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WISCONSIN NATURAL RESOURCES

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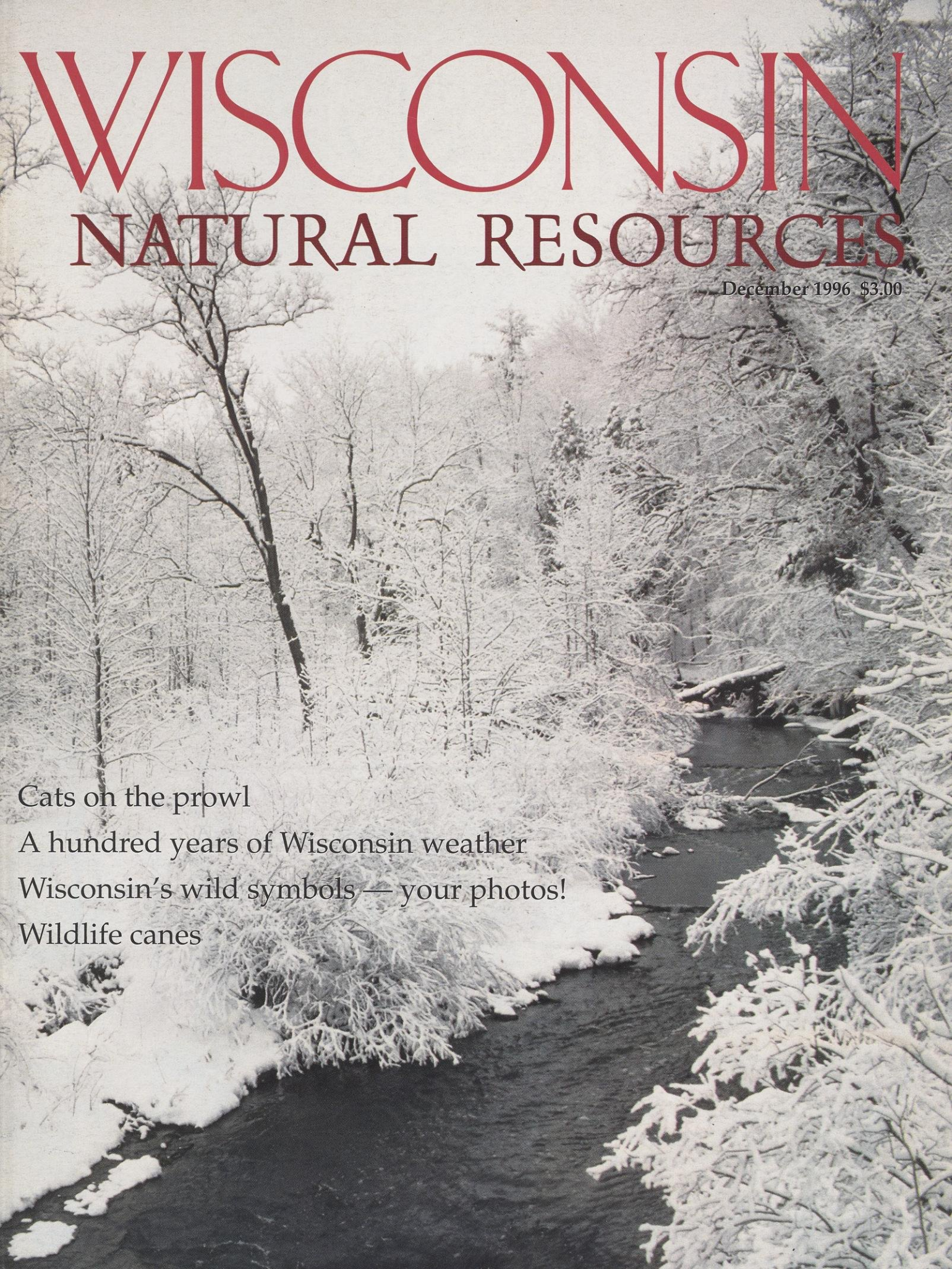


