

New Jersey Outdoors

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New Jersey Outdoors

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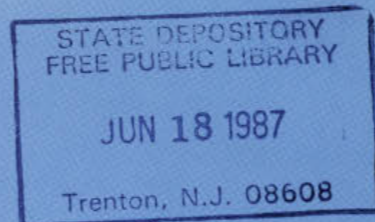
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NEW JERSEY OUTDOORS CREDO

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.



Guest Editorial

"The basic of all life." "Mother Earth." "The Land." By whatever reference, this global mass supports all living things for their duration and then reclaims the remains for a completed cycle.

Primitive man instinctively took his place in the system and conversely knew the most effective means of destroying his fellow man was to destroy his habitat—burn his earth.

Modern man has perfected ways to "burn" the earth. Not necessarily to destroy his fellow man, but rather in the cause of profitable ways to enhance his life while disregarding the primary eternal earth rule of a completed cycle where everything changes, nothing becomes "waste."

The good news is that we do have the opportunity and hopefully the enthusiasm and ingenuity to assess and address our misdeeds in the context of the assimilative capabilities of the earth's systems. As the most densely populated area on our global ship in space, New Jersey is running hard to retain and upgrade the quality of our habitat.

For the past twenty five years, the Green Acres Program has supported and embraced the land, protecting its openness; preserving its character; encouraging the wide and diverse uses that the land could support while at the same time securing it for future generations.

The enormous capabilities of our land is shown in several of the articles in this issue. From the land we can learn and teach others about our past and our future. From the land and its waters we can harvest food. From the land we can enjoy things of beauty that last lifetimes. Land stirs our emotions and stimulates us into action.

Land is not a product—it is a resource. Let's address the findings of the Governor's Council on New Jersey Outdoors and the State Planning Commission with enthusiasm and commitment. They reflect the best thinking of "the people." Given the facts, "the people" are usually right.

Hermia Lechner

Hermia Lechner has been active in many statewide environmental programs. She is the Administrator of the Green Acres Program (now on a leave of absence). Mrs. Lechner was a member and chairman of the NJ Water Policy and Supply Council and a founding member of the South Branch Watershed Association. Hermia is now serving as the Mayor of Clinton Township, Hunterdon County.

In this Issue



On the map of New Jersey, areas that are referenced in articles in this issue are highlighted. The article page numbers listed in the table of contents appear on the location map. A quick glance shows points of interest throughout the state.

This issue takes a *CLOSER LOOK* at another one of New Jersey's better known professional photographers—Walter J. Choroszewski. You have seen his photography everywhere, from the New Jersey State Tourism promotions to the cover of your telephone book; from corporate lobby photomurals to gallery exhibitions of his fine art prints. In addition to his photographic interests in New Jersey, he also maintains an active interest in environmental biology. Walter Choroszewski's works out of his home near Tamerville, New Jersey.



Blueberries

The pinelands of New Jersey are the home of one of America's favorite native fruits, the blueberry. Wild blueberries have been gathered from the swamps and pine forests of New Jersey since colonial times. They were still being harvested in the wild as late as the early twentieth century. New Jersey currently produces the second largest crop of cultivated blueberries in the United States. The largest blueberry farm in the world is located in New Jersey, and strains developed from New Jersey's wild stock are cultivated around the world. Yet today's blueberry and cranberry growers still demonstrate the traditional respect for nature and the environment that was held by the original wild blueberry foragers.

The gathering of wild blueberries played an important role in the economy of the pinelands by the end of the nineteenth century. For many families it was an essential factor in their economic survival. This point is aptly illustrated in a story told by Garfield DeMarco, descendent of one of New Jersey's first commercial blueberry farmers. In approximately 1895, his great-aunt's cousin, Martha Bozarth, was deep in the woods gathering blueberries during the harvest season. Far from home she learned through word of mouth that several days earlier her father, Bill Bozarth, had died. She sent a message home via word of mouth and messenger—she told them to put him in the icehouse and that she would take care of it after the harvest.

At the time there were no blueberries under cultivation. The market demand for the blueberries far exceeded the availability of the wild product, and by 1912 both those gathering wild blueberries and farming cranberries locally were investigating the possibility of cultivating the blueberry.


The most famous of these first blueberry growers was Miss Elizabeth C. White of Whitesbog, New Jersey. In approximately 1913 she began to offer rewards to gatherers who could locate exceptional wild blueberry specimens. She then would have the best of these bushes dug up and moved to Whitesbog for cultivation and study. Working in cooperation with Dr. F. V. Coville of the United States Department of Agriculture, she helped develop many varieties that formed the basis of the American blueberry industry. Many of these

varieties were named after the individual who found that particular wild bush. One of the more famous wild varieties was found by Rube Leek. According to local legend, Miss White was a little hesitant at naming this variety. She felt that to call it a Rube or a Leek wouldn't be fitting. Thus she came up with the name Rubel for this popular variety.

Miss White was not the only cranberry farmer cultivating blueberries at this time, however. James Garfield Alloway was planting and propagating blueberries between the years of 1913 and 1914 at the Friendship cranberry plantation near Chatsworth, New Jersey. J. G. Alloway was well aware of the blueberry's importance in the regional economy—after all, he was Martha Bozarth's cousin.

These early cultivated blueberries were first marketed in the late 1920's. However, this did not mean the immediate end of traditional wild blueberry gathering. As late as the 'forties and 'fifties, the "Knockers" were still working the pinelands for the wild crop. With a large basin tied to their waist, they would locate a bush with ripe berries and knock it with a length of rubber hose to shake the berries off.

By the late 1950's New Jersey's commercial blueberry crop came entirely from cultivated lands. The pinelands of Burlington County are still an important blueberry-raising area. Many of the farms here continue the historic tradition of raising both blueberries and cranberries.

A result of this traditional crop integration is the preservation of large tracts of virtually undisturbed woodland. Large quantities of water are required to irrigate both crops and to flood the cranberry bogs. Because of this, most farms in the area have a watershed of ten to twenty times the size of their cultivated acreage. This, combined with the State's acquisition of much of the surrounding woodland, has helped preserve one of New Jersey's unique ecosystems. The blueberry and cranberry farmers are well aware of the importance of maintaining this natural resource, yet there are pressures on this delicate ecosystem. State acquisition increases public recreational use, and it is important that everyone who uses this great resource helps preserve it from unnecessary abuse. 

BY BRUCE THIEL

PHOTOGRAPH BY
WALTER CHOROSZEWSKI

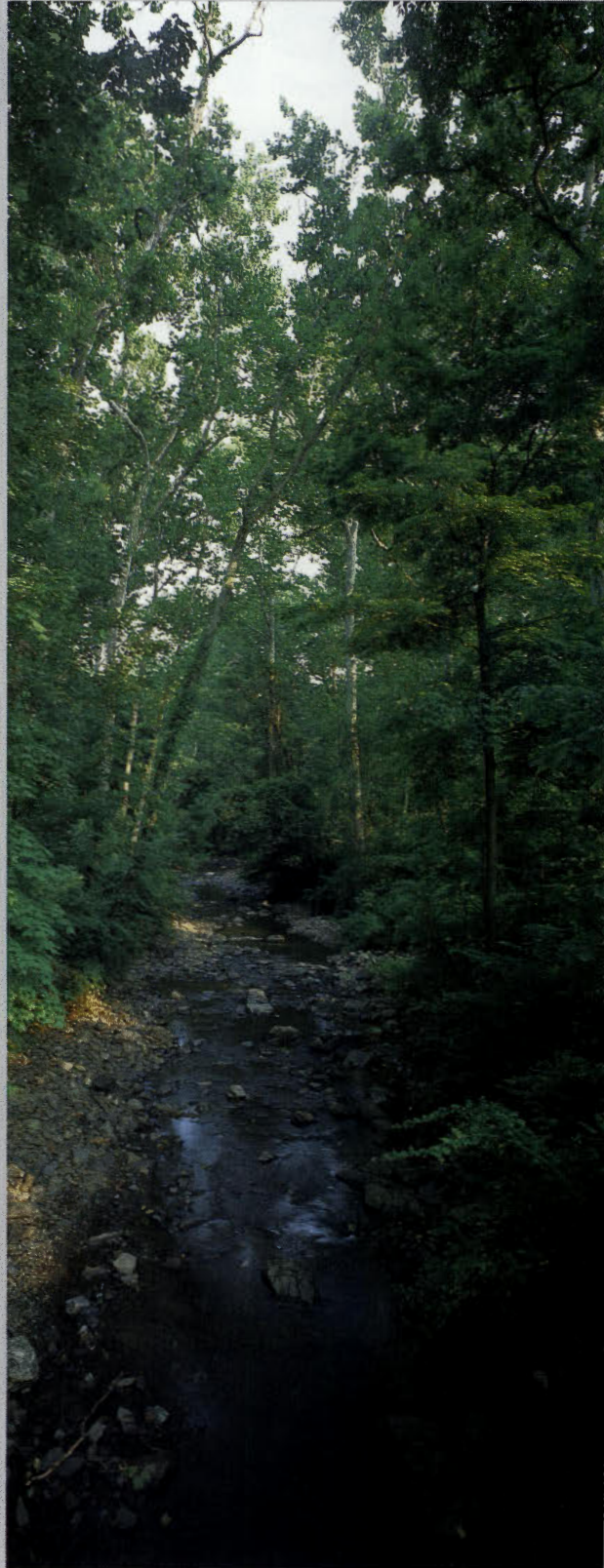
Bruce Thiel is a freelance writer.

PHOTOGRAPHS BY
WALTER CHANDOHA

Spring



Summer



Fall



Winter



the Uplands

BY RENEE BUCKWALTER

New Jersey was nicknamed the Garden State even before it became a State. Thomas Fleming, in his history *New Jersey*, tells us it was referred to in 1760 as "The Garden Colony." He tells us further that the "superbly cultivated farms in Raritan and Hackensack" were the reason for the nickname. Today, New Jersey is losing its claim to that title, and Raritan Township (in Hunterdon County) is losing its "superbly cultivated farms." Hunterdon, ranked eighteenth in population of the State's 21 counties, finds itself beleaguered with bumper-to-bumper traffic, condominium living and discount shopping. In Flemington, a new jail was erected on land proposed for a town park.

Fortunately, New Jersey has Green Acres State funds available to help judiciously stem the tide of "wall-to-wall" housing, but it is really up to the foresight and perserverance of local citizens to establish the goal and run the interference. Foresight and perseverance cannot be emphasized enough, as the "Uplands" group from Raritan Township learned over a period of 13 years.

As early as 1973 a group of Flemington and Raritan citizens had recognized the need to preserve open space for the public domain. A 100-acre tract known as "Uplands," ideally situated just outside Flemington in Raritan Township, was available, and a Green Acres application was filed.

Progress was slow. Green Acres returned the application for updating in 1974. The years 1975 and 1976 saw the requests reactivated,

Renee Buckwalter has been the Secretary of Citizens For Parkland since its inception in 1978. An enthusiastic advocate for environmental education, she now serves the Flemington-Raritan Recreation Committee as a member of their Bernadette Morales Nature Preserve Subcommittee.

and finally, in 1977, funding of \$455,350 to the combined Flemington and Raritan community was announced. They had until December 1978 to raise matching funds.

Thus in 1978 the grassroots group coalesced into Citizens for Parkland (C/P), formed to promote interest in preservation of open space. Local politicians agreed with the idea, but no local funds existed and Green Acres would supply only matching funds. C/P became a citizen's group to raise funds for public lands.

Raising Money

Small amounts of money were raised, but public interest was low. Hunterdon's rural standing didn't seem challenged, and Raritan Township was just experiencing its first planned residential development (PRD). Newcomers were having trouble coping with rural area's lack of transportation, lack of sidewalks, lack of shopping. Park land? It was all park land to them. The reaction of oldtimers was "Park land! What do you want that for? Empty land'll just be turned into a dump."

However, C/P continued selling T-shirts, keeping their name in the newspapers and keeping an eye on their coveted land and other sites nearby.

