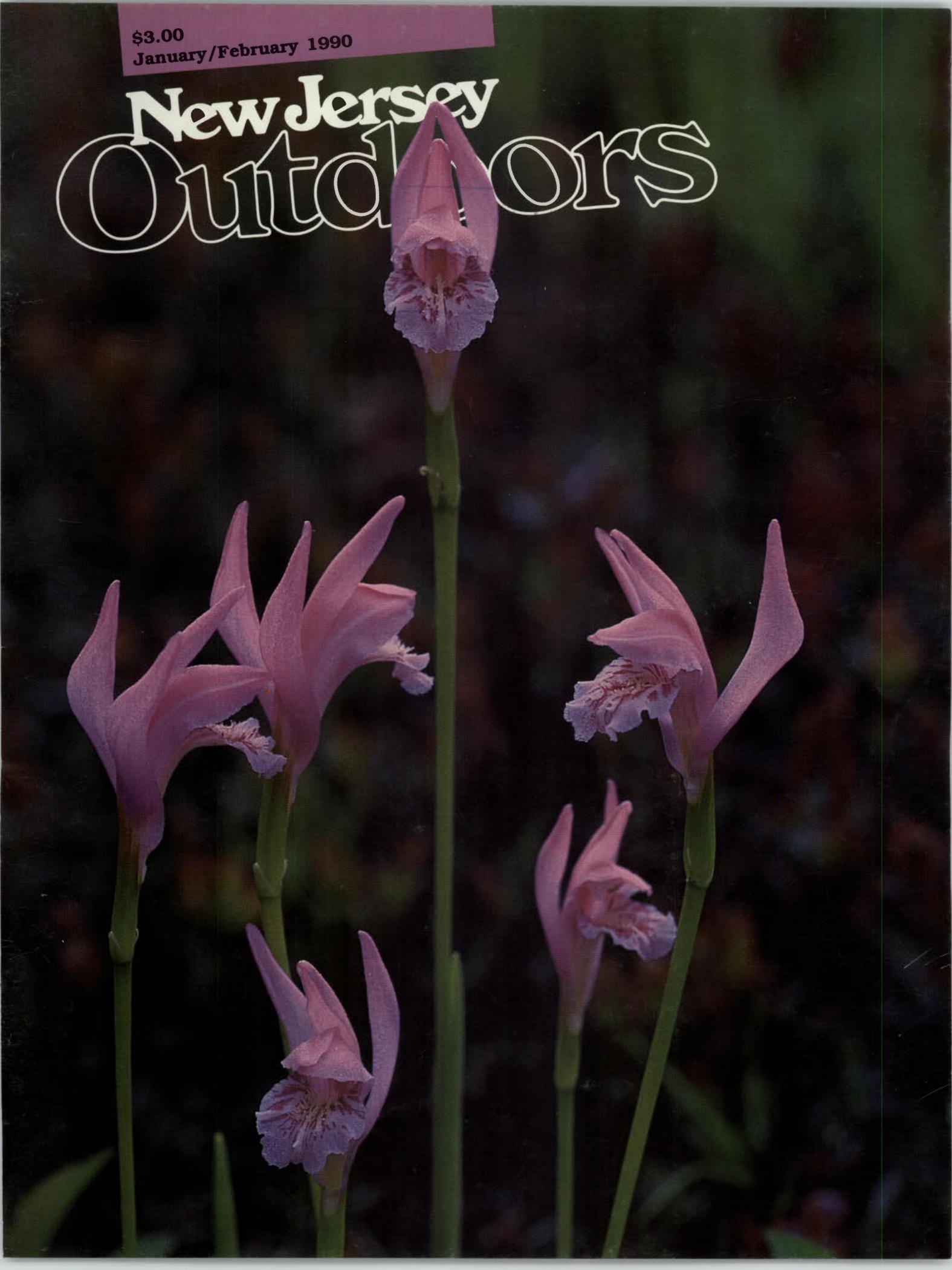


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January/February 1990

# New Jersey Outdoors





# New Jersey Outdoors

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**Front:** Once more frequent in New Jersey, the dragon's mouth orchid (*Arethusa bulbosa*) has now been reduced to rarity through habitat destruction and overcollection. Photograph by Phil Moylan.

**Inside Front:** Corson's Inlet State Park in winter. Photograph by Ken Bowman/Action Images.

**Inside Back:** "Red Fox." Original acrylic painting by Carol Decker.

**Back:** "Between the Pilings." Hand-colored, black-and-white photograph by Tony Bozza.

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## Story Locator



# Editorial

Sixteen days after the sponsoring legislation was introduced, the Department of Environmental Protection (DEP) was created on April 22, 1970. On that first Earth Day, demonstrations, teach-ins and seminars were held around the nation, especially on college campuses. We spoke out about air and water pollution, buried automobile engines, and planted trees. A nation became environmentally conscious.

Formed from units in the Department of Commerce and Economic Development and the Department of Health, the newly created DEP faced issues concerning air pollution from mobile sources and plants discharging untreated industrial wastewater and pollutants into rivers. New air pollution emergency procedures that would limit the use of incinerators to four hours a day and soot blowing from large fuel-burning installations to those same noon to 4 pm hours went into effect, and the agency won a legal challenge to potable water standards that regulated minute quantities of iron and manganese.

Over the last 20 years, 13 million acres of farmland were developed for urban use, the nation's list of endangered and threatened species grew from 92 animals to 305 animals and 164 plants, and the North American population of breeding mallards declined by 50 percent. Science and technology moved forward so quickly that the DEP now studies and regulates pollutants and a number of toxic chemicals relatively unknown in 1970. With more miles of highway than any other state, the highest per capita vehicle registration and the heaviest travel density, New Jersey still faces air pollution problems from mobile sources. Having learned that end-of-the-pipe controls do not solve all environmental problems, regulators are now working on preventing the generation of pollutants at the source.

At the signing ceremony, then Governor William T. Cahill asked every resident of the state to "participate in meaningful activities which will result in a better understanding of the environmental challenges we must face together." It is fitting that the 1990s begin with numerous opportunities for the continued participation of New Jersey citizens in a national, indeed international, environmental agenda that calls for protecting the environment, preserving natural resources and saving open space.

Early this spring, we will celebrate the March for Parks (March 24-25), Earth Day 1990, National Wildlife Week (April 22-28), the National Celebration of the Outdoors (April 22-29) and New Jersey Environmental Education Week (April 22-29), to name just a few. Across the state, there will be many locally sponsored conservation and environmental protection activities. The best friend of the environment is an informed

conservationist, and I encourage you to participate in these educational events.

A particularly important one is the first annual short course on the 1.1 million-acre Pinelands National Reserve. Sponsored by Cook College and the Pinelands Commission, it will be held March 10. In addition to the flora, fauna and folklore of the Pines, it will include presentations on the potential impact of pollution on the Pinelands, protecting the 17 trillion gallons of water in the Cohansey Aquifer, and teacher workshops on curriculum guides. For registration details, see this issue's Calendar of Events.

To keep you informed about events around the state, "Earth Day 1990 News in New Jersey" will be published monthly and identify organizations holding activities and workshops. To request a copy and be placed on the mailing list, call the DEP Office of Communications and Public Education at 609/633-1317.

Although events focus on Earth Day and the week-long celebrations, our responsibilities continue throughout the year. The "Earth Day Every Day: You Can Make a Difference" theme of National Wildlife Week is right on target. We must make lifestyle changes and practice conservation every day. Taking mass transit or scheduling errands so that the car stays home one day a week is a start toward reducing atmospheric pollutants. In the market place, include in your product selection its packaging and ingredients. Is it made from recycled materials and can it be recycled? Is it a concentrate in a smaller container that can be diluted at home? Does it contain ingredients harmful to waterways when poured down a drain?

Participate in organizations such as the DEP-sponsored Water Watch. "Adopt" a local water body and monitor its water quality, organize litter pick-up days, develop trails and recreational activities, or sponsor education programs. If you see problems that threaten our waterways, by reporting them early you minimize the natural resource damage. Become a Civilian Conservation Corps volunteer, as featured in the November/December issue. Join a Friends of the Parks organization or the "Take Pride in America" program.

In conservation and environmental protection, each of us can make a difference. Earth Day is every day, and environmental education is for everyone. Continue your education in the natural resources and effectuate all year what you learn. Your activism and participation will make it possible for us to have healthy natural resources that we can still "eNJOy!"



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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.

Let's protect our earth



NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

APR 9 1990

# Beauty So Rare

By Phil Moylan

While traveling along the New Jersey Turnpike, Garden State Parkway or the Route 1 corridor, you would scarcely realize that hidden somewhere within the state's densely populated boundaries is a federally endangered wild orchid, the small whorled pogonia, and another, the southern yellow orchid, which botanists are cautiously monitoring.

Nationally and statewide, much attention has been given to the osprey, bald eagle and piping plover since their continued existence has been jeopardized by pesticide use, the development of critical nesting areas and continued human encroachment on coastal and freshwater wetlands. Now, the Legislature and the Department of Environmental Protection have formally recognized the mutual importance of wild plant life as well as animal life with the passage of "The Endangered Plant Species List Act."

Enacted in April 1989, this new law, in conjunction with the Freshwater Wetlands Protection Act, establishes needed guidelines that hopefully will assure the safety of our botanical heritage, including the more than 40 species of wild orchids presently known to exist in our state.

It is largely the result of the extreme rarity of certain state orchids and their popularity among outdoor enthusiasts and botanists that they have become the preeminent symbol of all that is aesthetic, fragile and valued in our environment. It is the sensual charm and vulnerability found in orchids around the world that launched hundreds of ships, cost men their fortunes and others their lives, and incited generations of "Old" and "New World" gardeners, botanists, entrepreneurs and socialites to the obsessive quest for the most treasured of plants.

Their goal, to locate and transfer these gems from indigenous soil to their own manicured gardens, ultimately proved fatal to the plants while divesting the land of its inherent wealth. The most significant threats to New Jersey's orchids, fortunately, do not include commercial plant prospectors or opportunists intent on plundering the earth for selfish gain. We must continue to address the present dangers of unmonitored land development that could seriously imperil endan-

gered plants, including our coveted orchids.

The second largest family of plants in the world, the orchid family contains about 10 percent of all plant species and has long been the source of adventure, misfortune, romance and mystery. Since the early middle ages, they have captured the human sensibility with spell. From as a source of sustenance in the Middle East and as an aphrodisiac in Europe during the 13th and 14th centuries to their unnatural appearance upon the lapels of prominent Edwardian ladies at the turn of the century, orchids today retain their importance as a cultural legacy. One need not look too far to see living examples; a visit to the lush greenhouses of the Duke Gardens in Somerville or Longwood Gardens in Pennsylvania will provide opportunity to view many species, including some from the rapidly disappearing tropical rain forests of South and Central America.

Take time to inspect these "monocots" with their bizarre shapes, subtle odors and wide spectrum of color and size. A planned excursion into the Pine-

tured the human  
their magical  
their evolution  
sustenance

*The dragon's mouth orchid was once common near boggy areas.*



Photographs by author

(right) The ragged fringed orchid is characteristic of moist, successional habitats and occurs statewide.

Yellow lady's slipper orchids frequent the rich limestone woods of northwestern New Jersey.



lands during the proper season may bring the joy of discovering any one of the 30 or so species still in residence.

Included are the series of "fringed" and "fringeless" varieties which offer swirls of diminutive, monochrome, lipped flowers floating at the top of a single, delicate green stem. They are white, purple, yellow and orange. Some species, such as the white fringed, are common during the summer blooming period in central and southern bogs. Two of the rarest and most notable, the snowy orchid (*Platanthera nivea*) and the southern yellow fringeless orchid (*Platanthera integra*) are seldom seen and are known to exist in only a very few locales. Other sites, documented by Whitmer Stone in his *The Plants of Southern New Jersey*, have gone the way of the bulldozer or simply not produced plants in recent years.

The mystique associated with orchids is carried to the extreme by one of the state's rarest orchids and possibly the rarest orchid in the nation, the small whorled pogonia (*Isotria medeoloides*). First discovered in Virginia in 1814, it was "lost" until the early 1900s. So rarely seen and in so few areas, it was placed on the U.S. Fish and Wildlife Service's endangered species list. Nine locations have documented New Jersey's only federally listed endangered species.