Cats on the prowl

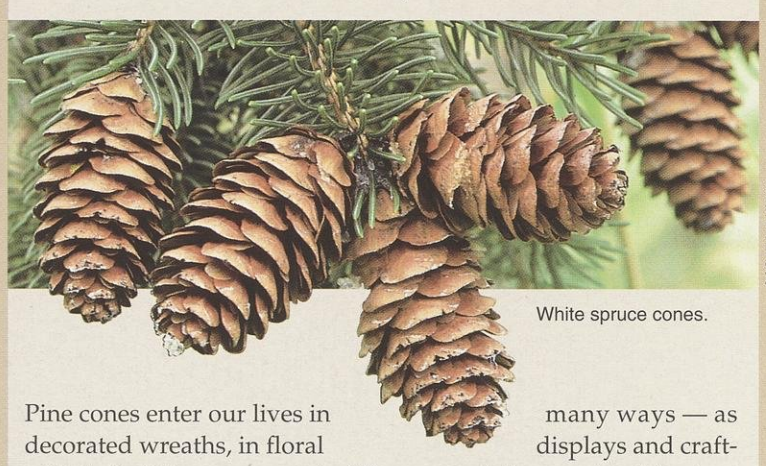
A hundred years of Wisconsin weather

Wisconsin's wild symbols — your photos!

Wildlife canes

The nature of cones

Anita Carpenter



SCOTT NIELSEN

White spruce cones.

Pine cones enter our lives in many ways — as decorated wreaths, in floral displays and crafted into holiday ornaments. We suspend them as bird feeders packed with peanut butter or suet coated with seeds. We kick them along forest paths and cuss when they litter our lawn or get chewed up in the mower. We watch red squirrels shred them and crossbills meticulously extract seeds with surgical precision.

We've all picked up cones of various sizes and shapes, casually looked at them and unceremoniously tossed them aside, but do we really know what they are?

We use the term "pine cone" to describe any cone from any conifer, but that's not right. Evergreens come in many types: spruce, fir, pine, hemlock, cedar. They are all called conifers because they all bear cones. We should name the cones for the parent trees —spruce cones, balsam fir cones and so on.

Each evergreen has two distinct cone types: female and male.

The hardened, dark brown cones are the females. These cones consist of a woody stalk surrounded by overlapping, stiff, shingle-like scales. Behind each scale is a bract, a small, flat modified leaf. Depending on the tree species, the bract may be hidden within the cone or extend well beyond each scale, like the western Douglas fir cones.

The smaller, inconspicuous male cone (or pollen cone) grows either singly or in clusters, depending on the species. They are usually found on the lower branches. The male cones wither and die shortly after releasing their pollen in the spring, though dried remnants of pollen may remain stuck to the tree for months.

Each evergreen species has its own timetable for flower development, pollination and cone maturation. Only true pine cones take two years to mature. All other evergreen cones mature in the same year they are fertilized.

In spring, pine buds begin to grow producing male cones in clusters at the base of new twigs. The female cones appear much later as the twigs grow. Each small gumdrop-sized female cone is soft and green tinged with a purplish red. Its tiny scales are slightly separated.

Continued on page 28

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WISCONSIN NATURAL RESOURCES

December 1996 Volume 20, Number 6

DEANN DE LA RONDE

DIANE ULLEDAHL

MICHAEL WEIMER

ROBERT QUEEN

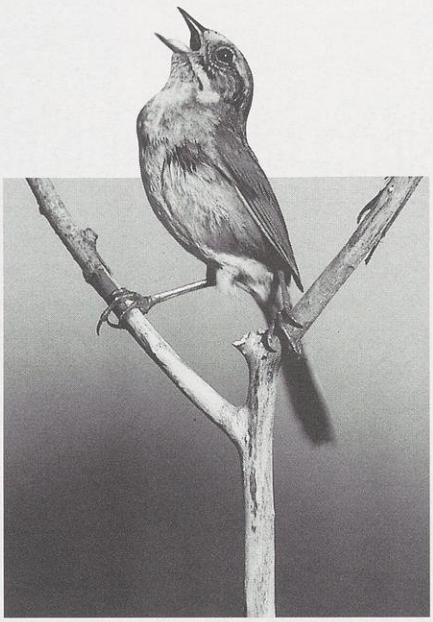
FRONT COVER: Weather can be beautiful or brutal in every season. See our story p. 17.
GARY F. MARTIN, Green Bay, Wis.