Some success came in 1979. Through a gift from Edwin and Mary Large, and by utilizing matching Green Acres funds, a 52-acre tract was acquired whose boundaries were contiguous with "Uplands." This was the beginning of a nature preserve and was named Bernadette Morales Park in memory of a local teacher.

There is nothing like success to spur more success, and in 1982, again with the help of Green Acres and some moneys that C/P had raised, 11 acres across the road from the nature preserve were purchased. With financial support from local businesses such as Johanna Farms, Bass Trucking, Tenneco, Burroughs Corporation and New Jersey Telephone, equipment was purchased to turn the site into a recreational park. A baseball diamond and a jogging circuit were established, and climbing equipment for the younger set was installed. The park was used from morning till dark.

At this time the C/P group was nearly disbanded. The recreational park had been created and the nature preserve begun, and many in the group felt the acquisition of a 100-acre tract was unrealistic. But a good team never stops fighting until the last whistle is blown.

The constant threat of purchase of "Uplands" by a developer nearly was realized in

1982, but a local benefactor agreed to purchase the land (to the astonishment of many) and hold it for an indefinite period.

In the meantime, the C/P group had approached Walter Chandoha, internationally famous photographer. He agreed to loan his services in a manner he had never done before because the appeal of the "Uplands" was so strong. Chandoha's artistry has immortalized the Mine Brook stream running through "Uplands" in a unique series of four-seasons photographs taken from exactly the same spot. These 2 by 3-foot photographs are available only through C/P. They make a stunning display in the lobbies of corporations that have purchased them.

Developing the Park

Work progressed on the Morales Park. Trails were established and chipped with donated Christmas trees. A scout working on his Eagle project had built a bridge across the stream. Another scouting project had started a trail for blind people. Interest in the Park, once so low, was now shared by the community.

Another land purchased by Flemington in 1982 had connected with the Raritan site, and cooperation between the communities was high.

Thirteen years had elapsed, and the community had three PRDs with a consequent influx of hundreds of people. A new mayor had become interested in preserving open space, and help had come from an unexpected source. The County Park and Recreation Board had been persuaded to look carefully at Chandoha's pictures and the land they represented. The county had agreed to help. C/P had scored a touchdown.

The county purchased the land by spending \$125,346. A Green Acres grant had supplied \$300,000, with the balance of \$122,000 to be loaned at 2% a year. The township and borough each contributed \$38,000, and C/P is responsible for reimbursing the two governing bodies.

The real value of purchase of "Uplands" becomes more apparent when we consider that Manhattan's 750-acre Central Park was purchased in 1856 (after much opposition) for approximately \$5,500,000. That couldn't be done now.

Open space does much more than provide a place to walk in peace and quiet or to jog or to play baseball. It conserves water, cleans our air and preserves the dignity of human beings from overcrowding—it preserves the community. It gives people a sense of pride in having the good sense to have seen the goal—and scored.

BY WALTER CHANDOHA

The Uplands four seasons photographs exist because Beryl Doyle is a charming and dedicated lady. A few years ago Beryl asked me, along with a number of artists, for samples of our work to be sold to raise money to save the Uplands. As I recall there was a somewhat tight deadline for the finished work and because I was in the middle for several assignments I could not help her at the time. I promised to make some photographs as soon as I had some spare time.

Later that summer I walked the land but could find nothing to photograph to show the beauty and the tranquility of the Uplands. Close-up photographs of the many specimens of wildflowers, shrubs and trees were a possibility, but these would be meaningless—they could be made anywhere in the county. A distant vista? Maybe. But it would be *from* the Uplands, not *of* the Uplands. An aerial view? Too distant. It's a beautiful place, but where to make meaningful pictures eluded me. I knew that somewhere on all those acres there had to be something I could photograph.

One evening as I sat in my living room pondering the problem, the answer was there hanging on the wall—a set of four photographs of an ash tree in each of the four seasons of the year. The group I was looking at was used a few years ago in FAMILY CIRCLE magazine to illustrate a poem by Nadine Stair. Why not do a similar four seasons set of the Uplands? I couldn't wait to start.

The next day, while unloading my photographic gear from the trunk of the car I saw the perfect subject for my Uplands photographs—a wooded stream just off the county road. The old condemned bridge crossing the stream gave me just enough elevation to get an unobstructed view to the southeast.

The first shot of a four seasons set is always the easiest. If the light is right, all I have to do is to frame a good composition and shoot. The successive shots require a little more care. After the camera is mounted on the tripod I study the photograph made in the prior season (I bring a transparency with me to the site) and try to get a precise composition match with the next shot. Usually there is a tree somewhere in the scene with a distinctive branch, or one branch intersects another to form a noticeable pattern; when I find one of these markers (mostly with the help of a magnifying glass) I can duplicate the composition in each of the subsequent pictures.

Getting a fairly accurate composition match of each of the four seasons has some problems but is not too difficult. Composition at least, is completely under my control. But I can't control the weather, or the status of the foliage.

The summer shot of a four season series is the easiest. Generally trees are in full leaf from the beginning to the end of the calendar summer—June 21 to September 21. The summer shot can be made just about anytime in the three month period. Winter shots are the most difficult to make. They should be full of snow, but a heavy snow precludes mobility and by the time the roads are cleared, the wind has blown the snow off the tree branches; and the scene, while attractive, is not in its prime. And forget about winter pictures without snow—they're not wintry enough; and in recent years we haven't had much snow.

To Capture a Season

By the calendar, both spring and fall are also three months long, but for the purpose of four seasons pictures they are photographically right for only about a week, maybe two weeks tops. It depends upon the types of trees in the scene. In this Uplands set most of the trees are sycamores and sugar maples, neither of which come into leaf at the same time; nor do their leaves color and drop at the same time in the fall.

This posed a problem. When the maples showed signs of leafing out in the spring, the sycamores were still bare. In the fall, they shed their brown leaves long before the maples even turned color. Only after shooting both the spring and the fall shots three times each did I get pictures I was happy with.

Then there's the problem of sky similarity. For a four seasons set to be successful there should be a marked difference between each of the pictures. In this set the spring shot was the last of the series and because the sky in each of the other seasons was cloudless, I wanted big, fluffy, cumulus clouds in this final picture. Unfortunately, big, fluffy clouds in the sky made big patches of shade on the ground. To get the scene sunlit with a big fat cloud in one corner of the sky took a lot of waiting.

The waiting was worth it. I was pleased with the results. But I was even more pleased that I could keep my promise to Beryl to help her in her almost single-handed effort to keep at least one corner of Hunterdon County the way it was when we all came here from more congested areas. And when Hunterdon itself becomes a congested area—as it seems to be headed—future generations can thank Beryl Doyle for the green and unspoiled Uplands.

Hunterdon County photographer **Walter Chandoha** is best known for animal pictures, garden photographs and accompanying articles. His work has appeared on more than 300 magazine covers over the past three decades and in thousands of publications including the National Geographic and Encyclopedia Britannica. In 1986, the Garden Writers Association of America honored him as the best horticultural magazine photographer of the year.

Technical notes: The photographs were made with a Brooks Veriwide camera equipped with a 47mm f/8 Schneider Super Angulon lens. EPR Ektachrome (ASA 64) was used with normal E-6 processing. No filters. Exposure according to meter. In order to show all four seasons, Mr. Chandoha's images have been cropped by NJO.

Weekend Angler



PAT DALY



WALTER CHOROSZEWSKI

BY C.E. LEWIS

I'm really disturbed. Recently I read an article in a national sporting magazine about trout fishing in March—or the spring of the year. The first two paragraphs ruined the whole story. Here are two "experts" riding around a lake with a "Fish-Lo-K-Tor" until the machine finds a mess of fish stacked up under a dock at the thirteen-foot level. Both men then attach three flies to their lines and proceed to pull up fish like its mating time at a flea factory. Naturally much time is spent in explaining how they both stripped fourteen feet of line from their reels and tied a knot so the sinker wouldn't go down farther than where the fish were. They just sat there and plunked their lines overboard and pulled up fish. This is fishing?

In the same magazine there was also a piece written by another expert, so called, on how to

catch trophy trout. Baloney—not in New Jersey streams. Actually, in the places I fish (North Branch, Passaic, Muskie, and environs), although there may be a lunker someplace, I'm happy to catch whatever comes my way. It seems to me the fishing magazines concentrate on so-called fishing experts who write not for the weekend worm-dunker but for the very few who make fishing an art instead of a sport. I'm what you would call a weekend angler. Yes, I do go out at least once a week, if not twice, and fish hard. At the present time I use salmon eggs in the spring and later on, if these don't work, go to a wet fly. Quite frankly, my success is usually measured depending on the stocking days. Isn't it funny—if you hit the stream the day after stocking, you become an expert, picking up your limit in no time. If the stream is heavily

Charles E. Lewis is a recently retired district insurance sales manager. Now Mr. Lewis is a substitute teacher and a longtime fisherman.



Dunnfield Creek

Below the falls in Clinton

fished, you have to work hard to get a strike.

I used to envy the man who had costly equipment, such as an Orvis rod and reel set, but a couple of years ago while I was in a large sporting goods store on Route 22, I got to talking to the manager of the fishing department and a customer who owned a custom outfit. I was asked what kind of a rod I had. It was a little embarrassing to admit I had a Sears Roebuck Ted Williams 7½-foot fly rood. It was about fifteen years old and had given me good service. It developed in our conversation that both men were well versed with dry flies, wets and so forth, while I admitted that I used worms and salmon eggs. I was then asked how often I got out. I told them I go fishing one or two days a week. The customer said a curious thing. He said he only got out once a month if he was lucky and that I was probably a much better fisherman than he was. In thinking back on that conversation, I'm inclined to agree with him. From a practical viewpoint, I am more experienced, at least in the local streams.

And that's another thing—most writers discuss the difficulties in catching the “willy” trout. If you relied upon their information, you should carry a temperature gauge to measure the coldness of the water. You should use a green-colored fly on sunny days, red-colored on shady days, fish only in the early morning or after sundown and on and on. Don't misunderstand me, usually I have to work hard for my fish and I do believe it takes some skill to get a few, but there are several myths that are just that—myths or a fisherman's justification for not catching anything. Heck, I've been skunked plenty of times, but I don't feel it's because the fish were so smart. Let me tell you about a specific case that I feel proves my point. It involves a stream called India Brook, located on the borderline between Mendham and Chester. This is an extremely small stream, so small that on the day's it's stocked, the stream is not even closed. As most fisherman know, during the dog days of summer, most streams are fished out or get like the Passaic in Basking Ridge, where the water turns brown and gets sluggish and low, and in many places the weeds start to clog the channels. Although India Brook gets low, the water remains crystal clear and cold. It really is what could be called a “sparkling little brook.” In most places you can step across without getting your feet wet. At this stage, your fishing is limited to widely scattered pools that can be found along the stream. I have found that sometimes there are layover trout in these pockets.

In one of these pools I have caught the same rainbow trout at least six different times. I


have hooked him on a weighted nymph, wet flies, salmon eggs and even a worm. While it's true, that the sunfish in this pool will also hit any bait I have on, eventually the trout will come charging through to take whatever is presented. With the crystal-clear water, I have had the opportunity of actually watching the fish take the bait. It was interesting to note the trout swam upstream first and took the bait coming down. This only happened with salmon eggs. The weighted nymph was taken when I drifted it under a submerged log embedded in the middle of the pool. The wet flies (Blue Dun) mostly were taken on retrieves. Although I would like to feel perhaps there were three or four trout in the pool, that would be wishful thinking. No, this was a dumb trout. He never learned a thing after being caught time and again and released.

Don't Cast A Shadow

That's another thing. The purist feel that in clear, low water, just about anything “spooks” a trout. You should never allow any shadow or reflection to appear in the water. I fish with a close friend who, I feel, is one of the finest freshwater anglers I know. He thinks you should not even see the pool where you wet your line. His contention is that if you can see the water, the fish can see you. This may be true for “native trout,” if you can find any in New Jersey, but with the stocked trout you have no problem even wading in the pool to cast your line.

