbuilding ventures behind and went off to war. Later in the rambling monologue, he gave Reid a rare compliment, calling him "one of the best boatbuilders in the state of New Jersey."

Hunt lives and breathes sneakboxes and the lore that surrounds them. We had been told what to expect. "Wait 'til you see Sam's. They're different, like Sam. They sure are different."

The Hunt boats, like the man, are rough and sturdy. Subtle nuances of form and grace are absent. Like his life, his sneakboxes are built with only one critic in mind — himself. "I changed the sneakbox. I sure did. No other builder does it the way I do," he boasted, and he never builds any two exactly alike.

Where other builders use a two-piece rib, adjustable to the size of the boat, Hunt bends his one-piece rib in a homemade steam box out in the yard. The yard is his workshop. At any given time, as many as a dozen boats may be waiting Hunt's attention, either for repairs or for the next stage of the building process. He never works on just one, he said.

Where decks meet side planking, Hunt doesn't bother with the finely feathered seam which identifies others' traditional methods. He installs a harpon, a piece of wood attached to the joint. "Makes it tougher," he said. If a Hunt-built boat ever leaks, he'll buy it back.

Hunt said he never builds a boat without runners, even though iceboating is not as popular as it once was. His disdain for conformity, whether it be lifestyle or boatbuilding, doesn't endear him to everyone, including other builders. They're used to him. They shrug and say, "That's Sam."

Hunt frequently peppers his discourse with references to "the girls" who come to buy his boats. He said sailing sneakboxes are more popular with women. Men don't appreciate sailing. They're macho. They want motors, but he'll build boats for them, too.

He is proud of the awards he has won for his sneakboxes. Last year, he brought home a second-place ribbon from Tuckerton for his sailing sneakbox. He revels in memories of being a featured folk craftsman in the 1983 Smithsonian Festival of American Folklife.

Hunt's house is simply an indoor version of the chaos in the yard. What defines the man are the books, photographs, plaques, bits of this and pieces of that gathered over an unconventional lifetime, piled here and there and everywhere.

If he is a man remarkably agile of mind and body, keeping up with the times in his own independent fashion, he appears to have steeped himself in the adventures of another man from another century.

He burrowed into a pile of possessions and pulled out a book by Nathaniel Holmes Bishop. Read and reread many times, *Four Months in a Sneakbox* long ago captured Hunt's imagination.

"Listen to this. I have it marked," he said. Holding the book to the light that struggled through his clouded windows, he read aloud a page containing Bishop's puzzling observation about water flow on the Mississippi.

"I haven't figured that out yet," he declared, snapping the book shut, clearly frustrated that the explanation escaped him.

A century and circumstance separate the two men. One was the privileged son of a wealthy family; the other, a son of the bay and the pines. Yet in one sense they are brothers. Hunt, like Bishop, has always charted his course by the compass in his own head. He plans to go on making Hunt-style sneakboxes outside in his jumbled yard, heedless of visitor or cold or biting wind.

From the legacy of Captain Hazleton Seaman and J. Howard Perrine, these men continue a tradition that is more than laying plank to hull. It is man and nature working together. It is independence and integrity. It is the pride in what two hands and a free spirit can do. NJO

Editor's Desk

Dinosaurs in New Jersey

Dinosaur displays are featured at the Morris Museum in Morristown. The museum is open Monday to Saturday 10 am to 5 pm and Sundays from 1 to 5 pm. Admission is $4. For details, call 201/538-0454.

In Trenton, the New Jersey State Museum has a permanent dinosaur exhibit. Open Tuesday through Saturday from 9 am to 4:45 pm and Sundays from noon to 5 pm, the museum is near the State House at 205 West State Street. Admission is free. Call 609/292-6464 or 292-6308.

Dinosaur prints from the excavation featured in "220 Million Years Ago" may be seen in New Brunswick at the Geology Museum of Rutgers University. Located in Geology Hall on College Avenue, the museum's exhibit features a New Jersey mastodon from Salem County. Admission is free. The museum is open weekdays from 9 am to noon and 1 to 4 pm. The annual Saturday Open House will be held on January 27, 1990. For details, call 201/932-7243.

Naturalist-guided tours are offered at the Walter Kidde Dinosaur Park in Livingston. Operated by the Essex County Parks Department, the quarry site was excavated previously and still contains dinosaur fossils. Group tour programs include fossil hunts. Family tours are offered on specific dates starting in mid-March, continue through spring and resume again in the fall. For information on scheduling group tours, fees, and family dates for spring 1990, call the Center For Environmental Studies in Roseland at 201/228-2210.