BACK COVER: Red pine, white pine and jack pine cones.
SCOTT NIELSEN, Superior, Wis.

On the prowl

In suburban backyards and rural fields, free-roaming cats are pouncing on songbird populations.

John S. Coleman and
Stanley A. Temple



STEPHEN J. LANG

(left) Cats never lose the instinct to hunt. Even declawed, urban cats can be effective predators. *(above)* Songbirds, like the swamp sparrow, are especially vulnerable when nesting, feeding and fledging their young.

Some days, you need a bit of imagination to view a house cat as a predator. Sitting in a sunny window, curled up on a bed or stretched out in front of a fireplace, most tabbies hardly seem to have the energy to attack their kibble. But cats are definitely hunters, and there are plenty of them in town, in barns and free-ranging in fields to put the bite on a variety of birds and other wildlife.

Cat populations are tough to gauge accurately. U.S. Census data track those cats that people claim to own as pets, and the numbers are impressive. From 1970 to 1990, the number of urban and rural cats tabulated in the census rose from 30 million to 60 million. Nationwide, approximately 30 percent of households "own" cats. In rural areas, where free-roaming cats often are not regarded as pets and not recorded by the census, as many as 60 percent of households keep cats on their property. In Wisconsin alone, with 550,000 rural households, we estimate the number of barn cats and outside cats may be as high as two million. Nationwide, there must be at least 100 million cats, mainly concentrated in the same places we find people.

Wild at heart

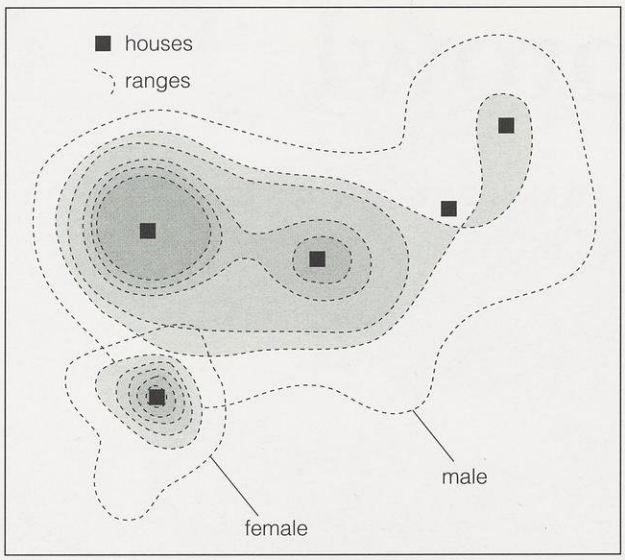
Domestic cats *(Felis catus)* descend from the European and African Wild Cat *(Felis silvestris)*. Although domestic cats make affectionate pets, their skills and behaviors as predators remain essentially unchanged from those of their ancestors, and they hunt as effectively as their wild forebears.