Adding to its rarity is the plant's peculiar habit of delayed blooming cycles and remaining dormant for at least two years. Inconspicuous in color, it is structurally comparable to its more abundant cousin, the whorled pogonia. A member of the lily family, it prefers New Jersey's dry, upland deciduous forests. Of the sites presently known, most are located on protected lands purchased by the Nature Conservancy or on privately held property in which the landowner has been notified of the existence of the globally rare plant.

Certainly the most familiar and attractive of orchids are the lady's slippers, offering an array of colors from pink to yellow to white. The resplendent, bulbous, cup-shaped blossoms are reminiscent of traditional Dutch wooden shoes. Found in a diversity of habitats including dry, rich woodlands, wet bogs, coniferous forests and limestone uplands, these are among the most eminent of New Jersey flora. Unfortunately, the showy lady's slipper, the most striking of the group with its two-toned cup, has apparently succumbed to fame. It has not appeared for many years in previously productive bogs, and state biologists fear its extirpation.

Not to be outdone, the three "feminine" pink orchids of our freshwater wetlands are the coquettes of the orchid world, presenting



(left) Grass-pinks are common in the wet, open areas of the Pine Barrens.

One or more of the several species of ladies' tresses occur in every New Jersey county.

us lavish, almost bawdy color with intricate yet delicate design. My favorite, the dragon's mouth (*Arethusa bulbosa*), initiates flower production toward the end of May, while the rose pogonia, less restricted in its habitat requirement than the dragon's mouth, commences blooming in mid-June and lasts several weeks. In academic circles the most celebrated of the three is surely the grass-pink (*Calapogon pulchellus*) for its distinctive pollination technique.

In 1877, the internationally acclaimed biologist Charles Darwin published an academic paper entitled "Various Contrivances by which Orchids are Fertilized by Insects." Even Darwin, the great explorer and inventive theoretician, was hopelessly smitten by the seduction of our most advanced family of plants. In that study and in subsequent research, it was determined that over 8,000 species of orchids rely upon some type of deception to entice insects, usually bees or wasps, to assist in the fertilization of flowers.

The relationship, however, is rarely equitable since the pollinator receives no compensation for its efforts. In some cases the bees are lured by odor, such as the calypso orchid of the northern U.S. and Canada, to the flower, only to leave unrewarded except for the innocuous adherence of pollen packets to its sides. In its instinctive effort to find

nectar, it is teased into trying again, only to fly away unsatiated.

The grass-pink, an established familiar species in New Jersey's freshwater bogs, has a reversed lip covered with glossy yellow hairs which resemble pollen-laden stamens. Like the calypso orchid, it attracts bees by deceiving the insect into thinking that a veritable feast awaits the next opportunist.

The grass-pink, however, does not transmit a tantalizing odor but by visual delusion induces its guest into what appears to be the ultimate gastronomical experience. Once again, our unwitting bee becomes an involuntary slave to the vampish allure of our sophisticated lady and falls victim, however temporary, to a one-sided game in which the plant is the sole victor.

Believe it or not, there are other species which mimic the female partner of the pollinator and emit a "perfume of love" to attract a male counterpart to mate. By the time the decoy is detected, the bee has pollinated the plant and the future of the species is assured. Our anthropomorphic biases might cause a stigma of deviousness and perversion to be affixed to what is merely a mechanism for survival.

Much has been said of the complex reproductive techniques of orchids. However, many biologists believe that some species resort to





self-pollination by default, since observations have proven no evidence of any pollinator, while other species are fertilized solely by one species of insect. These facts suggest the frailty of the orchid ecosystem, so that any interference in the mechanisms of pollination, as progressive as they might be, could jeopardize whole populations of plants. Pesticides and the "trampling syndrome," where too few plants are endeared and overrun by too many orchid lovers, remain as threats. Transplanters, eager to extend the boundaries of their gardens, should be aware that orchids require a symbiotic food interaction with specific fungi and it is next to impossible to duplicate, even in a controlled environment. Since the plants are unable to produce food independently, they rely upon the organic decay from this mycorrhizal alliance for usable nourishment. Further attempts by plant excavators to establish "wild" colonies of orchids in outdoor gardens would be detrimental to present populations and, in the context of scientific evidence, unconscionable.

Loss of critical habitat persists as the weakest link in maintaining our botanical treasure chest. While the freshwater wetlands act confronted this issue in part, pragmatic, supplementary solutions to protect non-wetland habitats are necessary. Development of small land parcels on non-wetlands has been given attention by governmental groups such as the Endangered and Nongame Species Program, the Natural Lands Trust and the Natural Heritage Program and by non-profit groups such as The Nature Conservancy.

This organization takes pride in its ability to educate land owners about the existence of rare and threatened plants and, in the sole interest of conservation, offers to purchase parcels where rare or endangered species are located. Independent botanists, such as Wander Ecological Consultants of Newton, provide expertise to private and corporate concerns in assessing the botanical valuation of a tract of land prior to its development. In this way the botanist can bridge the gap between conservation concerns, the requirements instituted by legislation, and the rights of land owners to develop their property.

From this discussion about protection, one might surmise that all orchids are endangered or threatened. There are, in fact, several species that continue to prosper despite difficult odds, such as the exquisite, bicolored showy orchis, the pallid, unobtrusive ragged fringed orchid or the communal,



fall-blooming nodding ladies' tresses. All are customarily seen in season, but unless you know where and when to look you will rarely stumble upon them.

The spring pioneer, the showy orchid, is readily overlooked amid the explosion of green on the mature forest floor in early May. After spending hours of searching the dense, grassy vegetation of a fallow field on a Fourth of July weekend, I finally came face-to-face with a handful of ragged fringed orchids. I realized why stalking even the most familiar of species demands a persistence akin to obsession. Add the fact that some common species, such as certain coral-roots, often will not appear above ground in the same location year after year.

Are these enchanted gifts from nature a paradigm of those lofty, ethereal, unattainable aspirations that dwell within our souls? Or are they simply flirtatious taunters that delude us with their beauty by playing on our desire to possess that which cannot be possessed?

Men have lost their lives and their fortunes to the quest of discovering and possessing these extraordinary plants. But it will take a common commitment and sensitivity to our steward responsibilities that will ultimately decide the fate of this precious inheritance. **NJ**

*(facing page) The white fringed orchid is still relatively frequent in the Pinelands but declining due to habitat loss.*

*The crested-yellow orchid is the most common of New Jersey's three yellow-flowered Habanarias.*

**Phil Moylan** and his "Elusive Butterflies" appeared in *NJO's* M/J 1989 issue. His avian photography has been featured on Audubon calendars, in *Audubon* magazine and in *Ranger Rick*, a National Wildlife Federation children's publication. The orchids were all photographed in natural light, using macro-lenses.

# Coastal Zone Management



Greg Johnson

By Will Berson  
and John Foley

We are a coastal nation. One in four Americans lives within 100 miles of a barrier island, and the population density in America's coastal counties is more than four times the national average. One-sixth of the nation's population lives within 300 miles of Atlantic City.

New Jerseyans are decidedly partial toward their 127 miles of Atlantic coastline and 1,792 miles of tidal shoreline. The United States has more than 95,000 miles of coastlines, including ocean, lake and river frontage and estuary systems.

The influence and importance of coastal resources on commerce, recreation and lifestyle continue to grow nationwide. Moreover, incidents over the past several summers have focused a new national concern for the protection of our coastal environment and interest in an expanded federal role in coastal management.

The principal federal law addressing coastal resource management is the Coastal Zone Management Act (CZMA). The purpose



Greg Johnson

of the CZMA, enacted in 1972 and reauthorized at four-year intervals, is to preserve, protect, develop and, where possible, restore the resources of the coast. Through a state-federal partnership, state-authored coastal management programs are reviewed by the federal government.

Approved state programs qualify for federal funds for urban waterfront and harbor development, habitat and resource protection, enhancement of public access, and development of planning and regulatory programs. In addition, state coastal programs review federally funded projects to ensure they are consistent with the state's coastal management program.

Concern for the preservation and wise development of the New Jersey coast has paralleled federal action. The formation of the Department of Environmental Protection (DEP), the creation of its Division of Marine Services, and enactment of New Jersey's Coastal Wetlands Act in 1970 marked the beginning of the state's coastal management

*(left) A federally funded study enabled the City of Camden to plan for further revitalization near its Ulysses S. Wiggins Waterfront Park.*

*Dune stabilization projects have included the erection of snow fences to lessen erosion.*

program.

Enacted in 1972, the Coastal Area Facility Review Act (CAFRA) requires state review and approval of energy-generating facilities, certain industrial and commercial facilities, and housing developments involving 25 or more units within a delineated CAFRA area. The CAFRA zone varies from 100 feet to 24 miles inland along the ocean and stretches along our Delaware shore from Cape May to Trenton. It covers approximately 17 percent of the state's land mass.

Former Governor Thomas H. Kean, a sponsor of the legislation creating the DEP and CAFRA while a state assemblyman, urged for the creation of a Coastal Commission which would assume the role of coastal management from the DEP Division of Coastal Resources, the successor to the reorganized Division of Marine Services in 1979.

Based on these state laws, New Jersey was among the first states to receive federal acceptance of its coastal management program in September 1980. Presently, 29 of the 35 eligible coastal states and territories have federally approved programs. Many of these states have looked to New Jersey in the formulation of their own laws for coastal management.

The CZMA provided the broad framework for states such as New Jersey to address coastal management and resource protection. It has permitted individual approaches by states to best fit their coastal areas and state priorities. Nevertheless, the growing use of America's shorelines and the general concern over the inevitable impact of increased use will be important considerations when Congress debates the reauthorization of the CZMA, due to expire in September 1990.

As a result of its coastal initiatives, New Jersey has received tangible federal benefits from federal grants to implement its coastal management program. These funds have been used for research and planning projects related to coastal management, acquiring sensitive coastal tracts and offsetting administrative expenses. Perhaps most importantly, more than \$1.2 million has been passed on in over 90 grants to coastal municipalities for local coastal planning and improvement in public access.

These projects have included the construction of waterfront parks, revitalization of underutilized waterfronts, creation of dune systems on barrier beaches to slow erosion, and planning initiatives to create open-space "greenways" and "blueways." Some of these projects are as follows:



Richard V. Atkinson

## Hudson River Walkway

The New Jersey Hudson River waterfront area from Fort Lee to Bayonne represents a unique urban environment. Formerly an industrial and transportation center, the renaissance of this region from a neglected and vacated manufacturing and transportation center to mixed and residential use offers residents their first opportunity to use the waterfront area for recreation.

The Hudson River Walkway was first proposed by the Regional Planning Association in its 1966 Lower Hudson Plan. This was followed by the 1982 "Hudson River Waterfront Walkway; Existing Conditions and Preliminary Walkway Designation," a federally funded plan commissioned by the Division of Coastal Resources. The study resulted in the "1984 Hudson Waterfront Walkway Plan and Design Guidelines," also federally funded.

*Planning for and providing greater public access to beach areas has resulted from the federal-state partnership.*

New Jersey State Library

Executive assistant to the Division of Coastal Resources director, **Will Berson** is a graduate of the Eagleton Institute of Politics and a former Governor's Fellow. **John Foley** has held several positions in his 13 years of state service and is presently the division's grants administrator. This is the first *NJO* appearance for both.

The result of these initiatives has been the incorporation of walkway design guidelines into all projects proposed along the Hudson waterfront. Ultimately, this plan will result in a promenade linking riverfront municipalities at their waterlines, offering residents and visitors a spectacular harbor view and access to riverfront recreation.

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## Monmouth County Bayshore Access Plan

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Using a \$20,000 planning grant, the Monmouth County Planning Board studied opportunities for public access and land acquisition problems posed by the development and availability of boat launching facilities. The study recommended protecting the Raritan Bay shoreline, providing access opportunities through a bicycle path and creating a waterfront park. In conjunction with the bayshore municipalities, the county is beginning to implement the recommendations through its bayshore access coordinator.

Greg Johnson

*Dune walk-overs provide better access for all beachgoers while protecting the dunes and native vegetation.*



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## Island Beach State Park

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A \$50,000 public-access implementation grant allowed a dune "walk-over" to be constructed at Island Beach State Park. It not only protects the dune system from beachgoers but also allows handicapped visitors to enjoy a day at the beach.

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## Tuckerton Borough

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The revitalization of the Tuckerton Creek waterfront, the heart of the borough's business district, was planned using \$20,000 in federal funds. The plan called for the designation of a landmark district and has resulted in the marketing of low-interest loans for businesses to locate along the waterfront.