Another myth is that after catching a fish the pool will be “put down” for a while, meaning that the remaining fish are frightened and won't take the bait. I have hooked five sunfish in a row and then have had a trout come through for the attack. As you can see, it's sometimes very difficult to discourage a hungry trout.

Successful fishing for me is not the amount you catch. That sounds like a good loser's statement, but if you must catch fish every time, don't go fishing. You're going to be badly disappointed. In my case, just getting out, wading a stream with a fly rod and concentrating on my casting gives me a peace of mind not found anywhere else—the strike, the fight and sometimes landing a fish are all icing on the cake.

For those of you who fished, liked it, but can't find the time anymore, I feel sorry for you. For those of you who never tried, I recommend you give it a whirl. You never know what your next cast will bring. 

Unexpected Beauties

BY AL LIST

PHOTOGRAPHS BY AUTHOR

First impressions of the Pine Barrens are those of bleak monotony or frequent and violent fires that fill the horizon with smoke. There are endless miles of pitch pine and scrub oak trees and a great deal of flammable material under the blueberries and huckleberries. When this material burns, the tree trunks are blackened from the searing blazes. However, the Pine Barrens does not appear to be burned everywhere—rather it is a mosaic of recently burned and long unburned patches, each thousands of acres in extent. Within the unburned patches there has been time for many special plants to grow and develop. Some folks are attracted to the display of wildflowers along the roadsides and in the open fields from May to October. For others the soft pastel colors of the lichens or the green carpets of moss and golden liverworts are an attraction that can be seen the year around.

Sphagnum

With the passage of time, one starts noticing little tea-colored, almost black, rivers, especially along the back roads. Towering above these streams are the spires of Atlantic white cedar trees. They form dark galleries and provide deep shade and a cool, moist habitat—cedar bogs! Each gallery has a soft, thick carpet on its floor that is composed mostly of *Sphagnum*, known as peat moss. It is undoubtedly the world's most important moss, used extensively for fuel and for organic material in gardening. During World War One it was also employed as an absorbant dressing on wounds (since it contains the antiseptic "sphagnol"). *Sphagnum* can hold 10 to 20 times its weight in water.

In some areas (for example, in the Poconos of Pennsylvania), the peat bogs are threatened by strip mining. With the Environmental Protection Agency, I have been working to help protect a few of the pristine peat bogs containing orchids and rare sedges. The Pine Barrens itself harbors a number of rare and endangered species that grow in peat.

My examination of species of peat moss in the Pine Barrens has revealed at least 28 different kinds of *Sphagnum*, by far the best represented genus. These mosses are colorful: deep purple, bright red, golden yellow, brown and light green. Some of the peat mosses are fertile and produce spore capsules about 2 mm in diameter. These small black spheres shoot spores explosively with a snap, crackle and pop into the air in early summer.

In a burned-over area, there are other species of mosses that play a role in the recovery from fire by a process known as secondary

succession. Most conspicuous are the haircap mosses (see photos), which first form vivid green carpets and then soon develop a yellow splash cup at the top of each leafy stalk. In these the fertilization of eggs by sperm cells takes place. Living up to its name, the moss puts up a stalk with a capsule carrying a "haircap" at its summit. After this cap falls off, a lid, called the operculum, is revealed. The operculum pops off the capsule to release the spores into the air, a process aided by a ring of moisture-sensitive peristomial teeth. So prolific are the spores that they are distributed everywhere. If there is enough moisture, and if there is a bare patch of sand, the spores germinate and start the life cycle all over again. Solid carpets of moss are the result.

Haircap and Peat

Besides haircap mosses (*Polytrichum*) and the all-important peats (*Sphagnum*), there are dozens of other types of mosses. At a scale still smaller than that of the mosses, there is yet another and stranger group of plants. They are called the liverworts, or *Hepaticae*. They come from a different yet equally primitive evolutionary line dating back several hundred million years. Along the rivers grows the strap-shaped liverwort (like thin, green, forking ribbons), *Pallavicinia lyellii*, one of the best known and most easily seen hepatics because it colors so many of the frequently submerged stream banks with dark green. Liverworts also engage in sexual reproduction, but the spore capsules that result are quite fragile and last only a day or so in early spring.

Along the banks of a stream called Old Hurricane Brook, I have found bolsters of the robust leafy liverwort, *Bazzania trilobata*. On rotten logs near streams is the widely distributed *Odontoschisma prostratum*, another leafy liverwort.

In the woods, on the bark of oaks, or sour gums, there is a leafy liverwort called *Frullania*. It is so strange in its structure that, when I examined it under the microscope, I found it difficult to accept as a liverwort. It is one of the leafy liverworts, with two rows of upper leaves and one row of underleaves. Every upper leaf has a pouch on its underside, and each pouch is likely to contain a wheel animal, or rotifer. At times when moisture is available, this organism "spins its wheels," an effect created by lashing its rings of flagella, in order to sweep in food. If this type of liverwort is submerged in water for 10 minutes on a microscope slide, the rotifers will reveal themselves.

Sphagnum fimbriatum with spore capsules.

Al List is a professor of Botany at Drexel University, Philadelphia, Pennsylvania. He also teaches at the Barnes Arboretum, School of Horticulture. Dr. List has been interested in mosses and lichens for many years.



The well known British Soldier lichen. *Cladonia cristatella* subject of much research.

Cladonia calvantha appears as little fountains, one above the other, a fruitcose lichen growing on humus.



Liverworts

Though not as abundant as mosses, liverworts exist in about two dozen species in the pinelands. Most are found in moist velvet pads at the base of cedar trees or growing mingled with hummocks of peat moss.

Another very visible yet poorly known group in the pinelands is the lichens. An artist would not have a complete sense of the colors of the region without painting the colors of lichens. They occur in four basic types on sand and tree trunks (or on pebbles): (1). There are *crusts* on sand, such as the tar lichen, or *Pycnothelia*, which I call the "schmoo" lichen on account of its fat little upright stalks. (2). There are dense overlapping *shingle* types, the *squamulose* lichens, *Cladonia comiocraea* or *C. strepsilis*, which extend upward stalks known as *podetia*. (3). Carrying the theme of lobes still further are the *foliose* lichens, the very conspicuous *Parmelia* and *Cetraria* species. One of them, *Cetraria ciliaris*, looks like green endive lettuce. *Parmeliopsis placodoria* is another common foliose lichen. (4). Finally, there are the "reindeer moss" types, *fruticose* lichens, which consist almost entirely of stalked *podetia*, often capped at the branch tips by spore-producing *apothecia* (the red of British soldier lichens) or smaller brown or black *pycnidia*. A fine example of a *fruticose* lichens is *Cladonia subtenuta*, which appears as a cloud-like mass at a distance. All told, my students, various naturalist friends and I have observed well over 100 different species of lichens in the Pine Barrens.

Lichens flourish under conditions of clean air and the daily cycling of moisture, which condenses in the morning and evaporates during midday. These organisms alternate between a soft, spongy texture when moist and a crispy, easily fractured structure when dry. They do not fare so well in the arid microclimates of cities, and there are very few species surviving in the presence of chronic industrial pollution. The great corridor of the eastern megalopolis has lost most of its lichens. The Pine Barrens lies to the east of this corridor and still retains most of the lichen species described by Evans, the famous Yale professor who worked there in the 1920's and 1930's. Evans was the teacher of one of our most prominent lichen experts, Mason Hale (now at the Smithsonian Institution, where we went to check our work.)

The knowledge of lichen disappearance in relation to air pollution is well documented by English and Swedish scientists in their coun-

tries, yet little has been done in this country to determine the cause of widespread lichen destruction.

Lichens

Lichens were noted (and the word *lichen* was first used) by Theophrastus (371 to 284 BC), who was a student of Aristotle. Theophrastus was reported to have described a tree moss (perhaps a *Usnea* species, which is also native in the pinelands).

Karl von Linné (Carolus Linnaeus), the great Swedish botanist who gave us the system of Latin binomials for naming every living species, called lichens *Rustici pauperimi*, which may be translated as "poor trash of vegetation." Linnaeus did not even accord them their own separate status as a major plant group, for they were regarded partly as mosses and partly as liverworts. Around 1753, Linnaeus erected the genus *Lichen* for some 80 species, and the force of his authority held sway for over 50 years. However, by 1810 the great lichenologist Acharius had created 41 separate genera.

Schwendener first announced the dual nature of the lichen body as a combination of a fungus and an alga (1867), but it took many years to understand lichen symbiosis as a kind of "balanced parasitism" in which the fungus benefits from food made by photosynthesis in the green algal cells and the green algal cells keep just ahead of the invasive fungus by dividing and multiplying. In modern-day biological research we owe much to scientist Vernon Amahdjian at Clark University in Worcester, Massachusetts, because he was the first to successfully recombine the separate components of a lichen. By employing culture conditions of near starvation within laboratory containers he successfully "synthesized" the well-known British soldier lichen, *Cladonia cristatella*, from its tiny green alga and its thread-like fungus.

Mosses, liverworts and lichens all contribute greatly to the colors and the beauty of the Pine Barrens, as well as to its ecological stability. They are an important component in the process of secondary succession after fires, because mosses and lichens bind the sand for many years after an area has been severely burned. Peat mosses support many fascinating insect-eating plants and a number of different orchids. Numerous species of *Sphagnum* act as nutrient-binding material and water acidifiers, exchangers of hydrogen ions. The lichens, mosses and even the lowly, less visible liverworts deserve far more attention.



I Brake for Birds

"I brake for birds," declares a bumper sticker on a sedan rushing down a New Jersey highway. It sounds like a nice idea, but in a state that has one of the most abundant bird populations in the nation, heeding those words could be dangerous.

The most heavily populated state in the country, New Jersey is one of only four states where the more than 200 different kinds of birds have been spotted in a single day. More than 435 species have been seen within our borders, but only 21 of them are permanent residents. Some have flown through by accident. And, since New Jersey is directly in the migration corridor between Canada and South America, most are tourists who crowd into our State for a visit. Still, some 200 species stay long enough to breed.

"If you're a bird, you can't travel from Canada to South America without stopping here," is the way Cape May Bird Observatory Director Pete Dunne explains it. Even though many of their traditional stopovers have grown more and more densely populated, the birds still

need to rest in New Jersey. They often stop right in the midst of our cities, in any grassy enclave they can find.

If you're not accustomed to searching your surroundings for birds, you probably think they only congregate in pristine, rural areas. If so, think again. Everything from the arctic ivory gull to the glossy ibis or the four-foot-tall great blue heron has been found in and around our State's urban areas. Unbeknownst to most New Jerseyans, birds in urban areas are so abundant that avid birdwatchers often make a game of sighting them as they commute along our congested highways. "I've counted as many as five raptors sitting in the trees just between Exit 15W and 16W on the turnpike," boasts Anne Galli, director of environmental operations for the Hackensack Meadowlands Development Commission.

Since birding and driving don't go well together, these same birders find other opportunities to pursue their hobby. Often they end up in the midst of garbage dumps and railroad embankments in the Hackensack

BY HELEN
LIPPMAN COLLINS

ART WORK BY TONY HILLMAN

Helen Lippman Collins is an Associate Editor with RN Magazine. She also writes about outdoor activities in New Jersey for the NEW YORK TIMES.

Meadows, in a landfill in South Amboy or in gravel pits in Lincoln Park. Or, if they're less energetic, they find interesting birds in most any inner city park or patch of green.

Rich Kane, director of the New Jersey Audubon Society's Scherman-Hoffman Sanctuaries, has been birding since he was seven. Although he works in a secluded spot buried in the woods in Bernardsville, he has spent many hours searching for birds in crowded northern New Jersey. According to Kane, the Hackensack Meadowlands—and the area it encompasses known as the Kearny Marsh—is the best urban birding spot in the state. Jersey City's Liberty State Park, he quickly adds, may be just as good—or at least a very close second.