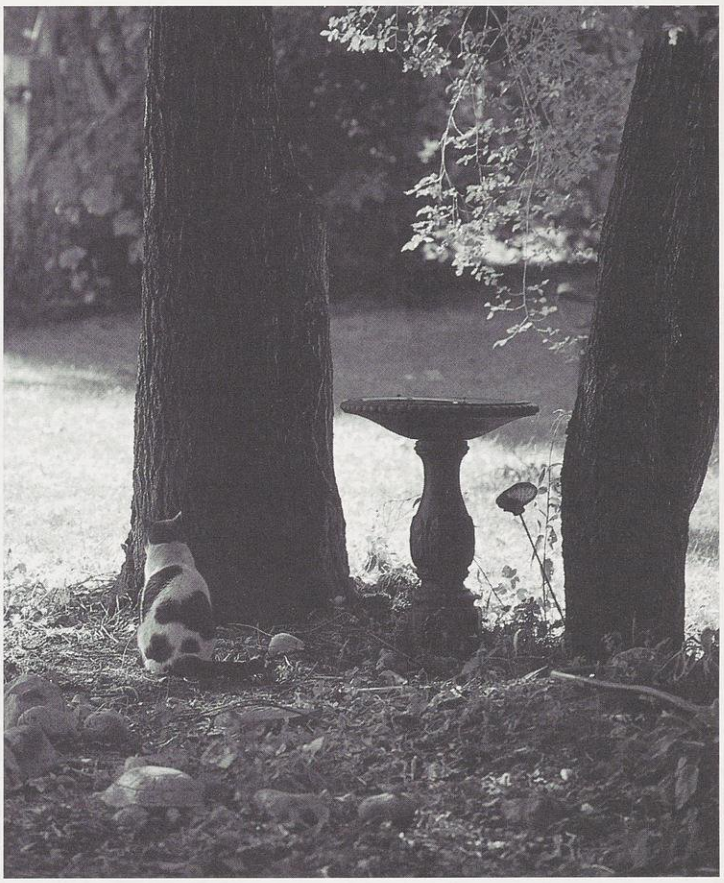
However, house cats differ from wild predators in several important ways: First, people protect cats from disease, predation and competition. Modern veterinary practices, from vaccination to bone setting, substantially extend a pet cat's lifespan. Second, domestic cats adapt well to human domiciles. Unlike native predators, cat densities are not limited by space or the availability of prey. Even barn cats have significantly better shelter, food and water supplies than bobcats, foxes and coyotes. The cat's range extends every time people build new homes and outside shelters. Third, although most people supply their cats with a dependable supply of food, research shows feeding does not suppress the cat's instinct to hunt and kill.

These factors combine to make free-ranging cats a potent predatory force, especially in rural areas. We've estimated that in some parts of rural Wisconsin, cat densities reach 114 animals per square mile — much higher than all mid-sized native predators. Given ample food supplies and a high reproductive rate, cat densities can exceed nine animals per acre in some areas.

Rural cats have access to many wild animals and undoubtedly take the greatest toll. Small mammals like mice and voles make up about 70 percent of their diets, birds constitute about 20 percent of their kills and a mix of other animals constitute the remaining 10 percent. Our research in Wisconsin suggests that free-ranging rural cats may be killing up to 219 million birds in the state; (see sidebar.) Many are native songbirds whose populations are already stressed by a host of factors including development, habitat destruction and pesticide pollution.

Many of these birds are ground-nesting grassland birds, like meadowlarks and sparrows, or birds that often feed on the ground, like robins.




ROBERT QUEEN

Summary:

- Males have larger ranges.
- Summer ranges are larger.
- Females have one center of activity; males have several.
- Ranges are centered on houses.
- Females focus on food and shelter; males focus on females.

Especially in rural areas, these birds inhabit pastures and hayfields around farms where high densities of cats seriously threaten them.

The cat predation affects wildlife dynamics in other ways. Domestic cats eat many of the same animals that native predators eat. Studies show that large numbers of cats reduce available prey for predators such as hawks and weasels.

Free-ranging cats may also transmit diseases to wild animals. Domestic cats have spread feline leukemia virus to mountain lions and may recently have infected the endangered Florida Panther with feline distemper (feline panleucopenia). Unvaccinated domestic cats can also transmit rabies and toxoplasmosis to people. Pregnant women are now routinely advised to avoid contact with cats and litter boxes to minimize the risk of infection.


JOHN S.COLEMAN

Research helped pinpoint when and where free-roaming cats in the country are most likely to prey on birds and small mammals. Several strategies can keep cats as wonderful companions and minimize their chance to hunt other animals. Support community efforts to license and neuter domestic cats. Use common sense. Don't assume every rural cat you see is "lost" or a "killer," or that every city cat is a well-tended house pet.

Keeping cats in check

Given these concerns, here are seven sensible suggestions to prevent growing cat populations from becoming an even greater threat to wild animals:

1. If you are going to keep cats and you don't intend to breed them, get them neutered at about six months of age. This will slow population growth and may lessen your cat's desire to roam. Only keep as many pet cats as you can feed and care for. On farms, keep the minimum number of cats that

How many birds do cats kill?

No one has collected enough data to definitively predict the number of birds killed by rural free-ranging cats. Our four-year study of cat predation in Wisconsin, coupled with data from other studies, predicts a range of values based on the following assumptions.

We estimate 1.4–2 million free-ranging cats in rural Wisconsin. We further estimate 23 percent of their diet consists of birds. This figure is consistent with other studies indicating roughly 20–30 percent of free-ranging cat kills are birds.