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## Long Beach Township

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The design for Long Beach Township's Bayview Park was funded by a \$10,000 federal grant. As Long Beach Island's first Barnegat Bay park, the area features a band shell and promenade and will provide recreational opportunities that include boardsailing, swimming and basketball.

In the Loveladies section of Long Beach, \$15,000 in federal funds assisted in the construction of an ocean beach access area, including expanded parking and rest rooms. This area is the only public access point in this portion of the township.

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## Little Egg Harbor Township

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A \$20,000 planning grant enabled Atlantic County to conduct an inventory of the River Bend area and assess its suitability for further development as a county park. Bordering on the Great Egg Harbor River, this tract represents a unique opportunity to provide access to the kind of near-shore areas which are often developed. When completed, River Bend Park will be the centerpiece of the Atlantic County Park System.

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## Middle Township

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Using a \$7,000 grant, the township was able to complete its plan for Shellbay Landing Park. It will offer residents and visitors access to Jenkins Sound, which lies between

the mainland and Stone Harbor, and includes a picnic area, gazebo and rest rooms. An additional \$50,000 in federal money was used to carry out the improvements.

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## Bridgeton

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The City of Bridgeton used \$15,000 in federal funds to produce a comprehensive plan for the Cohansey River waterfront. Completion of this plan capped a four-year effort, allowing the city to incorporate access to the Cohansey as a central theme in the revitalization of its business district.

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## Borough of Brooklawn

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An \$8,000 grant provided the seed for a waterfront recreation plan for this Camden County borough. By analyzing the local recreation needs, the physical suitability of the proposed site to meet those needs, and the opportunities for public access, the Borough of Brooklawn has provided a framework by which private developers can work in cooperation with the borough and assist in the implementation of the plan.

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## City of Camden

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Federal funds provided the City of Camden with \$10,000 to conduct a marina feasibility study for the site of the New Jersey State Aquarium. The city designated the Coopers Ferry Development Association as the consultant for the study. When completed, the study will provide Camden with additional options for the revitalization of its Delaware River waterfront.

Planning and construction grants help coastal communities take advantage of their location. In many communities, the existence of a preservation or redevelopment plan has provided the catalyst for cooperative ventures between private developers and municipalities or other levels of government. This funding provides each community with a greater incentive for planning and preservation of irreplaceable waterfront sites.

As coastal areas become more densely populated, public open space — particularly open waterfront areas and public access to them — will become more closely linked with quality of life issues such as recreation and water quality. The need for additional federal funding for these initiatives continues to

grow. Annual federal grants to states under CZMA declined by \$15 million between 1980-1988. Under the shadow of the federal deficit, it is unclear whether Congress will be able to justify additional expenditures on coastal-zone management.

If this downward trend in federal funding continues through the 1990 reauthorization of the Coastal Zone Management Act, even New Jersey — which has shown an awareness and willingness to pay the price for environmental protection — will be hard pressed to continue this broad-based support for planning and implementation. Opportunities will be lost. In the most densely populated state with an increasingly developed coastline, we cannot afford to lose the chance to plan and preserve a better future.

*The Cohansey River (background) flows past a revitalized Bridgeton waterfront.*



Greg Johnson  
January/February 1990

# New Jersey's Estuaries:

***“Estuaries and near coastal waters are among the richest, most productive, and most intensively used habitats on earth, accommodating fishing, commercial shipping, tourism, recreation, boat traffic, flood control, waste disposal, industry, waterfront development, wildlife, and people — all at the same time.”***

Tudor Davis, Director  
Office of Marine and Estuarine Protection  
U.S. Environmental Protection Agency



# Threatened Resources

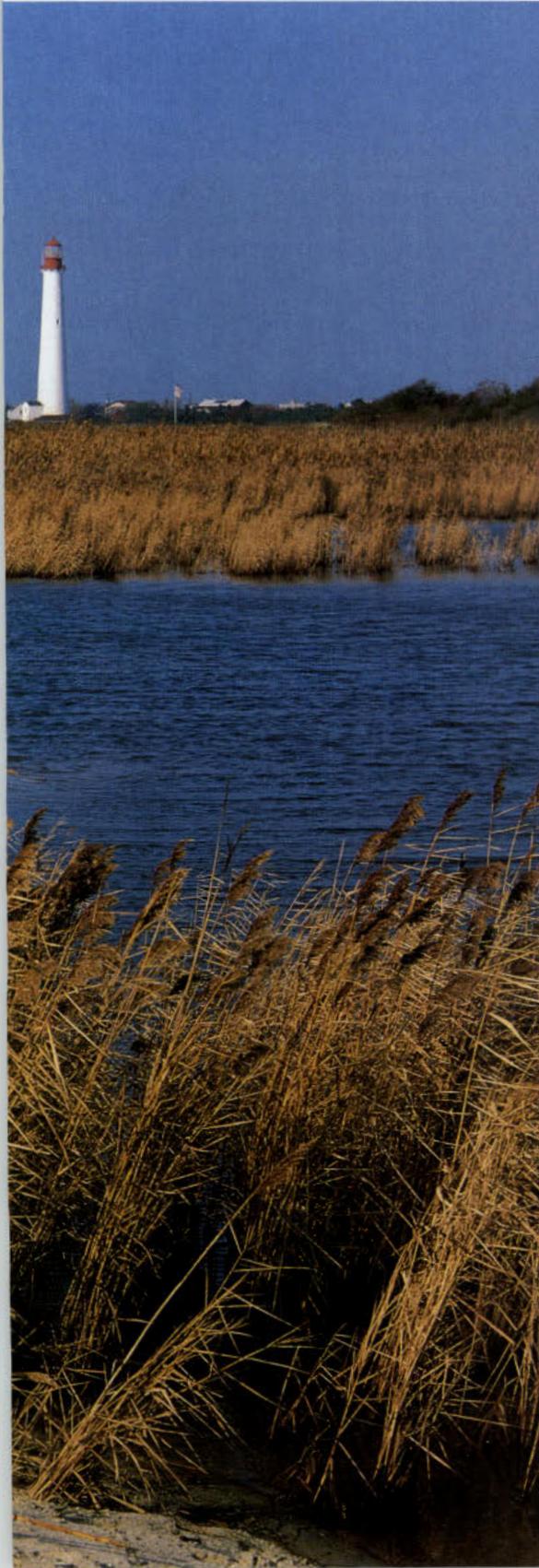
Richard V. Atkinson

By Mary Downes Gastrich

New Jersey is uniquely situated between two significant estuaries: the New York-New Jersey Harbor Estuary, known also as the Hudson-Raritan Estuary, on the east and the Delaware Estuary on the west. An estuary is a body of water that has a natural connection to the open sea and within which seawater, or saltwater, is mixed with fresh water from land drainage. This tidal mixing zone is a rich wildlife habitat, an important cultural and recreational resource, and an important commercial link between the land and the sea.

On the New Jersey side, the Harbor Estuary is a dynamic environment that includes University of Delaware Sea Grant College Program

*(facing page) Along the estuary, seasonal coastal towns have developed into year-round communities.*



the New Jersey Palisades, the Hackensack Meadowlands, Liberty State Park, the industry of Bayonne, petrochemical facilities along the Arthur Kill and Kill Van Kull, and the vast recreational activities of the Raritan Bay and Gateway National Recreation Area at Sandy Hook. Situated in one of the most densely populated regions of the United States, the harbor is the nation's leading seaport.

On the west, the Delaware Estuary begins at the head of tide in Trenton and extends downriver through a series of densely populated, older industrial cities such as Burlington, Camden, Gloucester City and Philadelphia. In Gloucester, Salem and Cape May counties, the estuary is characterized by

*Tidal wetlands improve water quality and provide habitat for fish and wildlife.*

*First-time contributor **Mary Downes Gastrich** earned a Ph. D. in ecology and a doctorate in science education. She serves as the coordinator of the National Estuary Program. Before joining the DEP three years ago, Dr. Gastrich taught at Ramapo College.*

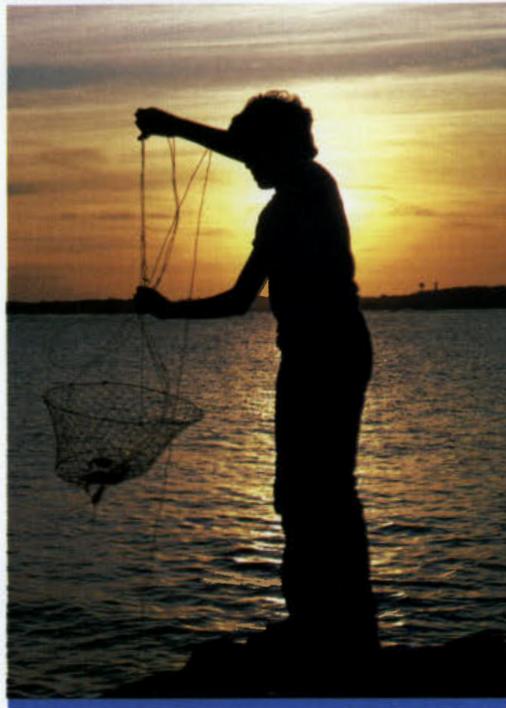


The New York-New Jersey Harbor  
Estuary Program

Richard V. Atkinson



Richard V. Atkinson



*(top) Commercial and recreational fisheries are major industries dependent on a healthy estuary.*

*Crabbing is a popular pastime in both estuaries.*

wetlands and numerous small tributaries that flow largely through agricultural lands.

The Delaware Estuary is inhabited by the heron, the rare peregrine falcon and other species, such as the hardshell clam, blue crab, lobster, bluefish, flounder and shad, known for their commercial and recreational value. The estuary is a source for public water supplies, and this 131-mile long estuarine treasure is the second most important commercial stretch among American rivers.

Both the Harbor and Delaware estuaries support a rich variety of bird and fish life. Over 125 species of resident and migratory birds are found in the Harbor and over 130 species of fish in the Delaware. The lower Delaware Bay, its wetlands and the numerous small tributaries form the second largest migratory staging area for shore birds in North America. Recently, endangered species have been returning to nest in the Delaware Estuary.

Unfortunately, both estuaries continue to be threatened by pollution, overuse and development. Economic growth and increasing population, strong threats to water quality on both sides of the state, strain both fragile aquatic ecosystems. In 1988, former New Jersey Governor Thomas H. Kean, together with the governors from Delaware and Pennsylvania, nominated both estuaries for inclusion in the National Estuary Program to ensure the protection of their water quality and enhance these precious resources.

The National Estuary Program, established by the federal Water Quality Act of 1987, identifies our nation's most valuable estuaries. Administered by the U.S. Environmental Protection Agency (EPA), it coordinates regional programs responsible for maintaining the estuaries' ecological integrity through a long-term planning and management process. New Jersey's two estuaries are among 12 nationally given "priority consideration" by the EPA.

Problems in these valuable and fragile estuaries are too big and too complex for one agency to address alone. Rather than responding to myriad local problems separately, the process will manage the estuary as an ecosystem. The National Estuary Program emphasizes a partnership between all agencies of government, citizens and users. It provides an opportunity to coordinate existing programs and efforts, in addition to coordinating estuarine research. In the Harbor, there are coordinating and integrating efforts underway with the New York Bight Restoration Plan, and the Delaware program will build on the research efforts begun by



Dick Meseroll/Shore Shot

Rutgers University, The Academy of Natural Sciences in Philadelphia and The University of Delaware.

The National Estuary Program planning process is modelled after the Chesapeake Bay Program and the Great Lakes Program, both characterized by a phased, management process and a collaborative problem-solving approach. The first phase begins with the establishment of committees to study the various complex issues confronting the two estuaries. The committees will develop recommendations for priority actions and schedules for pollution control in the estuary areas.

The second phase will develop a thorough scientific characterization of the estuary's pollution problems, its sources and probable causes. In the third phase, a Comprehensive Conservation and Management Plan will be developed to establish environmental quality goals, summarize characterization findings, and develop action and implementation plans. Finally, the fourth phase is the implementation process. Each state is responsible for implementing the plan.

This process is spearheaded by the crea-

tion of a management conference for each estuary. This type of management structure creates a comprehensive approach to developing management, scientific and public education programs through a partnership between representatives of federal, interstate, state and local agencies and affected users, including industry, institutions, the scientific community and public interest groups. The goal of the five-year management plan is to improve the environmental conditions of both estuaries.