In the area adjacent to the Hackensack Meadowlands Environment Center in Lynd-

hurst, bordering the turnpike on both sides, lies a collection of Hackensack River marshes, an old garbage dump and landfill that has become one of the most important feeding and nesting areas in the State for migrating shorebirds and waterfowl. The area attracts long-legged wading birds, shorebirds, gulls and ducks. In fact, almost 300 different species have been found there.

During fall migration, you might see the golden or black-bellied plover and at least five species of sandpiper. In the summer, you're likely to see ruddy ducks, marsh hawks and herons. And in winter, you may glimpse short-eared owls, rough-legged hawks, red-taileds and red-taileds kestrels. Rare birds, too, have been sighted there, Kane reports, such as the noisy, goose-like fulvous whistling duck.

Helen Lippman Collins is an Associate Editor with RN Magazine. She also writes about outdoor activities in New Jersey for the NEW YORK TIMES.



It's just a short distance from the environmental center to the Kearny marsh, an area that was turned into a marsh in the '70's when the meadowlands were developed. The Kearny marsh, Kane reported in a study of the area, has "a phenomenal waterbird density and diversity unparalleled by any other freshwater marsh in the state."

Among the species that breed there are the ducklike pied-billed grebe, a bird that rarely nests in New Jersey. Birders have spotted nests of the glossy ibis, yellow-crowned and black-crowned night herons, and cattle and snowy egrets. What's more, the Kearny marsh is reputed to be the very best place in the State to see least bittern.

Urban Birding

Because of the amazing variety of birds that are attracted to this urban wetlands refuge, the Hackensack Meadowlands Environment Center runs regularly scheduled birdwalks throughout most of the year.

Another urban environment that attracts a diverse array of birds is Liberty State Park, located off Exit 14B of the turnpike extension. There you can enjoy a birdseye view of the Statue of Liberty—and see both common and rare birds as well.

In an environment that combines the Hudson River waterfront, marshland, mudflats and beach, New Jersey birders last year spotted an ivory gull—an exotic bird that breeds on the Arctic islands of northernmost Canada and has been spotted in our State on only four other occasions.

Kane rates the fall and winter as Liberty State Park's best birding season, and interpretive specialist Frank Gallagher reports that he'll show the park's resident short-eared owl to anyone who comes to the park in winter. Beginning in May, Gallagher runs bird hikes on Saturday mornings. But he's quick to point out that these nature walks never begin in the crack-of-dawn hours usually associated with birding. The reason? The park's in the midst of a major city. "And city dwellers never do anything before 9 a.m.," Gallagher says.

Residents of neighboring Bayonne don't have to get up early to see birds either. All they have to do is visit Bayonne Park. There, they'll see plenty of wintering waterfowl and, in the spring, migrating warblers stopping there for a rest.

Newark residents also don't have to go far out of their way to see the many warblers that stop in Branch Brook Park each spring. As the

city gets more and more crowded, Pete Dunne explains, the park has become a migration trap—it's the only place the birds have to go. If you're observant, Dunne insists, you can see as many as 100 species on a day in May. Newark residents can also birdwatch in Newark's Weequahic Park, where they'll see songbirds in the trees and waterbirds on the lake.

In South Jersey, birders can see shorebirds as well as owls roosting in Camden's Farnham Park, which runs along the Cooper River. And in nearby Haddonfield in Hopkins Park Pond, it's not unusual to see osprey or to watch a kingfisher diving for food.

The Trenton marsh, also known as John A. Roebling Memorial Park, is another particularly good birding spot, especially in April and May. That's when you're likely to see everything from blackbirds to yellow-bellied sapsuckers, the blue-gray gnatcatcher, cuckoos, and the ruby-throated hummingbird.

Wetland Homes

Part of the wetlands that extend for about three miles along the Delaware River between Trenton and Bordentown, the Trenton marsh attracts many nesting marsh birds—like the pied-billed grebe, the least bittern and the marsh wren. It's also a favorite spot for snipe.

Further to the north, off the Garden State Parkway Exit 123, is the South Amboy Landfill. There, amid mudflats and broken glass, you can see lots of little and black-headed gulls in every season, and migrant flocks of Bonaparte's gull.

Birders who aren't content with climbing through landfill and garbage dumps may want to visit the Lincoln Park Gravel Pits, an abandoned sand and gravel quarry along the Pompton River in northeastern Morris County. More than 225 species have been recorded there—a wide variety of herons, waterfowl, raptors, shorebirds, sparrows and warblers.

The gravel pits have had their share of rare birds, too: Birdwatchers have spotted the golden eagle, the yellow rail, the ruff, the sedge wren and the black-headed grosbeak. Among the trees that border the area, they're just as likely to see the more common but still interesting migratory flycatchers, vireos, warblers, tanagers and orioles.

Soaring Hawks

No discussion of urban birding spots would be complete without mentioning the Mont-



clair Hawk Watch, which can be reached by traveling north on Upper Mountain Road, turning left on Bradford Avenue, and making a right turn onto Edgecliff Road, where the parking lot for the trail is located. One of the best hawk-watching spots in the State, huge numbers of broad-winged hawks pass through there during fall migration. This year, Pete Dunne reports, the Montclair Birding Club recorded 30,000 broad-winged hawks—all in a two-day period!

Hawk-watchers also flock to Paterson's Garret Mountain Reservation. This site is just as good for warblers in migration in the spring and fall. It also has a pond to attract waterfowl—and a lookout that provides one of the most spectacular views of northeastern New Jersey in the State.

No matter where you live in New Jersey, you can begin to enjoy birds and learn about them without traveling very far. But where can novices go to get experience—and to stop identifying everything that flies as a "little brown bird?"

Tips for Identifying Birds

"Take a class," Dunne recommends. Birding for beginners classes are offered by many community colleges and adult education programs in local high schools. What's more, the New Jersey Audubon Society, which has five centers scattered throughout the State, offers similar sessions.

In a recent two-hour class for beginners, Rich Kane told participants how to identify field marks and characterize the parts of a bird's body. He explained such terms as an eye ring, wing bar, tail band, crest or rump and offered a number of other tips for identifying birds.

First, there's the bird's behavior. Does it cock its tail like a wren, creep down a tree like a nuthatch or up a tree like a woodpecker?

Then, there's voice: The ear, Kane explained, is a better receptor than the eye, and a bird's call is like his signature. Birders use mnemonics—words to jog their memory—to help them remember bird calls. Thus, a titmouse's call sounds like "peter, peter, peter;" the catbird, like the name suggests, says meow; and the white-throated sparrow calls out, "Old Sam Peabody, Peabody, Peabody."

Habitat, too, is an important identifier, particularly among similar species—but this holds true only in breeding season. In migration, Kane points out, birds—like the arctic ivory gull that ended up in Jersey City—can wander very far from home. Range is another clue in identifying a bird, and it's found by

looking at the map on the field guide that every birder needs.

Kane offers a list of several bird guides, but he recommends that beginners get the "bible" of birdwatching: Roger Tory Peterson's "A Field Guide to the Birds East of the Rockies."

Since 50 per cent of the birds we see are flying at a distance, Kane suggests that beginners study the silhouettes on the inside back and front covers of the Peterson guide. By learning to identify a bird by shape, posture and flying pattern, he points out, beginners may soon do what experienced birders do: See a bird flying high up in the sky and immediately know exactly what it is!

Loons, for example, are easy to identify because they're hunchbacked in flight, while a chimney swift looks something like a cigar with wings.

The goldfinch, New Jersey's State Bird, can be identified even when you're too far away to see its sunny yellow feathers, because of its undulating flight pattern and the song it sings as it flies.


To identify birds that stop long enough to be glimpsed, every birder needs a good pair of binoculars. In fact, Dunne insists, lots of would-be birders have lost interest in the sport simply because they had the wrong binoculars.

Both Dunne and Kane suggest a pair ranging from 7 to 10 power. But both advise purchasers to beware. Often, salesmen know next to nothing about binoculars—and even less about birding. What's more, even a pair that's good for one birder may be uncomfortable for someone else, perhaps because of the size of his hand or the way he intends to use them. Dunne suggests that a birder should be prepared to spend around \$100 for a good pair—and he recommends checking with other, more experienced birders before spending the money.

Ready to Begin

Once you've got your field guide and your binoculars, you're ready to begin birding. And who knows? Before long, you, too, may be braking for birds.

Getting Started:

The best way to start is to join the New Jersey Audubon Society. Membership for an individual is \$20, and with it comes regular mailings of newsletters and the society's magazine, and a reduced price for participation in any of the various activities run by the NJAS' five centers. These activities include classes, morning bird walks, all-day outings and weekend activities. 

Here's how to contact the NJAS:

Lorrimer Nature Center

790 Ewing Ave.
Franklin Lakes, NJ
07417
201-891-2185

Cape May Bird Observatory

707 E. Lake Drive
PO Box 3
Cape May Point, NJ
08212
609-884-2736

Owl Haven

Englishtown-Freehold
Road
PO Box 26
Tennent, NJ 07763
201-780-7007

Rancocas Nature Center

Rancocas-Mt. Holly Rd.
Mt. Holly, NJ 08060
609-261-2495

Scherman-Hoffman Sanctuaries

Hardscrabble Rd.
PO Box 693
Bernardsville, NJ 07924
201-766-5787

Clean Water Begins with YOU

BY G. GEOFFREY CROMARTY

Streams have long provided inspiration to artists, poets, photographers, composers and others seeking the tranquility of a stream's environs. We cherish the aesthetic value. We can all visualize a waterfall and pool in a bright, green forest on a spring morning. Sometimes we don't remember a stream's other benefits—that it can provide resources for industry, recreation for outdoorsmen, and a source of drinking water for both humans and wildlife.

The 6,500 miles of streams feeding the aquifers and reservoirs that supply most of New Jersey's drinking water are an important part of the hydrologic cycle, the continuous process of evaporation, transpiration and precipitation that circulates the earth's water supply. This supply, through time, has remained virtually unchanged; but what has changed, and what can be controlled, is the amount of water that is usable.

It is important, then, that we recognize the effects of pollution on our water supply. During Clean Water Week (May 3-9, 1987), many concerned groups and organizations will take time to educate the public on water issues. This year, the focus of *Clean Water Week* is on the problem of non-point source pollution (NPS): the pollution that comes from many sources, often undetected. Any waste—animal waste, spilled oil or gasoline, or pesticides, for instance—that can be carried away by rainwater is a potential threat to the water supply.

NPS can enter any point of the hydrologic cycle and, no matter how small, can have a serious impact on the viability of the water supply. The result, of course, is detrimental. Of the streams and rivers monitored in New Jersey, 71% do not meet the State's standards to permit swimming. Many of New Jersey's lakes

are impaired or threatened with impairment by NPS. Ocean water quality, too, suffers when wastes, like pet wastes, are washed by rain through stormwater collection systems into the ocean.

A car owner who changes his car's oil may think of a local stream as a convenient place to dispose of the used oil. If he were to pour one quart of oil in a stream, down a sewer, or on the ground, he could contaminate hundreds of thousands of gallons of drinking water. The oil from one car can produce an eight-acre oil slick. The importance of recycling oil, therefore, is obvious and the solution is simple, for all service stations in New Jersey that sell motor oil must also accept used motor oil for recycling.

With a finite amount of water and a constant need for it, we must do all we can to protect it. The New Jersey Pollutant Discharge Elimination System has been beneficial to restricting and controlling source pollution of water. Likewise, New Jersey's watershed associations (listed on page 20) are assets to safeguarding our water supply. These groups not only work to protect the integrity of streams but take time to enjoy the beauty and activities such waterways can afford, often organizing canoe trips or hikes along the streams they work to protect.