The number of animals killed by an individual cat varies greatly from zero to much more prey than a cat can consume. One rural cat was recorded to have killed 1,690 animals in an 18-month period. On an annual basis, studies record low estimates of 14 animals per free-ranging urban cat to at least one animal per day for rural cats. Other studies reported 28 kills per year for urban cats and 91 kills per year for rural cats.

Here are our best guesses at low, intermediate and high estimates of the number of birds killed by rural cats in Wisconsin based on the formula (number of rural cats) x (number of kills/cat/year) x (percentage of kills that are birds).

Low value:
(lowest population estimate) x (twice kill rate by urban cats) x (low percentage of kills that are birds)
1.4 million cats x 28 x 20% = 7.8 million birds killed by rural cats annually.

Intermediate value:
(mean population estimate) x (intermediate kill rate) x (higher percentage of kills that are birds) **1.7 million cats x 91 x 25% = 38.7 million birds killed by rural cats annually.**

High value:
(highest population estimate) x (highest kill rate) x (highest percentage of kills that are birds)
2 million cats x 365 x 30% = 219 million birds killed by rural cats annually.

Note, these estimates *do not* include predation by urban cats.

Also note, in northern states such as Wisconsin, most kills occur in spring and summer, though predation at winter feeders is substantial. Many of the spring kills would include nestlings and fledglings.

The densities of free-roaming cats in rural Wisconsin are several times higher than the typical combined densities of other mid-sized predators like foxes, skunks, opposums and raccoons. Clearly, free-ranging cats are a major predator of birds in rural Wisconsin.

STEPHEN J. LANG

(above) Increased predation by cats is yet another threat that songbirds face as a consequence of development. Roads, wetland drainage and other land uses reduce nesting habitat and create easy routes for predators to reach prey species.
(below) Cats on the prowl can blend into the background and stalk as effectively as other predators.

JOHN S. COLEMAN

you determine can keep rodent pests in check.

2. Don't dispose of unwanted cats by releasing them in rural areas. This practice enlarges rural cat populations, is an inhumane way of dealing with unwanted cats, and places more predators in the wild. Contact a local humane society to find out where unwanted cats can be brought, adopted or euthanized.

3. If possible and practical, keep your cat indoors. This eliminates unwanted reproduction, prevents predation on wild animals, reduces cat fights and injury, and reduces the spread of disease. Keeping your cat indoors helps protect the birds and mammals around your yard and reduces the likelihood of injury to your pet. The two most common causes of death for rural cats are disease and being struck by an automobile.

4. Don't count on a bell as a solution. Research shows bells on cat collars are mostly ineffective in preventing predation. Even if the bell rings, it is usually too late for the victims.