Ultimately, the management conference will conduct activities to establish working relationships between federal, state and local governments; share scientific and management experience and expertise with participants and the public; increase public awareness of regional pollution problems and ensure public involvement in decision making; promote regional planning to control pollution and manage wildlife resources; and oversee development and implementation of pollution abatement and control programs.

The nucleus of the management structure is the Management Committee, the decision-making body reviewing all plans and proce-



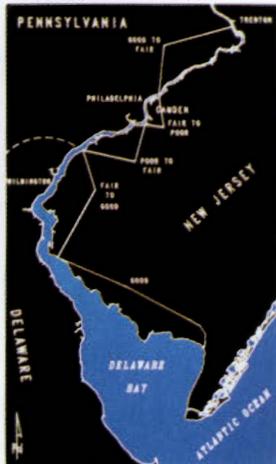
University of Delaware Sea Grant College Program

*Windsurfers in the waters off Liberty State Park take advantage of the harbor's recreational opportunities.*

*(bottom) Major portions of the ruddy turnstone's global population depend on the Delaware Estuary for food each spring.*

Water quality ranges from poor to fair in the densely populated, industrial reaches of the Delaware.

(bottom) One goal of the five-year management conference is to identify, reduce and control the point and nonpoint sources of pollution in the estuary.



Delaware River Basin Commission

dures and directing the day-to-day activities of the two estuary programs. The Management Committee is broken down into several advisory committees.

The Local Government Committee is comprised of representatives from local, county and state governments. It was established to ensure that local government and pertinent government agencies are part of the conference's decision-making process. It will advise on such matters as sewage treatment, zoning ordinances, local planning needs and land-use management.

The Scientific and Technical Advisory Committee advises on the scientific characterization of the estuaries. It recommends specific scientific tasks necessary to meet program objectives and advises on scientific information for public education. In the Harbor program, modules identified for scientific characterization include pathogen contamination, floatables, toxic contamination, nutrient and organic enrichment, and wasteload allocations. In the Delaware workplan, the scientific characterization will

identify historical data, status and trends for the four priority problems of water quality, water supply, habitat loss and living resources.

The Citizens Advisory Committee ensures public involvement, advocacy and public education about the program. It works on membership for the committee, including representatives from profit and non-profit groups in the estuarine states, and in developing a public participation program.

In both regions, there are governmental agencies concerned with protecting and improving the areas. In addition to the DEP and EPA, the Delaware River Basin Commission, the Port Authority of New York and New Jersey, the Interstate Sanitation Commission, and the Hackensack Meadowlands Development Commission play prominent roles.

In the Harbor program, Mike O'Lahan, a former staff member of the Rutgers University Extension Service, is the public participation coordinator, and Bill Kruse is the New Jersey co-chair of the Local Government Committee. For the Delaware, leadership roles in the public advisory committees by prominent New Jerseyans include Cynthia Poten, the Delaware River Keeper, as chair of the Citizens Advisory Committee; Hal Bickings of the New Jersey Fisheries Development Commission, as chair of the Local Government Committee; and Dr. John Kraeuter of Rutgers University, as co-chair of the Scientific and Technical Advisory Committee, along with Dr. Jonathan Sharp of the University of Delaware.

Public participation is critical to the success of these programs. Workshops and public meetings on the Delaware Estuary have already been held to find out what the citizens of New Jersey think should be done to improve the condition of the estuary. Workshops for users of the estuaries and to define the scientific and socio-economic research needs, planned for this spring, will be followed by additional public meetings. For the Harbor Estuary, a series of public outreach meetings will be held in both states. Sponsoring organizations are needed for the four regional meetings to be held in New Jersey.

Public education is critical to the success of these programs. Your participation and support are needed to ensure the future of the estuaries. To join this important effort or for additional information, call 609/633-7020 or write: Dr. Mary Downes Gastrich, National Estuary Program Coordinator, DEP Division of Water Resources, Trenton, NJ 08625-0029. 



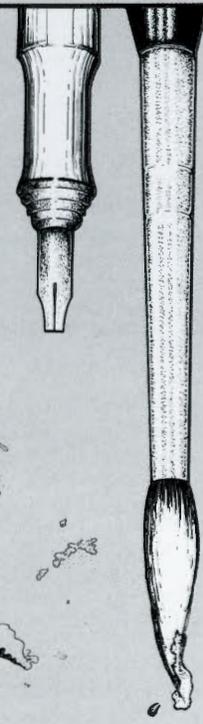
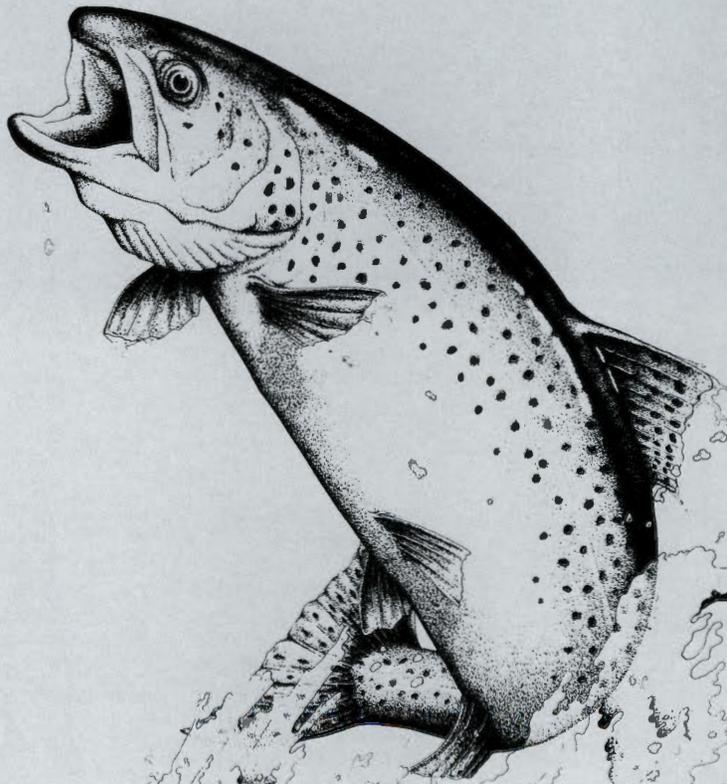
Warren Garretson



Michael Budden ©

# New Jersey Wildlife

A • R • T • I • S • T • S



Wendy Wolff



Lorraine Dey

"*Fishing the Mist.*" Roebeling artist **Michael Budden** has earned over three dozen awards during the past seven years. He was selected by Ducks Unlimited, Delaware Chapter, as the 1987 "Artist of the Year." Mike's artwork appeared on a cover of the last issue of NJO.

Rutgers graduate **Wendy Wolff** developed her strong interest in wildlife from raising and training Arabian horses. Her pen and ink stipple drawings have appeared in state publications, and the Frelinghuysen Township native is currently illustrating the local environmental commission's Natural Resource Inventory.

"*Storm Watch.*" Design artist for the 1988 "Garden State Wildfowl Carving and Art Show" poster, **Lorraine Dey** was invited to exhibit at the Brandywine Art Expo and the 1989 New Jersey Audubon Art Show. She has also exhibited at the Wings 'n Water Festival and the Waterfowl Festival in Easton, Maryland. The Toms River artist attended Robert Bateman's 1987 Master Class and was selected by the Ruffed Grouse Society, New Jersey Chapter, as the 1989 "Artist of the Year."

"*Playtime.*" A self-taught artist, Milford's **Irene Bowers** carefully researches her subjects to ensure realism down to the finest detail of the animal's position, proportion and background. Her pencil illustrations have appeared in several national and state publications, but oil painting is her second love. Named Artist of the Year twice by the Hunterdon County Chapter of Ducks Unlimited, she is currently finishing the New Jersey State Mammal poster.





Lorraine Dey 89©



Irene Bowers

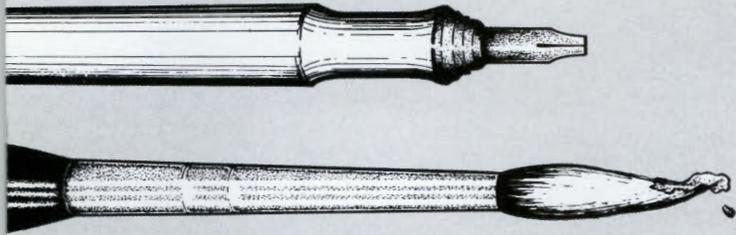


Degreed in biology and trained in the arts, **Doreen Curtin** of Clinton produces wildlife art with the purpose of educating the public about conservation. Her artwork and illustrations have appeared in publications of the Smithsonian, National Audubon Society, World Wildlife Fund, National Wildlife Federation, our own Endangered and Nongame Species Program, museums and zoos throughout the country, and in several science magazines.