New Jersey Wildlife Profiles

New Jersey Wildlife Profiles is now available. The 112-page volume features reproductions of 50 wildlife paintings created by New Jersey artist Carol Decker over the past 10 years for *New Jersey Outdoors.*

Species write-ups from *NJO*'s "Wildlife in New Jersey" series have been updated and species distribution maps added. Original black bear artwork appears on the jacket, and the book features a profile of the artist.

The illustrated wildlife and wildlife habitat information is excellent reference material for teachers, librarians, schools, environmental educators and nature centers. It also is a great gift for that favorite wildlife enthusiast or outdoors individual.

To order, send a $28.00 (postpaid) check payable to "Division of Fish, Game and Wildlife" to: Wildlife Profiles, Division of Fish, Game and Wildlife, NJDEP, Trenton, NJ 08625-0400.

Copies may also be purchased for $23.95 at the Pequest Trout Hatchery and Natural Resource Education Center in Oxford.

New Jersey's Artificial Reefs

Another publication of the Division of Fish, Game and Wildlife is also available now. ***A Guide to Fishing and Diving New Jersey's Artificial Reefs*** contains all the information needed to fish or dive on the state's artificial reefs.

The 80-page book includes LORAN C coordinates of over 120 artificial reef sites, articles written by noted outdoor writers on how to catch sea bass, cod, pollock and other reef species, the biology of artificial reefs, and over 30 underwater, color photographs of the marine life inhabiting these man-made structures.

To order a copy, send a $13.50 (postpaid) check payable to "State of New Jersey" to: Reef Book, DEP Bureau of Marine Fisheries, Nacote Creek Research Station, PO Box 418, Port Republic, NJ 08241.

From Our Readers

This is with reference to the photograph on the inside front cover of the July/August 1989 issue of *New Jersey Outdoors.* You have the wrong carousel. Our carousel at Casino Pier, seven blocks north of the one pictured, was purchased from Burlington Island Park shortly after the fire in 1928. It was first operated in Seaside Heights in 1932 and has been in its current location since that time.

The carousel pictured on the inside front cover came to Seaside Heights from Coney Island in 1955, where it had turned since it was built in 1917. It replaced the original carousel in that location which had been erected in 1913 and was completely destroyed by fire in June 1955.

In addition to being partially restored a number of years ago, The Carousel at Casino Pier has the distinction of having the only continuously operating original Wurlitzer band organ in the state, since most carousels today play recorded music. And it is the only carousel we know of which is operated, managed and watched over by a college professor and dean.

Dr. Floyd L. Moreland
Seaside Heights

Thank you for this bit of information and keeping NJO accurate. Dr. Moreland is a Professor of Classics and Dean for Student Affairs at the City University of New York Graduate School. He is also manager of this "antique carousel" on the Boardwalk.

As a New Jersey native, I grew up reading *New Jersey Outdoors.* Although I have not lived in the state in the past 10 years, I have continued to subscribe to the publication to keep abreast of natural resource issues in the state. I am constantly impressed by the diversity of articles in *NJO* and am glad to see that this publication is not simply an agency vehicle to tout the praises of its programs.

The July/August 1989 issue contains a technical error. The fish identified on page 10 is not a summer flounder as the caption indicates. The summer flounder is a left-eyed fish, and the photograph is of a right-eyed fish. Since it is possible for some summer flounder individuals to be right-eyed, other obvious characteristics are useful for identification. The summer flounder has a large mouth, approximately twice the size of the fish shown. Also, the summer flounder has a lateral line that strongly arches just behind the head.

I believe that the fish photographed is a winter flounder. Although not caught as commonly as the summer flounder, this species is an important sport fish in New Jersey estuaries. A Fishery Management Plan is currently being drafted at the federal level for summer flounder.

Keep up the good work in producing this fine publication.

Ronald J. Essig
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
Silver Spring, MD

The winter flounder was misidentified. Our "fluke" was also caught by the director of NOAA's Office of Fisheries Conservation and Management and a reader from Wyckoff. We appreciate your constructive notes about accuracy of information.

New Jersey State Library

Wood Turtle

A frequent *NJO* contributor, principal zoologist **James C. Sciascia** is the Interior Nesting Osprey Program project leader and supervises exotic animal regulation. Also working in the Endangered and Nongame Species Program, **Martin Rapp** is an assistant zoologist and a first-time contributor.

Carol Decker

By Martin Rapp
and James C. Sciascia

Since the time of the dinosaur, wood turtles have been roaming New Jersey. Of the state's 10 native freshwater turtles, the wood turtle is becoming an ever rarer species due to the loss of wetland habitats, over-collection, and stream degradation.

Although not commonly seen, the wood turtle is easily distinguished from other turtles. Its broad, flattened shell, or carapace, measures seven to nine inches long. As the turtle's Latin name *Clemmys insculpta* implies, the brown to steel-gray colored shell looks like sculptured wood. Covered with pyramid-shaped, layered growths, it is similar in pattern to the annual growth rings of trees except in 3-D. Counting the layers reveals the turtle's age.