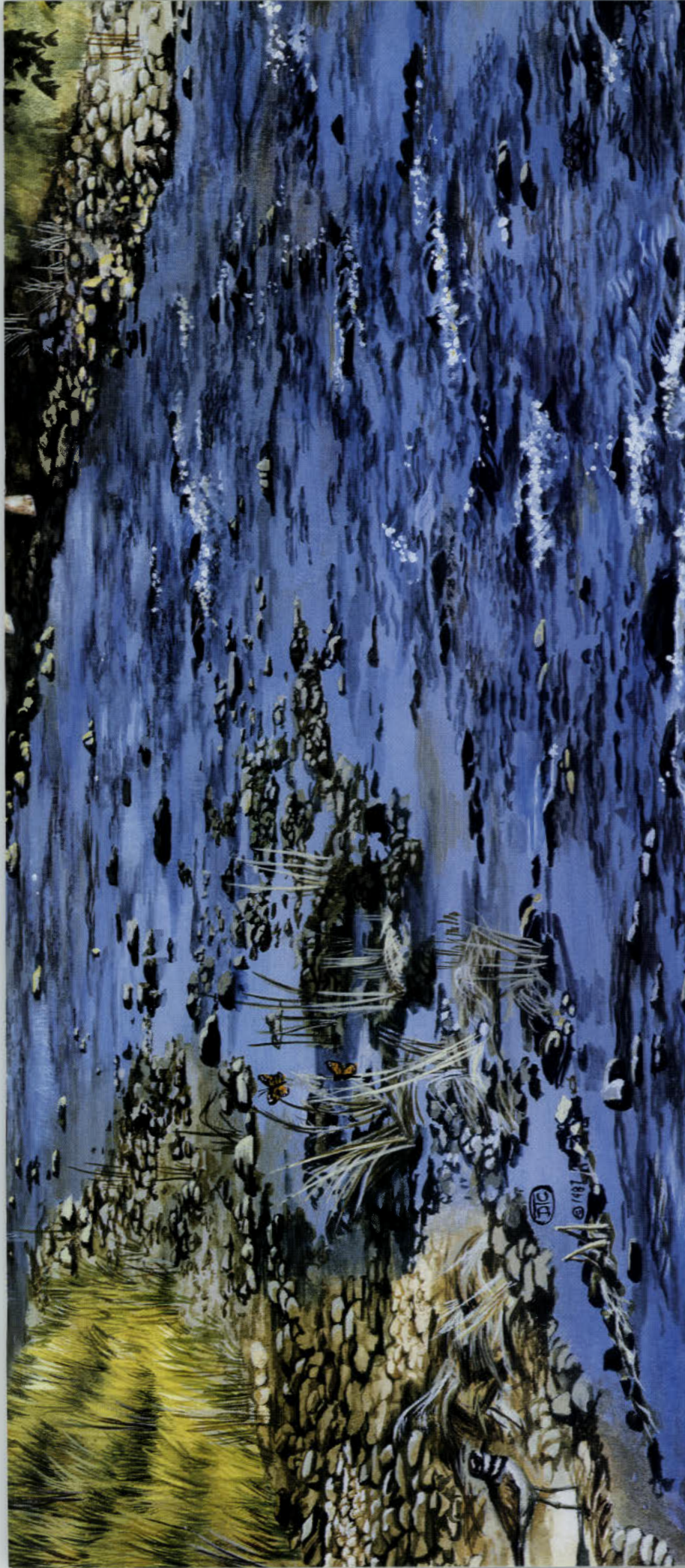
Aside from the effects pollution can have on our drinking water supply, it can also have damaging results to the aquatic life of the stream. The murkiness created by some pollution can reduce the light that is essential to photosynthesis. Without light, a stream's plant life suffers, thereby destroying the beginning of the food chain. A stream can naturally clean up some pollutants; however, it needs oxygen to accomplish this task. Oxygen depletion can result in fish kills and plant death. Any change in the personality of a stream can have devastating effects on the organisms that thrive on the stream's livelihood.

G. Geoffrey Cromarty is an Assistant Director in the Office of Constituency Relations in the Office of the Governor.



Clean Water Begins with You





Simple tips on how to keep our streams healthy and protect New Jersey's water.

- Recycle motor oil and all household chemicals; never dump them down catch basins, storm drains or in streams.
- Don't disturb stream banks; keep soil near streams covered by grass or other vegetation.
- Only use fertilizers and pesticides in amounts needed.
- Walk your pets in grassy areas or pick up wastes after them; pet wastes on pavements will be carried by stormwater into streams.
- Get involved; encourage local adoption of stormwater management and stream corridor protection programs.

**Report all signs of chemical spills and other contamination to your local police
or to the ENVIRONMENTAL ACTION HOTLINE (609) 292-7271**



Diagnosis: A sick stream:

Storm sewer releasing pollutants.

Oil slick from used motor oil.

Fishkill.

Eroded stream bank.

Litter.

↑ FOLD HERE

FOLD HERE ↑

The flap will overlay on the clean stream, showing what could happen.
Remember. Clean Water Begins with You.

New Jersey Watershed Associations

Watershed: A topographically defined area, drained by a river/stream so that all outflow whether overland or through underground channels, is discharged to a particular water course or body of water. Several *Watershed Associations* have been organized that deal with specific rivers and streams. They include:

- **Delaware River, Watershed Association of ***
Box 4, Frenchtown, NJ 08825
201/996-3900
- **Great Swamp Watershed Association**
Box 300, New Vernon, NJ 07976
201/267-6340 after 6:00 PM
- **Hackensack River Coalition**
Box 1200, Secaucus, NJ 07094
- **Lower Raritan/Middlesex County Water Resource Association**
40 Livingston Avenue,
New Brunswick, NJ 08901
- **Passaic River Coalition***
246 Madisonville Road,
Basking Ridge, NJ 07920
201/766-7550
- **Pompeston Creek Watershed Association**
Taylor's Lane, Riverton, NJ 08077
609/829-0067
- **South Branch Watershed Association***
RD#1, Route 31, Lebanon, NJ 08833
201/782-5513
- **Stony Brook-Millstone Watershed Association***
Box 263-A, Pennington, NJ 08534
609/737-3735
- **Upper Raritan Watershed Association***
Box 30 W, RD#1, Larger Crossroad,
Gladstone 07934
201/234-1852
- **Upper Rockaway Watershed Association**
Denville Municipal Building,
Denville, NJ 07834
201/361-1359

*Indicated staff agencies

CALENDAR OF EVENTS

MAY

- 14 CLEAN WATER—A NEVER ENDING CHALLENGE. Spring conference at Sheraton Poste Inn, Cherry Hill, NJ. Water Resources Association of the Delaware River Basin speakers will discuss improved quality of the Delaware River, fisheries restoration, and artificial reefs. (215) 783-0634.
- 15 WETLANDS INSTITUTE TURTLE DAY. Family fun and education—a day-long celebration for the conservation of turtles. Dinner and fee. (609) 368-1211.
- 16 WORLD SERIES OF BIRDING—24 HOUR BIRDATHON at Cape May Bird Observatory. Hotline (609) 884-2626 or (609) 884-2736.
- 23 LOST TOWNS OF THE PINE BARRENS. Guided tour of half-forgotten townsites and ruins; listen to tales of smugglers, highwaymen, and the Jersey Devil. Fee. Rancocas Nature Center (609) 261-2495.
- 24 SHOREBIRDS ON DELAWARE BAY. Millions of northbound shorebirds feeding on horseshoe crab eggs. Fee. Cape May Bird Observatory. Hotline (609) 884-2626 or (609) 884-2736.

JUNE

- 6 SPRING FLING—CELEBRATION OF THE COAST. Flea market, games, films, family scavenger hunts! Grand opening of new Boardwalk and Dock. Reception and Dock Dinner. Wetlands Institute (609) 368-1211.
- 6 FREE FISHING DAY, 10:00AM-4:00PM—This is a statewide event in which any person of any age may fish without a license. Special events taking place at Pequest include spin casting and fly rod casting classes for beginning fishermen. 201-637-4125.
- 17 BLACK BEARS OF NEW JERSEY, 8:00PM—Pat McConnell will lead us through the life of the black bear at 8:00PM. Don't miss this enjoyable slide show of Pat's adventures trapping, tagging and researching black bears. Call for directions and map to Pequest Trout Hatchery and Natural Resource Education Center. (201) 637-4125.
- 20 FOURTH ANNUAL FOLK AND BLUEGRASS FESTIVAL. Day-long folk and bluegrass festival featuring several groups and name entertainment, at the Sunset Lake Amphitheater in historic Bridgeton, NJ.

- 27 INNERTUBE FLOAT ON WADING RIVER. Sierra Club, West Jersey Group. Float for two hours after a 25-minute warm-up walk. Bring innertube, lunch, and wear old sneakers. Life jackets for children and weak swimmers. Meet on Rt. 563 at Jenkins Chapel, nine miles south of Chatsworth, near entrance to Wading Pines and Godfrey Bridge Campgrounds, at 10:30 A.M. (609) 267-7052.
- 27, 28 RIVER FESTIVAL AT NEW BRIDGE & LANDING HISTORIC PARK. American music, food, historic house tours, exhibits, and crafters at work. Bergen County Historical Society, (201) 343-9492 for information.
- 27, 28 RIVER FESTIVAL AT HACKENSACK MEADOWLANDS ENVIRONMENTAL CENTER. Celebrate the cultural and natural resources of the Hackensack River Valley. Craft shops, nature walks, folk music, and more. (201) 460-1700.

JULY

- 4 OLD FASHIONED 4TH OF JULY CELEBRATION at City Park in historic Bridgeton. Fireworks, food, games, contests, and athletic events. (609) 451-4802.

"It's a learning experience and a fun weekend . . ."

Wildlife Workshops for Teachers

Marine and Estuarine Wildlife—May 22, 23 & 24, 1987 at the Marine Sciences Consortium, Seaville, New Jersey.

These workshops are sponsored and conducted by the Department of Environmental Protection's Division of Fish, Game and Wildlife. They are designed to give teachers the content information and skills needed to teach about wildlife and the environment. Rutgers University will award one graduate/undergraduate credit for those working on advanced degrees or wanting inservice training credit.

These wildlife workshops have been held for the past 11 years and in that

period over 1800 people have taken the course. The courses are taught in the field by professional wildlife biologists.

For further information and registration forms contact:

**N.J. Div. of Fish, Game & Wildlife
Wildlife Education Unit
Pequest Rd., R.R. 1; Box 389
Oxford, N.J., 07863**

Phone: 201 637-4125



Sanderlings are found on every coast of the United States and on five continents. The public recognizes them more by their habit of playing tag with the waves than their name.



A nesting sanderling
(*Calidris alba*).

PETE McLAIN



J.P. MYERS

Sanderlings

BY PETE McLAIN

When you walk the sandy beaches of the Jersey shore and see the small flocks of little birds that run ahead of you as they chase after a receding wave, quickly probe the wet sand a dozen times with their pointed bills and then deftly escape the ocean's next wave, all in a matter of a moment, you know you have seen the sanderling. There is no other bird on earth whose habitat is a mere 15 meters wide yet spans five continents.

Sanderlings are among the most widely distributed birds in the world. In the United States they are found along our beaches from Maine to Florida, around the Gulf of Mexico, and up the Pacific coastline to Alaska. They are also common on the beaches of Ecuador, Tahiti, the Galapagos Islands, Holland, Russia and many other countries.

The sanderling is a member of the shorebird group, which comprises about 70 different kinds of birds usually found around water or wet areas. Sanderlings are plump-looking sandpipers, about seven to eight inches long. In spring and summer breeding plumage, the sanderling's back, head and upper breast are a mottled rusty color, and the bird shows a

white belly. The winter plumage is the palest of all the sandpipers: a snowy white below and pale gray on the back, except for a black shoulder mark. The bill and feet are black, and in flight a bold white stripe shows prominently on the upper side of the wings. One of the best identifying characters is their habit of advancing and retreating in rhythm with the ocean's wave action as they feed on sandy and muddy beaches. Their legs move in a blur of action as they exploit a habitat conquered by few other birds.

Millions of visitors to New Jersey's beaches have wondered why those little birds are running around in the surf, and they more or less take sanderlings for granted as a part of the ocean scene. However, the biological features and the tempo of life of this little two ounces of feathered energy are almost unbelievable. Their life is a constant rush as they race through the year, always on the move. They are truly in the fast lane of living creatures!