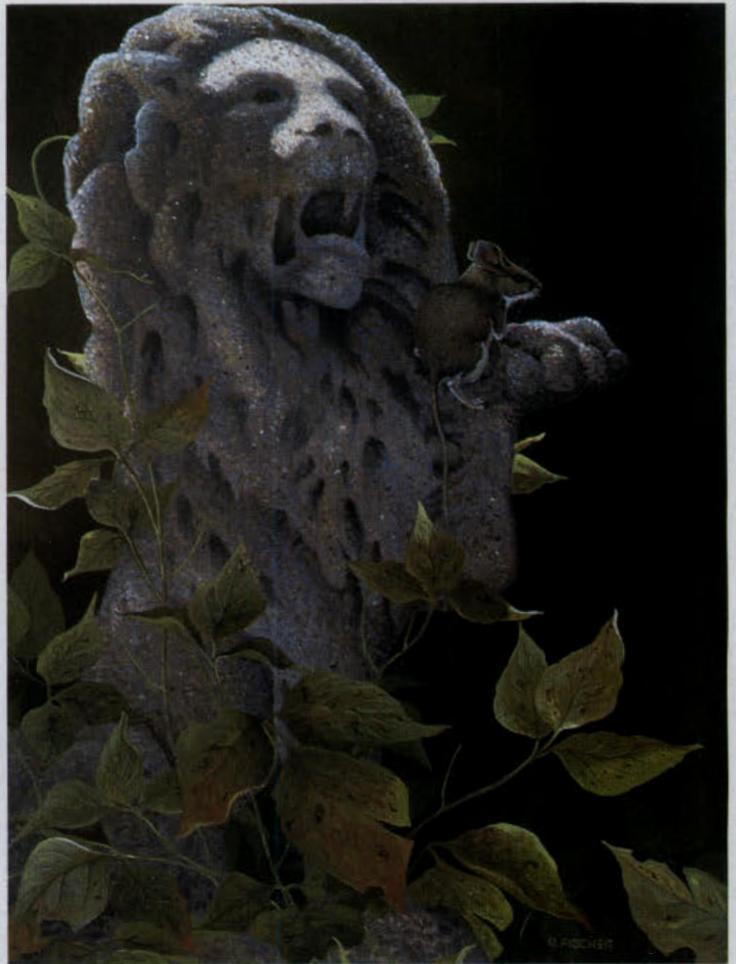
New Jersey State Library



Doreen Curtin ©  
January/February 1990



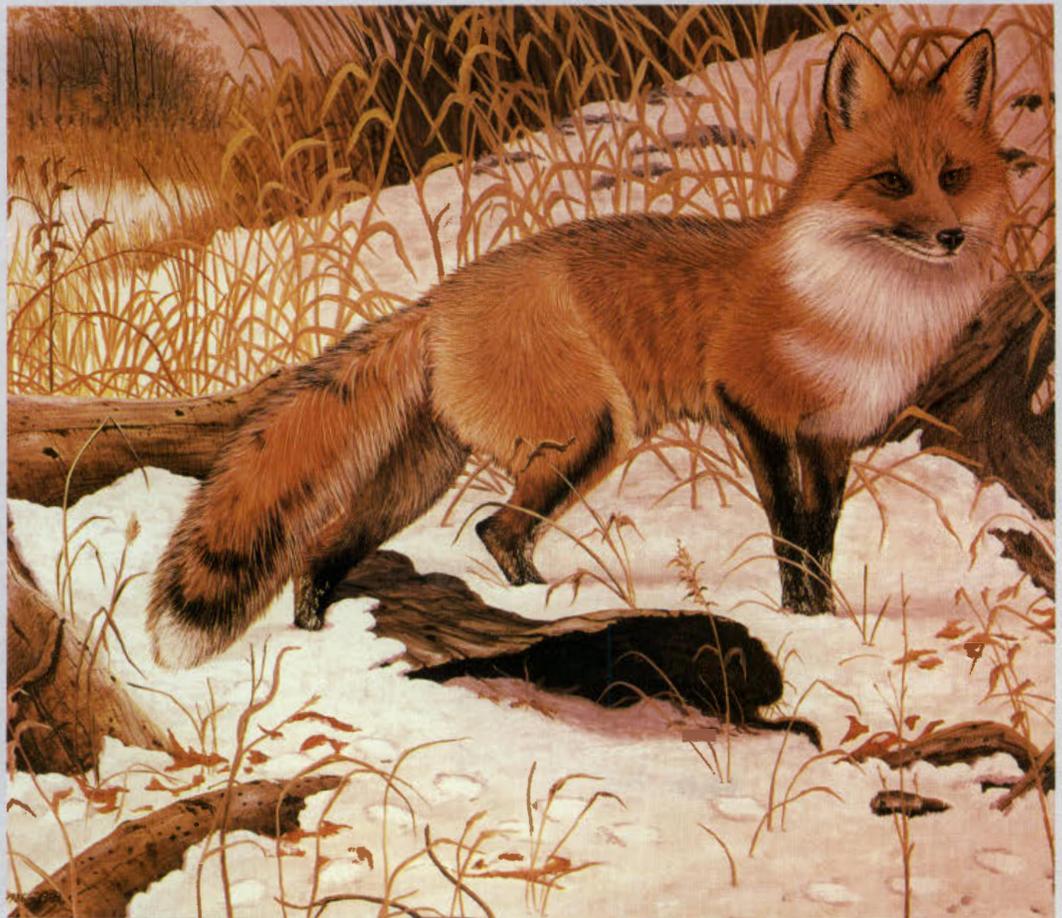
Frank Hulick



Robert D. Fischer

A meticulous renderer, **Frank Hulick** often works with magnifiers to recreate effectively each hair, feather and minute detail. His work has been displayed in the Governor's Office, and he has garnered a 15-year collection of ribbons, prizes and awards from area shows. The Oceanport resident is a retired U.S. government artist/illustrator.

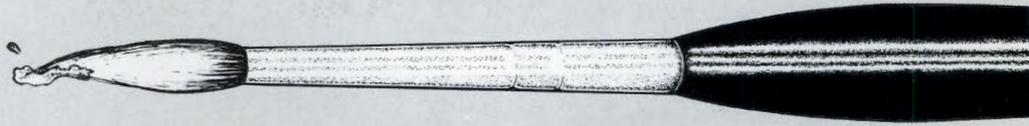
Trentonian **Jim Hitesman** is often praised not only for his realistic portrayal of his animal subjects but also for his extraordinary sense of place and mood. A graduate of two art institutions, Jim also studied animal anatomy and physiology. He was invited to exhibit in the 1986 Easton (Maryland) Waterfowl Festival, has exhibited at the National Wildlife Federation convention, and was commissioned by Boehm Porcelain and the Lenox company to illustrate limited edition collectors plates.



Jim Hitesman ©

**Robert D. Fischer** of Hazlet has exhibited at the Somerset Environmental Center and the Northeast Wildlife Art Show in Albany. Bob also participated in the internationally juried 1988 "Birds-in-Art" Show. He has garnered several "Best-in-Show" awards over 10 years of

wildlife painting and was one of 86 artists nationwide selected to study with Robert Bateman in 1986.



Douglas Allen



A painter of North American big game animals, **Douglas Allen** has illustrated more than 35 books and appeared in *Time*, *Sports Afield*, *Audubon* and *National Wildlife* magazines. The 1964 stamp commemorating the 300th anniversary of New Jersey's founding was designed by the Neshanic Station artist, as were several for the World Wildlife Stamp programs. He also has authored several catalogues and a biography on artist N.C. Wyeth.



**Rik Viola** of Haddonfield is a former illustrator for *The Evening Bulletin* of Philadelphia. Wildlife art is a relative recent addition for the commercial artist, who also does a regular comic strip for a national firm and is a professional actor and model.

Rik Viola

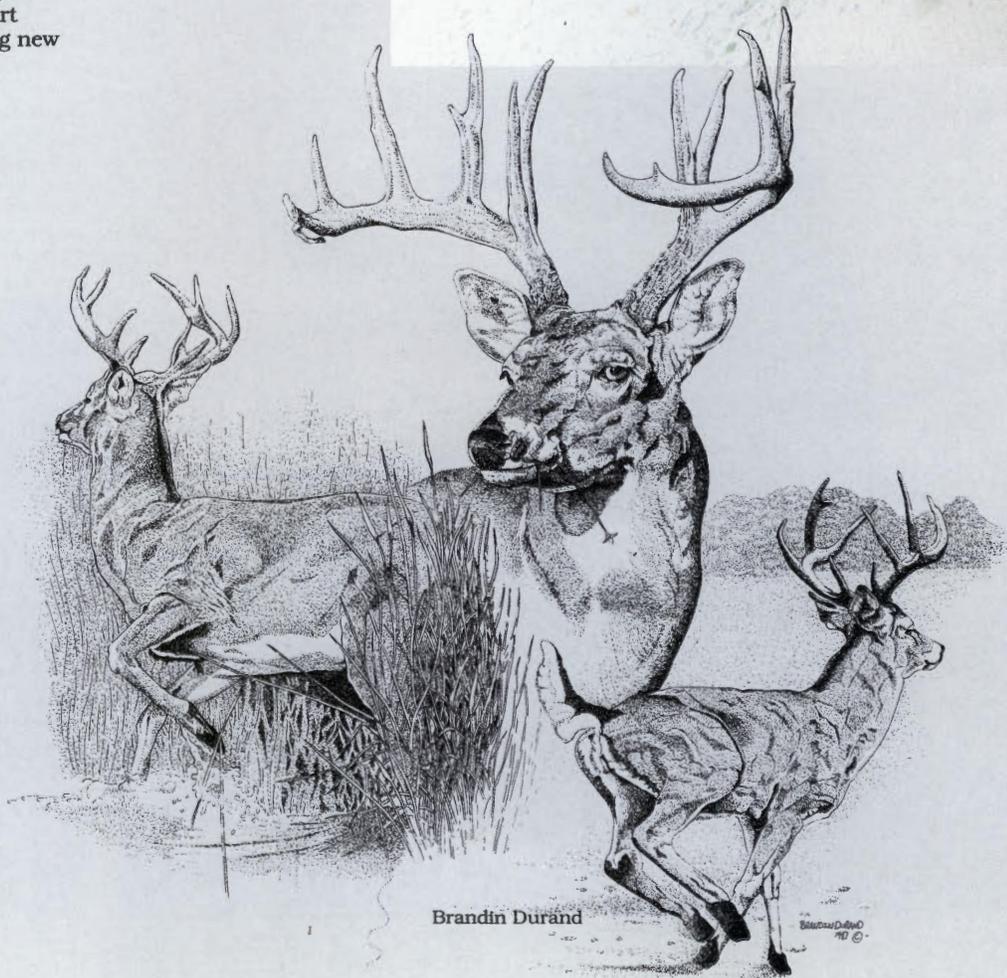


Beatrice Bork



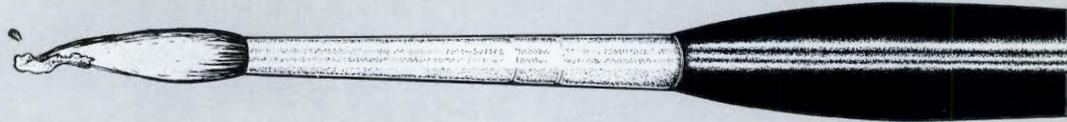
**Beatrice Bork** of Whitehouse Station feels that wildlife art should be viewed as fine art and, therefore, should not only be judged by its accuracy but also for its composition, creativity and expressive qualities. Trained in advertising design and illustration, she uses gouache and acrylic to combine abstraction with reality, bringing new life and style to wildlife art.

**Brandin Durand** of Mount Holly is an illustrator and graphic designer for several Fortune 500 companies. For 10 years his pen and ink stipple illustrations were done for personal enjoyment and fun, but Brandin's wildlife art career is now taking new focus.



Brandin Durand

Brandin Durand  
710 ©



Al Barker



"A Winter Scene." A former U.S. forester and school teacher, **Al Barker** of Bordentown has done wildlife art for 20 years, full-time for the last eight. The self-taught artist and outdoorsman has a "really great job," making his living by doing what pleases him: capturing the color and seasonal changes of the small towns, tidal marshes and wildlife along the eastern coastal scene.

Commercial painter **Sam Donovan** began drawing wildlife three years ago. The self-taught artist uses the animals on his Woodstown farm for subjects and feels very close to the wildlife he captures in acrylic and watercolor.



Sam Donovan

# Building Backyard Habitat for Wildlife

By Mike Valent

A recent study conducted by the U.S. Fish and Wildlife Service revealed that over 3.5 million New Jersey residents enjoy some form of wildlife-related activity each year. These activities range from casual observation to feeding and photographing wildlife.

For most people, this opportunity is dependent upon the presence of suitable wildlife habitat. For those of us living in urban and suburban areas, it usually means traveling to the nearest woodlot, park or wildlife management area. By providing the necessary ingredients for good wildlife habitat in your own backyard, you can increase your wildlife-viewing opportunities at home and bring wildlife to you.

The concept of attracting wildlife to our environs is not a new one. For years people have been putting up and maintaining feeders, birdhouses, birdbaths and nest boxes in an attempt to encourage wildlife to visit and live around their homes.

With a little research, planning and foresight, you can stack the odds in your favor and increase both the numbers and variety of wildlife around your home. Fortunately, there is a wealth of literature available on attracting wildlife, and you don't need a farm, large estate, or even a big yard in the country to be successful.

What you do need, however, is a carefully considered plan and set of objectives for your particular circumstances. This article is a starting point for anyone who wants to become involved in providing habitat for local birds, mammals, reptiles, amphibians and invertebrates. By learning and understanding a few basic principles of wildlife management, you can successfully develop and carry out a plan to meet your objectives.

## Benefits To You and Wildlife

The most obvious benefit of improving wildlife habitat around your home is the enjoyment that you and your family will get from watching animals in their natural setting. In fact, for many people this will be the primary reason for undertaking such a project. However, there are many other benefits to be gained.

Consider the colony of purple martins and their daily feeding forays over your backyard. These and other insectivorous birds and mammals help to keep insect populations in check. The pair of kestrels that selected your well-placed nest box help to control the numbers of small rodents around the home.

Your children or grandchildren can take an active part in developing your backyard

habitat area. Your backyard will become a living classroom where they will gain an appreciation for nature while learning some basic principles of ecology. They will learn how all parts of an ecosystem — living and non-living — are interrelated and how changing one variable can affect the entire system.

By providing additional food sources through plantings and establishing food plots, your vegetable garden may become less attractive to the family of cottontails that has taken up residence in the yard. As an added bonus, property values have been shown to increase between three and 10 percent as a result of planting trees, shrubs and flowers.

In New Jersey, probably more than any other state, it is apparent that we are losing wildlife habitat at a very rapid rate to development and urban sprawl. As a result, a large percentage of potential wildlife habitat is found in urban and suburban areas. By properly managing these areas we can collectively have a significant influence on the future of wildlife in the Garden State.

## Principles of Wildlife Management

The science of wildlife management is built upon the premise that the health of wildlife populations is directly linked to four basic elements: food, water, cover and space. Together these elements make up an animal's habitat. By manipulating an area to contain a variety of these elements, you can increase the quality of the habitat. The result will be an increase in both the variety and number of wildlife that are likely to use the habitat.

The variety of food, water and cover is just as important as the proper arrangement to maximize the attractiveness of the habitat to the greatest number of species. Maximizing "edge" habitat will usually increase the variety of wildlife species that you can attract to an area.

"Edge" is simply the area where different successional stages, plant communities or vegetative conditions come together. A "hard edge" is where two distinct communities come together, such as the border of a woodlot and a mowed field. A "soft edge" is created when there is a gradual blending of one community with another, such as the progressive transition from a forest to a shrub zone to an herbaceous area. Soft edges generally provide habitat for a broader range of species than do hard edges because you find an overlap of animals associated with each vegetative type as well as those that are unique to the transition zone.