The bottom portion of the shell, called a plastron, is yellow with dark blotches on the outer edge of each scute or flaring scale. Since the wood turtle's plastron is not hinged like the box turtle's, it does not have the ability to withdraw its head and legs into the shell and closeup for protection. The skin on the head, neck and legs usually has a prominent orange or red color, from which is derived the old-timer's nickname of "red legs."

The wood turtle's range extends as far north as Nova Scotia, south to northern Virginia and west across the Great Lakes region to Michigan and eastern Minnesota. In New Jersey the largest populations of "woodies" can be found in the northwestern counties of Morris, Warren and Sussex, but the turtle has been found in all but the southern one-third of the state.

While most turtles are either aquatic, like the painted turtle, or terrestrial like the box turtle, the woodie is equally at home on land or in water. Its usual association with relatively clean, wooded streams may be another possible origin for its common name. Nearly all streams which have or had naturally reproducing trout populations should be considered potential wood turtle streams, although the turtle is not limited to these types of streams.

The wood turtle spends early spring in or along cool, clear streams, exploring up and downstream in search of a mate. Mating occurs in the water, usually during April and May. The male follows the female underwater, until he is finally able to climb onto the top of her shell. The concave plastron of the male conforms to the convex carapace of the female, and copulation occurs when he wraps his tail under hers.

The woodie enters its terrestrial phase in late May and June, venturing onto land to find a suitable place to lay its eggs. The female deposits from five to 10 oblong eggs, about one and-a-half inches long, in nests dug on open, high ground. Woodies often favor railroad rights-of-way along rivers and streams, because they are usually elevated, the dark ash/cinder roadbed provides easy digging, and the eggs can absorb sufficient sunlight required for incubation.

Warmed by the summer sun, the eggs remain in shallow dirt or cinder-covered nests for about 60 days. The hatchlings are about one and-a-half inches long when they emerge. They have tails as long as their shells and could be confused with snapping turtle hatchlings, the only other hatchling species with tails as long as the shell. Neither the eggs nor hatchlings are provided parental care. The eggs are easily sniffed out, dug up and eaten by predators such as foxes, raccoons and skunks. If found, the hatchlings are also eaten by predators.

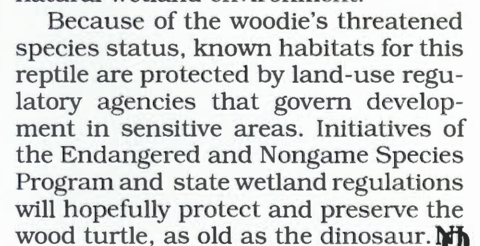
In spring the wood turtle can be found in wet woodlands adjacent to streams, crawling through skunk cabbage and sensitive fern or basking in the sun on a log or rocks. Woodies openly wander during summer utilizing a wide variety of habitats, including upland woods, meadows and agricultural fields. From its normal wetland haunts, the wood turtle wanders sometimes as far as one-half mile, although one marked turtle moved almost one mile in a two-month period. Its long food menu includes slugs, snails, fish, frogs and tadpoles, salamanders, earthworms, carrion, algae, leaves, mushrooms, strawberries and blackberries.

In autumn, wood turtles return from the long-distance summer excursions in the uplands back to the streams and rivers. The turtles remain active as long as temperatures remain mild, usually into November. Spending days swimming and basking in the sun, the wood turtle begins looking for a place where they can hibernate safely.

The hibernaculum is often at the bend in a stream under a cut-a-way stream bank, an exposed tree root system or in holes and cavities created by muskrats. Frequently hibernating in the same location for years, the wood turtle's energy is conserved until its early April emergence by a reduced metabolic rate . In their native habitat, wood turtles live for 20 to 30 years, although captive specimens have reached nearly 60 years.

Small streams and nearby vacant land where wood turtles were found two decades ago have changed considerably. The streams have been cleaned and straightened, and nearby lots are no longer vacant or wooded. The degradation and loss of suitable wetland habitats have led to dwindling populations of the wood turtle, and in New Jersey it is now classified as a threatened species by the Endangered and Nongame Species Program, DEP Division of Fish, Game and Wildlife.

The division has sponsored numerous studies to collect information on the turtle's natural history, abundance, and distribution and to determine how much terrestrial habitat it needs to survive. To protect the wood turtle in New Jersey necessitates protecting its natural wetland environment.



Because of the woodie's threatened species status, known habitats for this reptile are protected by land-use regulatory agencies that govern development in sensitive areas. Initiatives of the Endangered and Nongame Species Program and state wetland regulations will hopefully protect and preserve the wood turtle, as old as the dinosaur.

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Carol Decker

New Jersey

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