Sanderlings nest in the high Arctic, some within 600 miles of the North Pole, far from the ocean's surf, where they spend most of their lives. When they arrive on the Arctic breeding grounds in June, they don't spend

time building an elaborate nest but select a small depression on the ground, line it with bits of lichen and willow leaves and lay four eggs. Following an incubation period of about 25 days, the eggs hatch. Within three hours after hatching, the chicks are out of the nest and scurrying around the tundra. The next day the young birds are feeding on their own. At 17 days they are on the wing, and two weeks later, still showing some remaining down, they begin their fall migration south. The adults desert the young before they learn to fly, and without parental guidance, the young sanderlings fly south to join the flocks on the Atlantic and Pacific Coasts of the United States, Peru, Chile, Ecuador, Brazil and as far south as Tierra del Fuego at the southern tip of Argentina. Some populations of sanderlings migrate 15,000 miles a year on their fall and spring migrations. Other populations may winter in the southern United States and cover only 5,000 miles.

Little factual information was known about the sanderlings, one of our most common birds, until Dr. Peter Myers, formerly Associate Curator of Ornithology at the Academy of Natural Sciences in Philadelphia and currently Senior Vice President of the National Audubon Society, began his research on sanderlings in 1975, aided by grants from the World Wildlife Fund-US, the National Science Foundation and the Kleberg Foundation.

Over 400 Sanderlings Trapped

Dr. Myers started with a population study of the sanderlings on one beach in northern California but soon expanded it to include both the Atlantic and Pacific Coasts of the United States and then Chile, Peru, Ecuador, Venezuela, Columbia, Argentina, Brazil and other countries.

The wealth of scientific information collected in 15 years by Dr. Myers and his colleagues on the life history and migratory habits of the sanderlings is staggering. Knowledge of the migration routes and feeding habits of the sanderling has provided valuable information for protecting and managing not only the sanderlings but also many other species of shorebirds.

In 1982 Dr. Myers and other scientists initiated the "Pan American Shorebird Program," which developed a coordinated research project to study shorebirds in the Western Hemisphere. One research program was the banding and color-marking of sanderlings to determine their migration route and behavior.

From 1982 to 1986 over 4,000 sanderlings were trapped and color-banded so they could

be identified in the field without having to be caught again. Small colored flags and a combination of colored plastic leg bands, each designating the country, location, year and month of banding, were affixed to the sanderlings' legs. The standard metal US Fish and Wildlife Service band was also added.

Considering that there is an estimated population of 250,000 sanderlings in the Western Hemisphere, the scientists were delighted when observers began to report the colored flags and leg bands on sanderlings in 1983.

The first sighting of a sanderling banded in Peru was in May 1983 on the Delaware Bay of New Jersey, and this was followed by eight additional reports of color-marked sanderlings during the fall migration. The sighting uncovered the fact that sanderlings banded on the Pacific Coast of South America in Peru were showing up on the Atlantic Coast of the United States.

As banding continued and more sightings were tabulated, a pattern developed: sanderlings wintering in Chile and Peru follow one of two counterclockwise migration routes. During the spring migration some sanderlings follow the Pacific Coast north to their Arctic breeding grounds. The second migration is an overland route across Central America, over the Gulf of Mexico, across the Gulf States, up through the central United States and along the Atlantic Coast. The Delaware Bay of New Jersey is a critical stopover and feeding area for sanderlings, especially those from Brazil, Argentina, Venezuela and Florida. Each spring the Delaware Bay beaches support about one million migrating shorebirds. This is the second largest spring concentration of shorebirds in the Western Hemisphere.

Sister Reserve Program

The sanderling migration is frequently a nonstop flight of 35 to 50 or more hours between major feeding areas. Arriving drained of energy and fat reserves, the sanderlings depend on strategically located feeding sites where there is a profusion of food. Here they will double their body weight in 10 to 20 days to replace the fat reserves necessary to carry them thousands of miles to the Arctic nesting grounds.

Sanderlings, like many other shorebirds, migrate in great numbers, zeroing in on a relatively few feeding areas, which act as a feeding chain from their wintering to nesting grounds. Removing just one critical feeding

Pete McLain is a regular contributor to New Jersey Outdoors. He is known to many as the former (retired) Assistant Director of the New Jersey Division of Fish, Game and Wildlife.



PETE McLAIN



PETE McLAIN

Scientists trap and band migrating shorebirds to determine their migration patterns. Colored leg bands are used to identify the birds at a distance.

Color banding tells the observer the country the bird was banded in, the location, the year, and date of the banding. This research has provided a wealth of information on the migratory habits of shorebirds.

habitat, such as the lower 25 miles of the Delaware Bay, could result in the demise of a major portion of the Atlantic Coast sanderlings and other shorebirds dependent on this essential feeding and resting habitat.


Recognizing this migration behavior of shorebirds, Dr. Myers developed the concept of establishing an international "Sister Reserve" program, which would delineate critical shorebird habitat on a hemispheric basis. In 1985 the International Association of Fish and Wildlife Agencies passed a resolution establishing the Western Hemisphere Shorebird Reserve Network, in cooperation with the World Wildlife Fund-US. A technical panel of shorebird experts proposed 11 hemispheric sites, each of which supports over 250,000 shorebirds a year, and over 50 regional sites, which carry over 20,000 birds.

Governors Thomas Kean of New Jersey and Michael Castle of Delaware established the lower Delaware Bay of both states as the first shorebird reserve in May 1986. New Jersey, through the Department of Environmental Protection and The Natural Lands Trust, has been a leader in shorebird conservation and

management. At present, 30 states have joined the reserve system. The Canadian government and the Provinces of New Brunswick and Nova Scotia have shown a sincere interest in the program.

In South America, Peru has assigned five national parks to the reserve; Surinam and Brazil have joined the projects, whereas Argentina and Chile have indicated they will set aside national parks as part of the reserve network.

The groundwork has been laid, and the Western Hemisphere Shorebird Reserve Network is pushing ahead to encourage the protection of critical shorebird habitat on a hemispheric basis. The recognition of these reserves as essential to the survival of up to 20 million shorebirds in the Western Hemisphere may well ensure that we pass on the legacy of healthy wildlife populations to future generations of citizens.

As you watch the sanderlings playing tag with the ocean's waves, remember that you are looking at a shorebird that races not only against the waves, but against time, to survive in nature's fast lane. 

BRECK P. KENT



BRECK P. KENT



DIAN VISINTINI SCHROEDER





Exploring the Pine Barrens Wetlands

BY FRANK DESTENO

Pitcher Plants

Pine snake hatching

Pine Barrens Tree Frog

To the majority of people driving through the Pine Barrens, the sandy, flat, pine-covered terrain possesses a monotone landscape worthy of little more than a passing glance. But to the nature lover, an excursion into this landscape will provide a multitude of rewards like the swamps and bogs hidden within.

Turning off the smooth, macadam highway onto one of the many bumpy, sandy roads that criss-cross the Pines, you enter a wilderness that is displaced in time and space. It invites you to park the car and explore on foot. You park the car and succumb to the tranquil rustling of trees and singing birds.

Flowing through this vast expanse of forest are shimmering rivers of cold, tea-colored water. It is along these rivers and streams that you discover a place far different from the one so many travellers associate with the New Jersey Pine Barrens. Here, Atlantic white cedar trees (*Chamaecyparis thyoides*) dominate the landscape. Their dark green, spire-shaped tops present an impressive natural display unrivaled in the Pines.

White cedar swamps snake through the Pine Barrens following the meandering rivers and streams. They grow best in the saturated soils of these lowlands. Your feet sink slowly into the saturated carpet of sphagnum (*Sphagnum* spp.). Everywhere tall, straight trunks of white cedar trees stand, their bases forming hummocks providing a dry spot to rest. Above, the canopy is so dense it completely conceals the sky. The trees grow so close together that they block the sun and wind, creating a tranquil oasis in which the explorer can observe this fascinating community.

Squeezing the water out of the sphagnum is an almost impossible task. The water-holding capability of this plant allows it, as well as others, to survive occasional dry conditions. There are other plants sharing space on the hummock. If this walk takes place in April, leather leaf (*Chamaedaphne calyculata*) blossoms can be seen. In late spring, white azaleas (*Azalea viscosa*) fill the swamp with a fragrance one should experience first hand. In early summer, the cluster flowers of sweet



MARLENA GLOFF STRAW

Turkey Beard

pepperbush (*Clethra alnifolia*) form a nucleus of activity for pollinating insects.

As the exploration continues, you may enter an open expanse of low, wet ground. Stumps of cedar trees and their respective hummocks are mute testimony to what was once a beautiful swamp. Historically, the wood has been in demand since the eighteenth century, and research indicates that the white cedar forests have been clearcut up to five times since the arrival of the European settlers. The wood of white cedar is most prized for building materials such as panelling, shingles and fence posts because it resists rotting.

Where the Atlantic white cedars have been harvested, bogs now exist that are ideal for the cultivation of cranberries (*Oxycoccus macrocarpon*). Human conversion of white cedar swamps to cranberry bogs has had a positive impact on New Jersey in that the wetland habitat is maintained and another tasty crop is added to the Garden State's menu.



Pink Lady Slipper

Near the end of June, the bog is alive with pollination activity. Beehives can be seen around commercial bogs, the occupants making countless trips to and from the cranberry blossoms. Natural bogs come replete with cranberries as well as a complete array of blueberries (*Vaccinium* spp.) and huckleberries (*Gaylussacia* spp.). Proper timing of an excursion will result in snacking on blueberries in July, huckleberries into September and if you are really hungry, cranberries in October.

The most fascinating floral inhabitants that cluster in beds of sphagnum are the carnivorous plants. They make a living by trapping and digesting both terrestrial and aquatic insects. This activity allows the plants to supplement essential nutrients, which are in short supply in this niche.

Sundews (*Drosera* spp.) glisten in the daylight, their leaves covered with droplets of sticky nectar that lure some unsuspecting insect to savor a last meal. Pitcher plants (*Sarracenta purpurea*) also produce a fragrant



BRECK P. KENT

Frank Desteno lives in the Pinelands Region and has a real understanding of its beauty. The article was selected as a second place winner in the unpublished category of the 1986 New Jersey Outdoors Editorial Board Writers Contest.

Pine Barrens Swamp


nectar that attracts prey. The hapless victim is lured to the plant's open mouth and finds it can only walk downward. Eventually it falls into a pool of rain water and digestive juices. Bladderwort (*Utricularia* spp.), aquatic plants of the bog, float quietly on pools of cedar water, giving no clue to the activity below. Small, bulbous traps lie along its underwater stems, and when tiny aquatic animals come in contact with the nodules, they are pulled inward on a jet of inrushing water.

Among the animals who call cedar swamps their home are Pine Barrens treefrogs (*Hyla andersoni*), and hibernating timber rattlesnakes (*Crotalus horridus horridus*), both of which are endangered species in the State.

Also found in these wetlands are white-tailed deer (*Odocoileus virginianus*), beaver (*Castor canadensis*) and river otter (*Lutra canadensis*). Additionally, there are fifteen more mammal species, thirty-nine birds, fourteen reptiles, and fifteen fishes rounding out the vertebrate population.

An integral role played by cedar swamps is in the area of wildfire control. Although fire plays an important part in the life cycle of the Pine Barrens, severe wildfire is an ever-present threat to human activities. Cedar swamps act as natural firebreaks by aiding in containing this necessary aspect of Pine Barrens ecology.

However, white cedar swamps do burn. Although the Wildland Fire Hazard Classification (NJ Bureau of Forest Fire Management) of this wetland is low, wildfires that occur during droughts can devastate a drying swamp. Fortunately, the cedar forest is fire-adapted. The open areas thus formed offer ideal conditions for the reestablishment of cedar stands. The characteristic pure, dense, even-aged cedar swamp results from mass seed germination after a fire or other disturbance.

It is fortunate that New Jersey has recognized the importance of these wetlands. Legislation protecting the unique Pinelands ecosystem has helped in this endeavor. 