As you begin planning your backyard

*(facing page, top) Eastern goldfinches are attracted by the supplemental feeding of niger seed before backyard plantings can provide any appreciable amount of natural foods.*

*(fp, bottom) Backyard pools are easy to construct and provide water essential for wildlife and habitat for aquatic species.*



habitat, don't lose sight of your objectives. By selecting the appropriate habitat-improvement techniques, you can attract the species you want while lessening the chances of attracting unwanted or nuisance animals.

### Start With a Plan

Your first step in creating a backyard habitat is to develop a plan and set of objectives. No matter how simple, you should make a map of your property and identify existing plants and structures and include what you would like to add or change in the future. Chances are that you already have the beginnings of your wildlife habitat, and even if you have only a lawn to start with, you can get some good results in a relatively short period of time if you plan properly. An important factor to keep in mind when developing your plan is that habitat is not static. It is constantly changing and you must be aware of how it will change in order to plan effectively for the long-term.

It's also a good idea to talk to your neighbors when planning your backyard wildlife project. Let them know what you intend to do and see how they react to the idea. You may be surprised to find that they are willing to improve the habitat in their own yard, thereby creating an even larger island of habitat.

### Plantings For Wildlife

The key elements to any backyard wildlife habitat are the plants that you select to create a diverse supply of food, cover and nesting or reproductive areas. Selecting the right plants supplies the needed elements for wildlife on a year-round basis and, at the same time, meets your objectives for attractive landscaping.

How you arrange your plantings is extremely important when designing a backyard habitat. It is generally advisable to plant the large trees toward the rear and sides of your yard so as not to obscure your view. The smaller trees and shrubs should be interspersed among open areas in a way that they create a variety of heights for both visual appeal and habitat diversity.

Try to select a variety of trees, shrubs and flowers that overlap in fruiting and flowering time and be sure to include some that hold their fruits well into the fall and winter. This will assure a supply of natural foods throughout the year.

When selecting your plantings, be sure to consider the site factors and conditions present in your yard. Select plants that will

grow well with your soil fertility and moisture conditions, slope, and amount of sunlight. If you are starting from a bare lawn, it will take some time before the plantings become established and begin to provide adequate food and cover for wildlife. The shrubs and herbaceous plants will provide some immediate habitat, while the larger trees will need several years before they become beneficial to wildlife.

Finally, you will need to fight the urge within all of us (and, often, pressure from neighbors) to maintain a well-manicured yard. By adopting a maintenance program that reduces pruning, thinning and trimming, your yard will become much more attractive to wildlife. If possible, leave some areas completely undisturbed so that native vegetation becomes established. Avoid using pesticides and herbicides in your wildlife area and use fertilizers only sparingly when required.

The accompanying table contains a selection of plants for wildlife-habitat enhancement that are recommended for planting in the northeast. When selecting plants, be certain to choose the exact species recommended as some species within the same genus may not be as valuable to wildlife. Most plants can be purchased through local garden centers, nurseries, soil conservation districts, or from the DEP Bureau of Forest Management.

### Supplemental Feeding

Providing supplemental food for wildlife is probably the easiest and most obvious way to attract wildlife to our environs. It can be especially important during the early stages of your wildlife habitat project, before your plantings begin to produce any appreciable amount of natural foods. A few well-placed feeders stocked with a selection of preferred seeds will attract a variety of birds.

A study of bird feeding preferences conducted by the Urban Wildlife Research Program of the U.S. Fish and Wildlife Service showed that you can obtain the best results by using black (oil) sunflower seed and white proso millet, offering them separately. As a general rule of thumb, ground-feeding birds such as sparrows and juncos prefer white proso millet from a slightly elevated platform feeder, while cardinals, grosbeaks, blue jays and chickadees, which use elevated tube feeders, favor black sunflower seeds. Special hanging thistle feeders stocked with niger seed will bring in goldfinches and pine siskins. Beef suet will attract woodpeckers, nut-

*Clusters of reddish fruit of the winterberry, a deciduous member of the holly family, provide food for many songbird species well into the winter months.*



hatches and other insectivorous birds.

During the summer months, special liquid-dispensing feeders filled with a solution of one part sugar and four parts water will attract hummingbirds. These feeders must be kept scrupulously clean to prevent the build-up of harmful fungus which can damage a hummingbird's bill.

Squirrels and chipmunks will feed on corn that is left on the cob, in addition to various nuts left in the shells. Whatever types of feeders you use, keep in mind that they should be kept clean and sheltered from rain and snow. Sweeping or tamping the snow beneath feeders allows birds to consume the spilled seeds.

Don't make the mistake of limiting your feeder observations to daylight hours only. Depending on where you live, you may have activity around your feeders at night. Flying squirrels and white-footed mice will feed on a variety of seeds. Try switching on the lights (red bulbs work best) after dusk and check your feeders periodically. You may be surprised at what you see.

### Water

Your backyard habitat won't be complete until you provide for the wildlife's critical water needs. All wildlife needs water to sur-

vive, yet this is commonly the most neglected habitat element when people plan for wildlife around their homes.

Providing water for wildlife can be as simple or as extravagant as you want it to be. Economically-minded individuals can simply maintain a standard bird bath or even an upside-down garbage can lid kept clean and filled with water. Those who prefer something a little more lavish can build a small pond or pool.

This is accomplished by digging a pool to any shape and depth you desire and lining it with two layers of heavy vinyl plastic. Be sure the material is chemically inert so it will not react with water or other materials to produce toxic by-products that could be harmful to wildlife. Your pool will need a small recirculating pump to oxygenate the water and prevent it from becoming stagnant. Ideally, the pool should be large enough to support aquatic and emergent vegetation.

Simply widening a small stream or spring seep running through your property can create a pool. Line the pool in order to maintain the desired water level, and allow vegetation to grow up to the edge of the pool to provide food and cover, making it even more attractive to wildlife. Once your pool is complete, it will become the focus of your backyard habitat and the center of much

## Recommended Plants for Wildlife Habitat Development in New Jersey

Plant Name	Flower Dates	Fruit Dates	Plant Name	Flower Dates	Fruit Dates
<b>Tall Trees</b>			<b>Shrubs</b>		
Red Oak ( <i>Quercus rubra</i> )	•••	Sep-Oct	Autumn Olive ( <i>Elaeagnus umbellata</i> )	May-Jul	Aug-Jan
White Oak ( <i>Quercus alba</i> )	•••	Sep-Nov	Silky Dogwood ( <i>Cornus amomum</i> )	May-Jul	Aug-Oct
Black Cherry ( <i>Prunus serotina</i> )	•••	Aug-Oct	Red-Osier Dogwood ( <i>Cornus stolonifera</i> )	May-Jun	Jul-Sep
Red Maple ( <i>Acer rubrum</i> )	Mar-May	May-Jul	Tatarian Honeysuckle ( <i>Lonicera tataric</i> )	May-Jun	Jun-Aug
American Beech ( <i>Fagus grandifolia</i> )	•••	Sep-Oct	Blackberry ( <i>Rubus sp.</i> )	May-Jul	Jul-Sep
Yellow Poplar ( <i>Liriodendron tulipifera</i> )	May-Jun	Oct-Feb	Blueberry ( <i>Vaccinium sp.</i> )	May-Jul	Jul-Sep
Eastern White Pine ( <i>Pinus strobus</i> )	•••	Aug-Nov			
Eastern Redcedar ( <i>Juniperus virginiana</i> )	•••	Sep-May			
<b>Small Trees</b>			<b>Vines</b>		
Flowering Dogwood ( <i>Cornus florida</i> )	May-Jun	Aug-Dec	Grape ( <i>Vitis sp.</i> )	May-Jun	Sep-Mar
Hackberry ( <i>Celtis occidentalis</i> )	Apr-May	Sep-Nov	Virginia Creeper ( <i>Parthenocissus quinquefolia</i> )	Jun-Aug	Sep-Jan
Serviceberry ( <i>Amelanchier arborea</i> )	May-Jun	Jun-Aug	Climbing Bittersweet ( <i>Celastrus scandens</i> )	May-Jun	Sep-Dec
Sumac ( <i>Rhus sp.</i> )	Apr-Jun	Sep-Feb	Greenbrier ( <i>Smilax sp.</i> )	Jun-Sep	Oct-Mar
Red Mulberry ( <i>Morus rubra</i> )	May-Jun	Jun-Jul			
White Mulberry ( <i>Morus alba</i> )	May-Jun	Jun-Jul			
Pin Cherry ( <i>Prunus pennsylvanica</i> )	May-Jul	Jul-Oct	<b>Herbaceous</b>		
American Holly ( <i>Ilex opaca</i> )	May-Jun	Aug-Jun	Foxtail ( <i>Setaria sp.</i> )	May-Jul	Aug-Dec
			Sedges ( <i>Carex sp.</i> )	Apr-Oct	Jun-Dec
			Panicgrass ( <i>Panicum sp.</i> )	May-Oct	Jul-Nov

Senior nongame zoologist **Mike Valent** is editor of *Nongame News* and authors many of the program's publications. He coordinates the field research on interior-forest raptors and oversees the Wildlife Check-off Conservation Grants program.

activity. The pool might also create habitat for a whole host of aquatic organisms, including frogs, toads, salamanders, turtles, dragonflies and possibly fish.

### Homes For Wildlife

An essential element of good wildlife habitat is the availability of cover. Cover is used by all wildlife for nesting, hiding, resting, sleeping and feeding. If you have planned your habitat carefully and provided a good mix of grasses, shrubs, trees and flowers in the proper arrangement, you will have satisfied most of the cover requirements of wildlife. However, the most critical feature of cover — providing nesting sites — is typically in short supply in backyard habitats.

Nesting sites vary considerably among species, but those most frequently lacking are tree cavities. Most urban and suburban backyards lack natural tree cavities, seriously limiting the availability of nest sites for many species. In New Jersey, there are approximately 40 species of birds and mammals that need cavities for breeding. Many other species, including some reptiles and amphibians, use cavities for shelter.

You can supplement the lack of natural tree cavities in your habitat by providing man-made nest boxes. Suitable nest boxes

for a variety of birds are available at retail locations. For do-it-yourselfers, plans are available for most species that utilize cavities. Since nest boxes are intended to simulate natural cavities, it is important to provide boxes of the proper dimensions for the species you are targeting. Probably the most critical box dimension is the diameter of the entrance hole. This will determine which species use the box.

Your backyard habitat should contain a variety of nest boxes to provide nesting and roosting sites for many species. They should be constructed of durable, weather-proof materials for long life. They must also have a removable top or side for cleaning and inspection.

A properly designed rock or brush pile can enhance your backyard habitat by providing resting and escape cover for a variety of mammals, reptiles, amphibians and even some songbirds. The key to creating good brush shelters is to start with large materials. Logs, stumps, rocks or drain tiles covered with progressively smaller materials will ensure that "tunnels" are kept open, allowing access to the interior of the structure.

### Butterfly Gardening

Nearly 110 species of butterflies regularly occur throughout the Garden State. These range from the large, familiar monarchs, swallowtails and sulphurs to the lesser known coppers, hairstreaks, fritillaries, checkerspots and skippers.

You can invite butterflies to your backyard simply by providing a few properly located shrubs and flowers. Butterflies are present in New Jersey from April to October, and you can entice them into your surroundings by providing a perpetual bloom of flowers during this period.

According to the National Wildlife Federation, butterflies are drawn to:

- Nectar-bearing, compound flowers such as those in the daisy family (zinnias, marigolds and asters). Older varieties generally provide more nectar than the hybridized ones.
- Butterfly bushes (*Buddleia alternifolia* and *B. davidii*).
- Spring blooms such as lilacs, azaleas and golden alyssum.
- Late blooms such as goldenrods, michaelmas daisies, gaillardia and blazing stars (*Liatriis*).
- Many herbs such as hyssop, the sages and catnip.



Properly placed and maintained nest boxes provide habitat for cavity-nesting birds such as eastern bluebirds, chickadees, kestrels and tree swallows.

## New Jersey's Endangered and Nongame Wildlife Conservation Fund

- A wide variety of flower colors including orange, pink, lavender, purple, yellow and white.

When planning your butterfly garden consider the following:

- Flowers should be placed in a location where they will receive full sun during most of the day.
- For optimum butterfly attendance, you should provide a perpetual bloom from late March through early frosts.
- To satisfy the butterflies' entire life-cycle needs, you might try to provide for them in their caterpillar phase: red clover or alfalfa for sulphur butterflies; parsley, dill, loveage or fennel for the black swallowtail group; and the milkweeds for monarchs and queens. 