The Olmsted Legacy

BY STEVEN
K. BRUSH

With the coming of warm weather, New Jerseyans turn to their parks. Throngs take delight in the Japanese cherries gracing Newark's Branch Brook Park. In Trenton, Cadwalader Park is green once again, welcoming the city residents to its pastoral spaces. To the south, weekenders return to campsites amidst laurel and pine in Parvin State Park.

We take for granted that government provides these areas and others in New Jersey's system of parklands for our use. The assumption is justified because the things that parks provide—among them natural resource protection, leisure opportunities and community services—are public benefits most of us support. Yet it was not always so: public parks as we know them today originated with a movement of the later nineteenth century. It was a trend with a distinctly American character.

Frederick Law Olmsted (with his partner, Calvert Vaux) is best known as the creator of Central Park in New York City. As the first planned park in the country, Central Park (1857) expressed Olmsted's vision of a "rural" park providing an antidote to the increasingly crowded city. Taking as a model the landscaped properties of the English aristocracy, Olmsted included features that became his trademark, including curving paths and drives, lawns framed by irregular groves of trees and the ingenious use of rock outcrops, water and vistas. Captivating as the design itself proved to be, the concept of a park open to all citizens was probably the most significant aspect of Central Park. One student of Olmsted wrote, "Before this project, American cities included no large, informal recreation spaces. . . . After the success of Central Park, however, every major American City began to imitate New York's example."

During the post-Civil War period, Olmsted and Vaux were employed to create parks for cities from Boston to San Francisco. In 1867, Newark, New Jersey, was just emerging as an industrial and civic center. Newark commissioned the firm to design a large park, which it estimated would cost one million dollars. The city requested the money from the State Legislature but was denied, and it was not until 1895 that the Olmsted firm under John C. Olmsted, a nephew, built a smaller park called Branch Brook. This was the initial unit in the nation's first county park system. Today Branch Brook Park contains many recreational facilities within its 359 acres and contributes greatly to Newark's quality of life.

Like Branch Brook, Cadwalader Park in Trenton has been designated as a State and National Historic Site. Cadwalader was begun in 1891 and comprises 145 acres surrounding

*One of the statues
gracing the landscape of
Cadwalader Park in the
City of Trenton.*



PHOTOGRAPHS BY WALTER CHOROSZEWSKI

an historic mansion in northwest Trenton. It is the only New Jersey park in which Frederick Law Olmsted had a direct hand.

Another facet of the parks movement was gaining headway after the Civil War. The concept that government should set aside large tracts of wilderness lands for public use can be traced back to the first decades of the nation and was gaining adherents up through the nineteenth century. It remained for Olmsted, though, in an 1865 document recommending Yosemite Valley, California, as a

*Branch Brook Park in
Newark—part of the
Essex County Park
System.*





Runners in the annual Cherry Blossom Race in Branch Brook Park.

Steve Brush is a freelance writer and a regular contributor to *New Jersey Outdoors*.

State Park, to give "the first systematic exposition of the right and the duty of a democracy," to create State and National Parks. Olmsted felt that these larger parks should be as left in as little-spoiled a condition as possible. At the same time, like the urban parks that he had so recently created, they should be open to every citizen. He observed that private parks in Great Britain were a great asset, but only for the owner. "Thus, without means ... taken by government to withhold them [from private acquisition] ... all places favored in scenery to the recreation of the mind and the body will be closed against the great body of the people." He argued further in the Yosemite report, "they should be ... open to the use of ... the people [and] the establishment by government of great public grounds is thus justified ... as a great public duty."

The reservation of Yosemite Valley as the first State Park in the nation was a landmark in the parks movement. Other Federal and State tracts, beginning with Yellowstone (1872), were set aside in the years to come. Olmsted was further involved in the struggles to reserve Niagara Falls and the Adirondack Mountains as public areas under the control of New York State. Following these early examples, other states, including New Jersey, would begin to develop their own park systems. Beginning with the first State Forest at Bass River in 1904 and the first State Park at High Point in 1923, the State system of public lands now contains more than 400,000 acres.

Over the years after the death of F.L. Olmsted in 1903, his landscape architecture firm did design work at High Point, Cheesequake and Parvin State Parks. The firm continued to practice until 1961, at which time it had done over 600 projects around the country, with over 60 projects involving public parks in New Jersey. These projects included county park systems in Camden, Union, Passaic and Essex Counties and municipal parks in Middlesex, Union, Essex and Mercer Counties.

Thus, although Olmsted personally created only one public park in the State, his career had a lasting impact through New Jersey. In addition to the projects of his firm, the precedent-setting nature of Olmsted's work on city, county and state parks stimulated many elements of the park movement. His pastoral style of park was adopted by the new profession of landscape architecture.

Our parklands, to say the least, have gone through many changes since the Olmsteds created Cadwalader and Branch Brook Parks for the purposes of quiet contemplation of scenery and "passive" recreation. Now automobiles must be accommodated, public safety

addressed and "active," organized recreation provided for. The park system has separate, new lands categories for endangered species, fish and game and historic sites. The effect of people on the parklands has sometimes been detrimental to the land and the facilities.

Since 1961, the people of New Jersey have provided a funding source for the upkeep and improvement of park systems by approving five successive Green Acres bond issues. Local, county and State park offices apply for low-interest loans and grants from the Green Acres office. Many Olmsted parks have received infusions from this source for improvement and restoration work. Green Acres granted \$2.5 million from the 1974 bond fund to Essex County, for example, for part of a Branch Brook Park rehabilitation project. The money went for road improvement, ballfields and maintenance. Six other Olmsted parks in Essex County received over \$200,000 from Green Acres for lake rehabilitation and facility construction.

Green Acres also has made grants for Olmsted parks in Union, Mercer and Passaic Counties. The Union County park system has received almost one million dollars in the last few years. The funds have been combined with Federal and local moneys and directed for projects in Warinanco and Cedar Brook Parks and Rahway River Parkway. In Trenton, Cadwalader Park benefited from a \$45,000 grant to stabilize the banks of water bodies, restore landscaping and walkways and build a "tot-lot." Passaic County received grants for some \$900,000 to restore three of its Olmsted parks—Garrett Mountain, Goffle Brook and Weasel Brook. The Olmsted State Parks at Cheesequake, High Point and Parvin have benefited from Green Acres grants, mostly for improved facilities for day use and camping, over the last decade.

An important investment

Almost a century has elapsed since Frederick Law Olmsted designed Cadwalader Park in Trenton. Since then, New Jersey has continued to undergo the urbanization that he observed and sought to counteract in New York. Olmsted pursued a vision of public parks because, "The time will come when New York will be built up ... and when ... the Island will have been converted into ... monotonously straight streets and piles of erect, angular buildings." Indeed, many New Jersey parks created in undeveloped areas have become islands of open space in a built-up landscape. In this story, Olmsted's work offers the moral that our parks are an investment that appreciates over time.

New Jersey Outdoors welcomes letters from readers. Letters for publication should include the writer's name and address and should be mailed to: Editor, New Jersey Outdoors, CN 402, Trenton, N.J. 08625. Letters may be edited for reasons of length or clarity. Please keep the letters coming. We'd like to hear what you think about the magazine. We'll also try to answer questions and if we cannot, we'll ask our readers for help.

Dear Editor

We Are Happy That You're Happy

Having spent most of my sixty-two years living and working, hunting and fishing in New Jersey, I love the New Jersey outdoors. I am spending my retirement years in Florida, but New Jersey is my home and no other place attracts me as does Sussex County. I enjoy "New Jersey Outdoors" as I enjoyed New Jersey outdoors.

Ed Denzer
Florida

You have a great magazine. I had been a resident of New Jersey for some 35 years and did not know about the annual "World Series of Birding" (March/April 1986) that ended in Cape May Point. I enjoyed many weeks of vacation time there.

About 40 years ago, we were at the point and walking out on the rock jetties as butterflies were swarming all over, at about head high. Then the winged critters were attempting to fly across the bay to the Delaware/Pennsylvania side. The prevailing wind had shifted and the monarchs had to return to the point and await a change in air current to help them in their migration south.

Anyway, keep up with the fine work. I am past the retiring stage, however, I try to keep some activity going. I am 81 years of age.

A. R. Hastings
Texas

More on Iron

Another excellent book on iron mining in New Jersey ("Cast in Iron"; November/December 1986) is the "Iron Mine Railroads of Northern New Jersey," by Larry Lowenthal, published by the Tri-State Railway Historical Society in 1981. It covers the iron industry and the railroads that served the mines and furnaces in Morris County. At last check, the hard cover edition is still available in very limited quantities from Tri-State R.H.S., PO Box 2243, Clifton, New Jersey 07015-2243 and at some railroad hobby shops. It may also be found in some public libraries.

John W. Burlage, Jr.
Cherry Hill

NJO Contest

Your pages devoted to the four photo contest winners were gems! I enjoyed them so much I wanted to write and ask about the possibility of next year of your reproducing four pages rather than two, to let us readers see the efforts of more photographers.

Marion E. Blaetz
Pemberton

TWO POINTS OF VIEW

I let my subscription to NEW JERSEY OUTDOORS run out. I find your fishing articles informative. But, I don't know how many backpackers, or museum goers there are in this state. I'm sure there are many more hunters. The magazine used to deal with hunting and game animals, now you tell us about insects or lizards. It's unfortunate. Hopefully, you will go back to the old format and make the magazine more interesting.

Ross W. Hull
Perth Amboy

I am a subscriber to your magazine for many years, and have very often given gift subscriptions to my family and friends. I also am an animal and bird lover. I have noted a marked increase in your articles on "Animal Management," hunting, and fishing lately. Please be fair by remembering that there are many people who prefer to view their animal and wildlife through binoculars or a camera, rather than down the barrel of a rifle. In fact, I believe that we outnumber the hunters by about two to one and we are still growing fast. Your magazine is a superb rendition of pictures and everything pertaining to our state, correctly called the Garden State, so don't spoil it.

Ruth E. Duffy (Mrs.)
Clifton

COMPLAINT

Here it is February and I just got November/December issue. All the magazines were way too late.

E. Schipani
Cape May Court House

Sorry for any inconvenience. If you have a problem, please call us at 609/292-1281.

MORE INFO ON KEN LOCKWOOD GORGE

The May/June 1986 issue carried a front cover photo of the end of Ken Lockwood Gorge. It is a lovely spot not unlike a few I have seen in New Jersey, but I don't recognize the name. Can you tell me the location of Ken Lockwood Gorge?

Warren Cornell
Little Silver

Ken Lockwood Gorge is one of the most picturesque of all the Wildlife Management Areas. The 260 acre area contains the two and one-half mile gorge, formed by the South Branch of the Raritan River. It is located north of High Bridge and east of Route 513 in Hunterdon County. The gorge is open to fly-fishing only from April to November and is closed to all fishing on days that the area is stocked. The gorge is maintained primarily as one of the states natural areas. It is an example of northern mesic hemlock-mixed hardwood habitat with highly varied understory and ground cover. For more information on Ken Lockwood Gorge, contact the NJDEP, Division of Fish, Game and Wildlife, CN 400, Trenton, New Jersey 08625.

EXPLORER

I was under the impression that the EXPLORER pullout section was going to be in every issue. But there wasn't any in the November/December issue. How can I obtain EXPLORER for my grandchildren for they are both in Cub Scouts and the EXPLORER is great for them?

W. J. Scheidt
Secaucus

Please send me information about NEW JERSEY OUTDOORS, EXPLORER program publication materials.

James Newquist
East Orange Public Schools

Explorer was first published in the September/October 1986 Issues of NJO and was also included in the first three issues of 1987. At this point, a decision as to continue the publication of Explorer in the fall of 1987, has not been made.

Striped Bass

At one time the Navesink River in Monmouth County supported a commercial and recreational fishery for striped bass. In fact, the Navesink River was selected in the late 1890's as the site for collecting young-of-the-year stripers that were shipped by rail to California for stocking (see *NJO* March/April, 1985). Today a thriving sportfishery for striped bass exists on the West Coast. In comparison, striped bass fishing along the East Coast has experienced a precipitous decline. It is hoped that newly enacted management strategies including restoration by stocking can bring back this popular finfish species.