Tax time is your opportunity to show that you care about New Jersey's wildlife. Line 39B of the state income tax form makes it easy for you to invest in the future of New Jersey's wildlife. By checking off a contribution on Line 39B of the tax form, you will be helping the more than 400 species of non-hunted wildlife in the Garden State — species like the bald eagle, peregrine falcon, piping plover, eastern bluebird, pine barrens treefrog and bog turtle.

Your contributions provide more than 90 percent of the funding for New Jersey's Endangered and Nongame Wildlife Program. Without your help there would be no effective program to protect and manage endangered and nongame wildlife in New Jersey. Your investment today will help to conserve our wildlife heritage for future generations to enjoy.

The contributions are used for reintroduction and restoration programs for endangered and threatened species, for research to determine the population status and distribution of nongame animals and the causes for the decline of endangered and threatened species, for protection and management of habitats important to nongame wildlife, and for public information programs to promote an interest, appreciation and knowledge of our nongame wildlife.

### It's Easy For You To Help

Look for line 39B on your state income tax form and check off \$2, \$5, or \$10 or write in any amount you wish to donate. Your contribution to the Endangered and Nongame Wildlife Conservation Fund will reduce your refund or increase the amount of tax owed to the state. If you have your taxes prepared professionally, remind your accountant to check off your contribution. If you don't file a return, or simply prefer to, you can send a direct contribution to the Endangered and Nongame Wildlife Conservation Fund. All contributions are tax deductible on your federal return as allowed by law.

For additional information on how you can develop and manage your own backyard wildlife habitat, please write: Backyard Wildlife Habitat, Endangered and Nongame Species Program, DEP Division of Fish, Game and Wildlife, Trenton, NJ 08625-0400. 

*Conifers provide important winter cover and summer nesting sites for wildlife.*

# A Close-up View of Wildlife

By Eleanor Gilman



Alice Demarest

*(top) The raccoons feel as much at home on the deck as the Demarests do.*

*Alice Demarest fills a thistle feeder with niger seed, a goldfinch favorite.*



Eleanor Gilman

The natural world has always been an important part of Alice Demarest's life. When she and her husband built their home in Passaic County nine years ago, there was no question that they would share part of their one-acre property with wildlife.

"We wanted to leave as much woods as possible," says Mrs. Demarest, "and to have access to the animals without frightening them."

Their property has been designated Backyard Habitat 2540 by the National Wildlife Federation. From either of the two decks overlooking the densely foliated yard, the Demarests have an excellent vantage point from which to observe the activity below.

And what activity there is! A perky red fox stops for a drink of water as he dashes through, chipmunks peek out from their home in the wood pile, and squirrels jump gleefully from tree to tree. At twilight, the skunks and raccoons arrive for dinner. The opossum, who is shy, eats after the others.

The raccoons, the most gregarious of the group, climb onto the deck to frolic, sit in the comfortable chairs and generally make themselves at home. Mrs. Demarest always leaves a snack on the deck for them, and often they will eat from her hand. In June or July, they appear with their still unweaned, yet big, babies. The mother makes her distinctive "chrrr-chrrr" sound which the babies echo. "Then in November, when they're getting ready to hibernate," laughs Mrs. Demarest, "you should see them. They're huge with their accumulated fat and big winter coats."

Sometimes the raccoons become downright rambunctious and try to get Mrs. Demarest's attention by banging on the door with a rock. Occasionally at night, they throw everything off the deck. "They're very curious," she says. "They like to investigate."

A distressing instance of their curiosity occurred last spring when the resident box turtle dug a hole, laid her eggs and covered them. Mrs. Demarest eagerly anticipated the eggs' hatching, only to find the raccoons feasting on them the next day!

While the animals are going about their business, the birds in the yard are active too. Cardinals, catbirds, wrens, chickadees, nuthatches, downy woodpeckers, starlings, mockingbirds, finches and beautiful flickers, with their peculiar call, all enjoy the black-oil sunflower seeds which fill the two feeders. The chickadees even sit on her hand while she pours the seed into the feeder.



Alice Demarest



Alice Demarest

From their decks and large windows, the Demarests take pleasure all year long in watching the birds, although spring and the arrival of the baby birds is a special time.

About every two weeks, depending on the time of the year, Mrs. Demarest buys a 25-pound bag of dog food, dozens of loaves of bread from a discount bread store, boxes of donuts and a 50-pound bag of bird seed. She gets turkey and chicken parts from a poultry farm and occasionally buys a bag of marshmallows as a treat for the raccoons. The food and water dishes are filled daily, even in winter when the animals are hibernating.

With its thickets, the wooded yard provides a natural cover and shelter for the animals. They live in, and are protected by, the hollows of trees and bushes that include honeysuckle, wild rose, catbrier and weigela. Recently, Mrs. Demarest discovered that a neighbor was about to discard a diseased tree. Together, they brought the tree to her property, providing yet another shelter for the animals.

Mrs. Demarest has also added to the existing growth a Nandin bush from Florida (whose berries the birds love), some catnip, and an herb garden. To create a wildflower garden that would appeal to birds and butterflies, she transported bloodroot, hepatica, trillium, jack-in-the-pulpit, violets, and a pussy willow tree from her country home. The flowers, which thrive in the shady woods, are nourished by the falling leaves.

She also planted butterfly weed (a milkweed) to get the attention of the Monarch butterflies and parsley to attract caterpillars. She especially enjoys watching her young grandson's reaction to the caterpillar's metamorphosis to a butterfly. Mrs. Demarest has in many ways encouraged her grandson's avid interest in nature. The Demarests created a nature trail through their backyard habitat. They walk through it with their grandson, showing him squirrel nests, woodpecker borings and wildflowers. He has his own insect collection, including specimens of praying mantis, Japanese beetles, cicadas

*(left) The raccoons and opossums feast on the readily available cat or dog food.*

*A supply of clean water year-round is critical for wildlife.*

# The Backyard Wildlife Habitat Program

Since the National Wildlife Federation's Backyard Wildlife Habitat Program began in 1973, over 6,700 backyard wildlife habitats have been certified nationwide, 245 of them in New Jersey. The program recognizes the efforts of small landowners on behalf of wildlife and provides information on the "how-to's" of wildlife gardening.

Participants receive suggestions for plant materials that provide sources of food, cover (protection from the elements and predators), and areas for the animals to raise their young. The possibilities are many, depending on the kinds of animals the property owner wants to attract.

For example, brightly colored flowers like milkweed or cosmos will attract butterflies, parsley is a favorite food of caterpillars, and rock walls provide good cover for chipmunks.

Shallow pools provide water for drinking and bathing. They are also perfect places for amphibians such as toads, frogs, and salamanders to lay their eggs in the spring. Leaf matter makes a fine cover for earthworms to escape from the robins.

Backyard habitats range from 40 square feet to hundreds of acres, but most of those involved own a quarter-acre to an acre. A large piece of land isn't necessary.

The program has been very successful. Over the last three years, more than 3,000 backyards have been certified. Before that, the National Wildlife Federation was receiving only 300 applications a year. The increased interest is attributed to a growing awareness of the shrinking wildlife habitat.

If you are interested in a wildlife habitat for your backyard, you can obtain a free packet of information by writing: The Backyard Wildlife Habitat Program, National Wildlife Federation, 1400 16th St. NW, Washington, DC 20036-2266. 

and bees, says Mrs. Demarest, eager for her grandson to enjoy the natural world.

But she's also concerned — very concerned — about what the earth will be like when he grows up. We're losing animals all over the world, says Mrs. Demarest, who recently returned from a trip to Tanzania where enormous numbers of animals used to roam. Now there are fewer and fewer every year, she says sadly. Not only has poaching reduced the elephant and rhinoceros population, but by allowing their cattle to graze on dedicated land, the Masai have reduced the food source for wild animals. Wild animals graze only the top, she explains, while the cattle eat down to the soil.

Wildlife is being destroyed in this country too, she says. Black bears are killed for their gall bladders, which are thought to be an aphrodisiac. "We're also losing our bee population," she adds. The wildflowers that she grew up with and used to photograph are disappearing as well.

Mrs. Demarest notices the difference even in her own backyard over the years. "The raccoons used to be plentiful," she says. "There used to be 20 of them, then 13. Now there are eight. Last year there was only one opossum, one box turtle and very few chipmunks. The area is being overdeveloped. "There's nowhere for the animals to go," she laments, "and they are going to die." She also believes that people are illegally setting traps. Last year, Mrs. Demarest found two maimed animals: a raccoon that lost a tail and a skunk with a missing leg. "If this is a trend, then our wild animals really need habitats," she says.

So intent is Mrs. Demarest on saving wildlife, even in her own small way, that she recently tried to stop traffic on busy Route 208 to rescue a mother duck and her 13 ducklings that were trying to cross the road. She was unable to save the mother from being killed by a speeding pickup truck, but the babies landed safely in a storm drain. Three police cars and several hours later, the grate was maneuvered off the drain, and the ducklings rescued and brought to the wildlife center in Wyckoff, where they happily joined other ducks.

"It's greed that is destroying whatever wildlife is left," says Mrs. Demarest. "That's the devastating part. It's just due to greed." But she believes there is hope. "People need to become aware of the problem and participate in conservation projects." With more people like Mrs. Demarest taking an interest in our vanishing wildlife, perhaps there truly is hope. 



Alice Demarest

*Some of the enjoyment of backyard wildlife, such as these juvenile raccoons, occurs after dark.*

In 1988 **Eleanor Gilman** told the tale of a brazen woodpecker. This feature marks the fifth *NJO* appearance for the Bergen County freelance writer.

# Explorer

January/February 1990 Issue Number Three

## Beauty is in the Eye of the Beholder

Have you ever heard the expression "Beauty is in the eye of the beholder"? What this means is that everyone

has their own opinion of what is beautiful.

Years ago, most people thought that tidal marshes, the soggy land that meets the bay waters, were ugly. Tidal marshes were used for garbage dumps or filled in with dry soil so houses and businesses could be built.

Then, only a few people saw the beauty of tidal

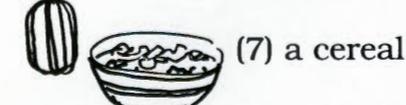
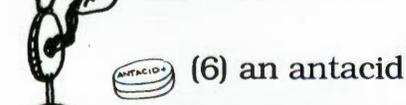
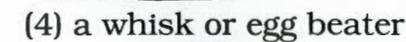
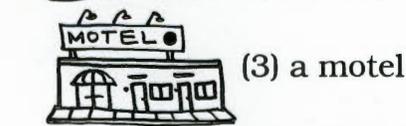
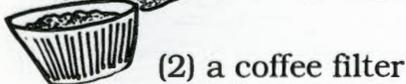
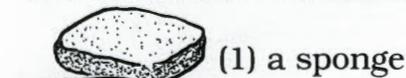
marshes. These people were the bird watchers who knew that New Jersey's chain of tidal marshes provided a resting, feeding and nesting area for hundreds of species of birds. They were the duck hunters and muskrat trappers who carefully watched the populations of their catches. They were the families who would walk in the squishy ooze to ponds to catch crabs and killifish.

Today, many people understand the value of tidal marshes. Now people, not nature, are creating new tidal marshes to replace ones that have been lost to buildings and other uses. More and more people are learning that tidal marshes are beautiful places!

### a matching game

## A Tidal Marsh is Like ...

Place the number on the blank with its appropriate match.

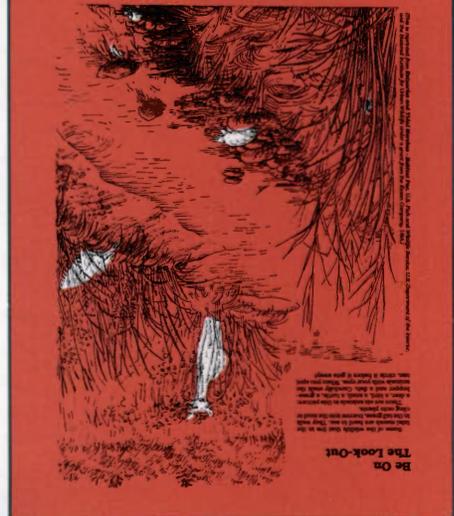


- It filters impurities from water.
- It is a resting place for migratory birds.
- It mixes oxygen and tiny bits of food into the water.
- It absorbs excess water.
- It provides a nursery that shelters, protects and feeds young wildlife.
- It neutralizes (new-tral-eyes-ez) or makes harmful substances less harmful.
- It provides nutrient-rich foods.

(This activity is an adaptation of "Wetland Metaphors" from Aquatic Project WILD.)

### answers

A Tidal Marsh is Like ...  
 (1) It absorbs excess water. (2) It filters impurities from water. (3) It is a resting place for migratory birds. (4) It mixes oxygen and tiny bits of food into the water. (5) It provides a nursery that shelters, protects and feeds young wildlife. (6) It neutralizes or makes harmful substances less harmful. (7) It provides nutrient-rich foods.



## Be On The Look-Out

Some of the wildlife that live in the tidal marsh are hard to see. They walk in the tall grass, burrow into the mud or cling onto plants.

There are six animals in this picture: a deer, a bird, a snail, a turtle, a grasshopper and a fish. Carefully stalk the animals with your eyes. When you spot one, circle it before it gets away!

*(This is reprinted from Estuaries and Tidal Marshes - Habitat Pac. U.S. Fish and Wildlife Service, U.S. Department of the Interior, and the National Institute for Urban Wildlife under a grant from the Exxon Company, USA.)*



# Calendar

## February

**17 TACKLING TACKLE.** Learn about the selection, use and care of fishing tackle. 1 pm. Pequest Trout Hatchery and Natural Resource Education Center, Oxford. Reg. Req. 201/637-4125.

**17 FILMS.** "If I Were An Animal," "Nature in a Top Hat" and "World Turned Upside Down." 1 pm. Visitors' Center, Washington Crossing State Park, Titusville. 609/737-0609.

**18 BLACK RIVER GAME PRESERVE SKITOUR.** NJ Nordic Ski Club (NJNSC). Chester Township. 201/584-3953.

**18 PAULINSKILL VALLEY TRAIL HIKE.** 10 am. NJNSC. Halsey parking lot, near Newton. 201/356-3289.

**19, 26 SINGLES HIKE OR CROSS-COUNTRY SKI TRIP.** Hike or ski five miles based on weather and trail conditions. Potential venues include Harriman State Park, Jockey Hollow, Blue Mountain Lakes, Stokes State Park. NJNSC. For location, 201/968-4914.

**21 ENDANGERED AND NONGAME SPECIES PROGRAM.** Learn about the animals being helped by your income tax check-offs. 7:30 pm. Pequest Trout Hatchery and Natural Resource Education Center, Oxford. Reg. Req. 201/637-4125.

**24 FILMS.** "Five Colorful Birds," "Forest Babies" and "America—Inventing a Nation." 1 pm. Visitors' Center, Washington Crossing State Park, Titusville. 609/737-0609.

**25 HIKE AT BLUE MOUNTAIN LAKES.** Seven miles, moderate pace, easy terrain. 10:30 am. Blue Mountain Lakes parking lot. NJNSC. 201/968-4914.

## March

**3 FILMS.** "Spring Comes Again," "We Explore the Beach," "We Explore the Stream" and "Bill of Rights of the United States." 1 pm. Visitors' Center, Washington Crossing State Park, Titusville. 609/737-0609.

**5,12 SINGLES HIKE OR CROSS-COUNTRY SKI TRIP.** (see Feb. 19)

**10 A SHORT COURSE ON THE PINELANDS.** Presentations and workshops on such topics as Pinelands plants, folklife, geography and many others.

9 am. Loree Building, Cook/Douglass Campus, Rutgers U., New Brunswick. \$25. Reg. Req. 201/932-9271.

**10, 17 MAPLE SUGARING.** A "how-to" demonstration on home maple sugar production. 1- 2:30 pm. Nature Center. (17th at Greene Grove, 1- 3 pm). Washington Crossing State Park, Titusville. 609/737-0609.

**10, 25 PAULINSKILL VALLEY TRAIL HIKE.** 10 am. Footbridge Park, Blairstown. NJNSC. 201/356-3289.

**11 FIRE AND ITS ROLE IN THE PINE BARRENS.** 5-8 mile nature-history walk in the Spotswood Outlier. 1:30 pm. Reg. Req. Outdoor Club of South Jersey (OCSJ). 609/655-5467.

**11 HIKE IN WHARTON STATE FOREST.** Eight-miler on the Batona Trail. 10:30 am. Carranza Memorial parking lot. NJNSC. 201/968-4914.

**17 CANOE THE PAULINSKILL.** Winter is over! Join the Paulinskill Valley Trail Committee in their St. Patrick's Day canoe trip. Meet at Blairstown Elementary School. NJNSC. 201/356-3289.

**18 WALK TO RED BANK BATTLEFIELD.** 6-7 miler to Fort Mercer and Ann Whitall House. 11 am. West Deptford Soccer Field. OCSJ. 609/662-7758.

**21 HOOKED ON THE HUDSON.** Slide show and exhibits. 7 pm. Fort Lee Historic Park Visitors' Center. Palisades Interstate Park Commission (PIPC). 201/768-1360.

**22 THE NIGHT SKY: PLANETARIUM AND TELESCOPE PROGRAM.** 6:45 and 7:30 pm. Hackensack Meadowlands Development Commission (HMDC) Environmental Center, Lyndhurst. 201/460-8300.

**24-25 NATURE SLIDE PROGRAMS.** Sa: "Water, You Can't Live Without It" and "Soil, You Can't Grow Without It." Su: "Discovering Wildlife in Your World" and "Predators." 1:30 pm. Nature Center, Washington Crossing State Park. 609/737-0609.

**25 LEBANON STATE FOREST HIKE.** Eight-miler among Pinelands cranberry bogs. 10:30 am. Meet at park office. NJNSC. 201/968-4914.

**25 CANOE GREAT EGG HARBOR RIVER.** From Pennypot to Weymouth Furnace. 9 am. Rts. 322/561 junction, near Folsom. OCSJ. 609/365-5451.

**31 NATURE SLIDE PROGRAMS.** "For-

ests Are More Than Trees" and "We Care About Eagles." 1:30 pm. Nature Center, Washington Crossing State Park. 609/737-0609.

## April

**1 OPEN HOUSE AT PEQUEST.**

**1 TREASURES OF THE HUDSON.** Interpretive beach walk. 10 am. North parking lot, Englewood Boat Basin. \$2.50/car. PIPC. 201/768-1360.

**1 15K SUPER CITIES WALK FOR MS.** Three separate routes through Bergen and Passaic counties. 10 am. Benefits the National Multiple Sclerosis Society. 201/261-WALK.

**7 OPENING DAY OF TROUT SEASON.**

**8 GARDENING FOR BUTTERFLIES.** 11 am - 4 pm. Pequest. 201/637-4125.

**14 FOURTH ANNUAL PALISADES SHAD FESTIVAL.** Fishing contests, shad fishing demonstrations, shad bake and more. 9 am - 4 pm. Ross Dock Picnic area. Palisades Interstate Park. \$2.50/car. PIPC. 201/768-1360.

**19 STAR SEARCH.** 7 and 7:45 pm. \$3. HMDC, Lyndhurst. 201/460-8300.

**19 FAMOUS AMERICANS AT NEW BRIDGE: COLONEL ROBERT ERSKINE.** Presentation on Washington's chief mapmaker and ironmaster of the Ringwood Mines. Bergen County Historical Society. Second Reformed Church, Hackensack. 201/343-9492.

**21 GUIDED BIRD WALK.** 8:30 am. HMDC, Lyndhurst. 201/460-8300.

**21-22 CIVIL WARENCAMPMENT.** 2nd Rhode Island Regiment. 11 am - 4 pm. Fort Lee Historic Park. \$2.50/car. PIPC. 201/768-1360.

**22 EARTH DAY 1990.** Celebration at Liberty State Park. DEP Office of Communications and Public Education (OCPE). 609/633-1317.

**22-28 NATIONAL WILDLIFE WEEK.**

**22-29 NEW JERSEY ENVIRONMENTAL EDUCATION WEEK.** For information call OCPE, 609/633-1317.

**28 ORIENTEERING FOR BEGINNERS.** 10 am- 4 pm. Fort Lee Historic Park. \$2.50/car. PIPC. 201/768-1360.

**28-29 WORLD OF MINERALS.** 18th annual gem, mineral and jewelry show. Sa: 9 am-6 pm, Su: 10 am-5 pm. \$3.50. William Patterson College Rec. Center, Wayne. 201/539-5116.

Carol Decker

# Red Fox

By David Chanda

You can't outsmart a fox, so the old saying goes. Indeed, the red fox is probably one of the smartest wild animals in North America. Often portrayed as a cunning and cagey trickster, it is known for its ability to outwit hunters and hounds.

Adages such as "sly as a fox" and "crafty old fox" attest to the intelligence man has bestowed upon this creature. Although its cleverness is often exaggerated in stories, the red fox is undoubtedly an intelligent animal.

Many people find it hard to believe that the fox is the smallest member of the dog family. Usually standing about 15 inches at the shoulder, the red fox weighs only eight to 10 pounds and is approximately 40 inches in length, including its 15-inch bushy tail. A red fox sports several distinct coat colors, which can vary depending on weather and geography. Although it may have black fur or black mixed with red or silver, the most common fur color is a reddish-yellow.

Its belly is usually white. The long bushy tail is mixed with black hair ending in a white tip which is one of the most distinguishing features of the red fox. With the exception of the arctic fox which can be all white in winter, no other fox has a white-tipped tail.

Except for Florida, the red fox is found throughout the United States and Canada, extending almost as far north as the Arctic Tundra. In New Jersey, the red fox prefers to live among open hardwoods and field edges. It generally has a home range of one to two square miles. However, changing weather and the availability of food can

determine how far a red fox will travel. It is not unusual for a fox to travel as much as 10 miles during a night of hunting.

The red fox is an omnivore, eating plant material, such as berries and grains, as well as meat. However, mice are probably the most important food item in a red fox's diet. It also eats rabbits, squirrels, weasels, moles, snakes, woodchucks, chipmunks and a variety of small birds.

The area around a fox den often reveals that the red fox is not particular about what it eats. I once came across a den entrance area littered with bones from rabbits and mice, feathers from a blue jay, a grouse and a few other unidentifiable small birds, and what appeared to be insect remains. The red fox also consumes a variety of fruits, berries and wild grain and large numbers of beetles, grasshoppers and crickets.

The red fox relies on its keen hearing and smell to locate food. These two senses are so sharp that they can sustain a fox even when it cannot see. The fox generally zigzags across a meadow hunting for mice, pausing occasionally to cock its ears and listen. It has been said that a fox can hear a mouse rustling in the grass at more than 50 feet!

Once located, the fox will pounce on its prey, pinning it to the ground with its front feet. With one quick bite it will kill the prey. If the fox misses the mouse, it might rise up on its hind feet to get in a better position to locate and once again pounce on the mouse.

The red fox begins to seek a mate in January. Called a vixen, the female selects a den site and gives birth to six to eight young sometime near the middle of March. The young, called kits, are born with their eyes closed. They weigh about 3½ ounces, are dark brown and have a white tip on their tail. In eight or nine days their eyes open, and the kits remain in the den the first month. After

about five weeks, they venture to the entrance of the den to play and feed. As they get older, they wander farther and farther away from the den. At the slightest hint of trouble, though, they scurry back for the safety of the den.

Both the male and the female red fox care for the kits. During the first few weeks, the female stays with the young almost constantly, while the male hunts and brings food to her. As summer approaches, the young follow the parents to learn how to hunt.

By early fall, the young are old enough to fend for themselves and leave to find a new territory. At this time, the male and female also drift apart. Although they never completely separate, over the next few months there will not be a close relationship among adults until another mating season begins.

The red fox has few natural enemies in New Jersey. A coyote or wild dog will kill a fox if they have an opportunity, but this is rare. The mortality from hawks and owls occasionally killing young kits has an insignificant effect on the fox population. Probably the greatest threat to the red fox in New Jersey is that of habitat loss. Even the best wildlife management program can do little for wildlife if the habitat is destroyed.

Although many of the stories about the cleverness of the red fox may be nothing more than folklore, the fox is indeed a crafty and intelligent animal. Its ability to survive in a highly urbanized state such as New Jersey attests to this. Yet the red fox will need more than its share of wit to hold a place in our state's farms and forests.

Its future in the Garden State depends upon how we treat the environment over the next decade. As long as we can provide the proper habitat, the red fox will continue to thrive in our state and, as always, kindle the curiosity and imagination of all who come in contact with it. 



Carol Decker  
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