Scientists are not certain if the original striped bass population in the Navesink River was a separate stock, born and bred in the system, or merely the result of Hudson River migrants that used the Navesink as a nursery area. If the former were true, then possibly the construction of two dams to form both the Swimming River Reservoir and Shadow lake eliminated striped bass spawning habitat, and this would definitely lead to the decline of the fishery. Water-quality conditions are now acceptable for striped bass spawning, and we hope that the strain of striped bass being introduced can find suitable spawning grounds.

Brookneal strain selected

The Brookneal strain, which New Jersey selected for its restoration, is originally Roanoke River stock that became landlocked when the Staunton River near Brookneal, Virginia, was impounded in the early 1950's. We desired a nonmigratory strain that would become a self-sustaining population and would create its own localized sportfishery instead of contribute to the coastal migratory stocks.

In 1984, the Division of Fish, Game and Wildlife received 50,000 one to two-inch striped bass fingerlings from the US Fish and Wildlife Service's hatchery in Edenton, North Carolina. Since there is no acknowledged stocking formula for open water systems, we used the recommended amount for stocking impoundments—10 fish per acre. Based on the 4,500 acres in the Navesink and Shrewsbury rivers, we arrived at a total of 50,000 fingerlings.

Selecting the stocking site proved to be a complicated task. The first criterion to be met was access to water from a good road. We also desired a stocking location that was in the freshwater regime of the system so that we could eliminate snapper bluefish predation during the summer. We felt our stripers could tolerate predation by pickerels and snapping turtles but schools of small bluefish could wipe out the small stripers we stocked. The third criterion was a shoreline and river bot-



are back in the Navesink

tom with heavy submerged and semisubmerged aquatic vegetation, which would provide good cover for the newly stocked fish.

We found all of this where Riverdale Avenue crosses the Hockhockson Brook. A quick lesson in geography: The Hockhockson Brook is the only major tributary to the Swimming River, and the Swimming River is the freshwater extension of the Navesink River that begins at the Route 35 highway bridge in Red Bank and flows west to its terminus at the Swimming River Reservoir. When we say that striped bass are being returned to the Navesink, we're really talking about its freshwater end—the four- to five-mile-long Swimming River.

Stocking the brook with fish is a short-lived event if the water temperature is right. Providing the water temperature in the brook is comparable to that in the hatchery truck tanks, the fish are dip-netted from the tanks, placed in buckets of tank water, carried down to the brook and gradually released.

25,000 bass fingerlings

When water temperatures are not in agreement, water from the brook must be placed into the hatchery truck's tanks. Fish can be stocked directly into slightly colder water but never into water that is 5° F warmer. In the latter case, the warmer brook water would immediately raise the metabolic rate of the fish and cause considerable stress. Our twelve striped bass stocking procedures conducted over the last three years have all occurred without any unfortunate incidents.

When the fish from the Edenton Hatchery arrived, we directly stocked 25,000 striped bass fingerlings and sent the other 25,000 fish to the New Jersey Division of Fish, Game and Wildlife's Hackettstown Hatchery to be raised to larger sizes. At Hackettstown the fish are placed in indoor tanks of constantly circulating water that is maintained at 78° F. The fish experience constant lighting and are fed a commercial grade fish-food pellet by automatic feeders. In three months, fingerlings that were one-and-one-half to two inches in size leave Hackettstown as six-inch fish.


All the striped bass that leave Hackettstown are fin-clipped. This involves the complete removal of any one of the fins except the tail fin. Fish stocked at different sizes have different fins clipped so that we can identify their age class when they are recaptured. Prior to having their fins clipped, the fish are anesthetized to facilitate handling and decrease the chances of injury. Clipped fish are treated with antibiotics to prevent infection.

Information is still being gathered to determine the optimum stocking size for striped bass, whether it be two, four or six inches. We are proceeding under the premise that bigger is better, and we are trying to raise as many six-inch stripers as possible. The optimum size for stocking will take into consideration the cost of rearing the fish and the relative survival of fish stocked at various sizes, ranging from one-and-one-half to approximately six inches in length.

The Bureau of Marine Fisheries within the Division of Fish, Game and Wildlife has recently completed its third year of the restoration project. In 1984 we successfully stocked 46,995 stripers; in 1985, 26,847 fish; and in 1986, 37,645 striped bass, this brings the three-year total to 111,447 fish stocked at various sizes.

Good survival and growth

Field monitoring is starting to provide information on the fate of our striped bass. During the summer and early fall, recently stocked fish were observed to be clustered near Newman Springs Road at the interface of salt and fresh water. Seine catches there have indicated good survival and growth for stripers in the Swimming River. Important forage items such as grass shrimp, sand shrimp, amphipods and smaller finfishes have been found in the stomachs of the stocked stripers. We are continuing to search the deeper waters of the Navesink and Shrewsbury Rivers to locate overwintering striped bass. Gill nets set in the Swimming River have caught fin-clipped nine- to 14-inch bass, indicating that stripers of all age classes reenter the Swimming River in the Spring. We will look for striped bass eggs and larvae in a few more years to see if we've had fish spawning in the Swimming River.

Recreational fishermen continue to be an important source of information on the infant fishery. We have received many calls from anglers who have caught small stripers in areas where these fish were previously uncommon. If you catch a striped bass anywhere in the Navesink or Shrewsbury area, please examine the fins to see if any are missing. Record this information as well as the fish's length. If possible, scrape off a few scales above the lateral line between the two dorsal fins before returning the fish to the water. Pre-printed scale envelopes for collecting these data are available by calling the Nacote Creek Research Station (609-441-3292). Together we can piece together the puzzle of the striped bass in the Navesink, Shrewsbury and Swimming Rivers. 

BY PETE HIMCHAK

Pete Himchak is a principal fisheries biologist in the Bureau of Marine Fisheries, NJ Division of Fish, Game and Wildlife. Pete, a candidate for his Ph.D., has been the striped bass investigation project leader for the last 6 years.

PHOTOGRAPHS BY AUTHOR

Stocking the Swimming River branch of the Navesink.

Field monitoring the stripers.

Cliff Swallow

By JAMES C. SCIACIA

Like the flowering of the dogwood trees and the shadbush, the return of the swallows is a sure sign that spring has arrived. The return of the swallows to the San Juan Capistrano Mission in California, supposedly on March 19 of every year, is an annual rite of spring that draws national attention. The swallows of San Juan Capistrano, like the New Jersey swallows, are cliff swallows.

The swallows return to New Jersey from their wintering grounds in South America during the month of April when their staple food source—insects—is available. The timing of the swallows' arrival is critical to their survival, because a blast of cold weather could make insects scarce enough to cause significant swallow mortality.

The North American swallow family consists of eleven different species, six of which occur in New Jersey. The swallow species found in New Jersey from April to September include the cliff swallow, bank swallow, barn swallow, rough-winged swallow, tree swallow and purple martin. The cliff swallow is distributed widely throughout North America during the summer breeding season and can be found in parts of Alaska, Canada, most of the continental United States and a portion of Mexico.

The cliff swallow, *Hirundo pyrrhonota*, is five to six inches long and has a wing span of approximately 12 inches. Its crown, back, wings and tail are bluish black; the throat and face brownish red; sides and flanks grayish brown and belly white. Characteristic markings of the cliff swallow are the buffy white forehead and rusty orange rump patch.

The cliff swallow resembles the barn swallow but can be distinguished by its nearly square tail, which differs markedly from the deeply forked tail of the barn swallow. All of the other members of the swallow family that occur in New Jersey also have forked or notched tails.

The cliff swallow prefers open country where it has access to an abundant insect food supply. Swallows are often seen swooping low across the ground and water surface with their wide mouths agape, scooping insects out of the air as they fly. Many times the dreary task of mowing the lawn has been made more pleasant by diving and darting swallows that have learned to take advantage of the numerous insects flushed from the grass by the mower.

The New Jersey population of cliff swallows appears to consist of two main groups. A large group nests on the bridges across the Delaware River in Mercer and Hunterdon Counties, and a smaller group nests on buildings and barns in Warren and Sussex Counties. The Hunterdon and Mercer swallows begin to appear in April, and nesting begins in late April. The Sussex and Warren swallows begin nesting in early June, about one month after the Hunterdon and Mercer colonies.

Cliff swallows are colonial nesters, with the colony ranging in size from two to thousands of pairs. The largest New Jersey colonies contain around 200 pairs. The cliff swallow nest is gourd-shaped and attached to the undersides of bridges, the eaves of barns and buildings and, in more remote parts of their range, on the walls of cliffs, canyons and gorges.

The first recorded account of cliff swallows nesting on the eaves of a building was in 1825. Since that time it has been suspected that they have expanded their range and distribution by locating their nests on man-made structures. Their propensity to use the overhangs of barns and buildings has earned them the name of eave swallow in some areas.

The nest is constructed from mud pellets, which both the female and male carry in their mouths to the nest site. During periods of extremely high humidity, persistent rains and drought, partially completed and completed nests often fall owing to excess moisture or the lack of it. Close examination of a cliff swallow nest will reveal the incredible amount of effort and persistence required to build each nest.

Once the nest is completed, three to six eggs are laid. Both parents incubate the eggs until they hatch, 12 to 16 days later. Both adults bring insects to the young while they are in the nest. The young swallows are ready to fly at the ripe old age of 23 days. Under good conditions, each pair is able to produce two broods each season. Weather conditions and competition from house sparrows affect the swallow's ability to produce two broods and sometimes even one brood. Consequently, this has led to population decreases in some colonies and the complete disappearance of others.

The Endangered and Nongame Species Program of the DEP's Division of Fish, Game and Wildlife has monitored New Jersey cliff swallow populations since 1982. The cliff swallow was classified as a State endangered species in 1984 because of the serious decline in the number and distribution of swallows in our State. The major cause for the decline of the cliff swallow has been competition from the introduced European house sparrow.

The gradual decline of cliff swallow numbers began in the early 1900's, shortly after the introduction of the house sparrow. As early as 1930 the New Jersey Audubon Society proposed a plan to encourage the declining and disappearing cliff swallow colonies.

The house sparrow is a cavity nester and has learned to take advantage of the nests built by the cliff swallow. After the cliff swallows complete their nest, the house sparrow evicts the swallows and uses the nest to raise its own young. Observations have revealed that the eviction sometimes occurs after eggs have been laid and in some instances even after the chicks have been hatched. The displaced swallows then attempt to build another nest, which may also be pirated by sparrows.

Swallow colonies parasitized by sparrows rarely produce two broods because of the time lost in building multiple nests. This competition, compounded by natural causes of mortality, such as weather and parasites, has led to the disappearance of many cliff swallow colonies. The future of the Warren and Sussex colonies remains uncertain because they are all affected by sparrow competition.

On the positive side, the colonies on the bridges over the Delaware are increasing, owing to the ideal location over water and the absence of sparrow competition. Active management of the bridge colonies by the Delaware River Joint Toll Bridge Commission and the Endangered and Nongame Species Program has also contributed to the success of these colonies. The next time you cross the Lambertville Bridge, take the time to read the sign about the cliff swallows on the Jersey side and observe the swallows under the bridge.

The Endangered and Nongame Species Program is interested in learning about new cliff swallow colonies. If you are fortunate enough to have a colony on your property or know of a colony anywhere in New Jersey, you can help by telling a Program biologist. Please contact Larry Niles, Tuckahoe Wildlife Mgmt. Area, P.O. Box 26, Tuckahoe, NJ 08250, 609-628-2103, or Jim Sciacia, Northern District Office, Box 383, R.D. 1, Hampton, NJ 08827, 201-735-8975.

Inside Back Cover Cliff Swallow. Painting by Carol Decker

Front Cover Photo By Walter Choroszewski. Canoeing along the Oswego River in early morning

Back Cover Photo By Walter Choroszewski. A spring day fishing at Echo Lake, Union County Parks



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