5. Declawing cats may reduce hunting success, but many declawed cats are still effective predators.

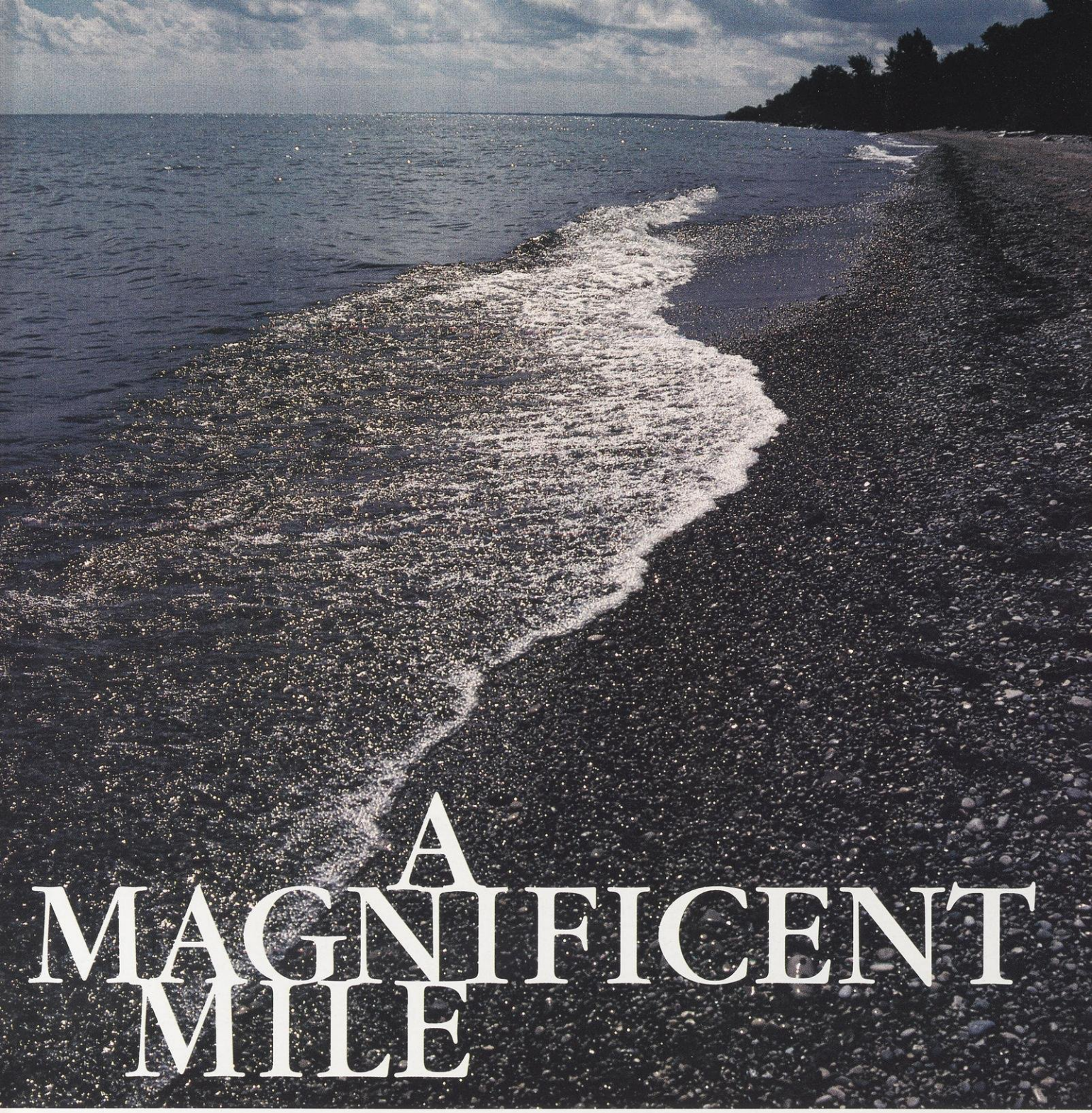
6. Locate bird feeders in sites that don't provide cover for cats waiting to ambush songbirds. Take the same precautions you use to make feeders squirrel-proof — place feeders away from overhanging tree limbs, decks and away from shrubbery.

7. Support community efforts to license and neuter domestic cats. Unlicensed, untagged, free-roaming cats indicate owners are not responsibly controlling their pets. □

John S. Coleman is a wildlife ecologist with the Great Lakes Indian Fish and Wildlife Commission stationed in Madison, Wis.

Professor Stanley A. Temple teaches and oversees research projects in the Department of Wildlife Ecology at the University of Wisconsin-Madison.

For more information on free-ranging cats and wildlife, get a copy of "A Conservation Dilemma: The Free-ranging Domestic Cat." The new publication will be abailable from the University of Wisconsin-Extension Service in Spring 1997.



A MAGNIFICENT MILE

A mile of Lake Michigan shoreline has been set aside for birding, picnics and quiet walks.

Story and photos by Dave Crehore

On a hot July morning, the first things you'll hear at Fischer Creek are the summer sounds of birds: the buzz of a clay-colored sparrow, the lisping of a cedar waxwing, the rattle of a belted kingfisher, the startled squawk of a great blue heron.

On a sinfully cool and bright October afternoon, sights take over from sounds. Daisies, asters and fleabanes still bloom, milkweed seeds drift across the old fields, golden aspen leaves flutter and the sugar maples glow as though they were burning a year of sunlight in a single day.

Gulls and shorebirds abound at Fischer Creek. Bird watchers will want to check here regularly for the chance to spot migrating waterfowl, shorebirds and warblers in spring and fall.
(right) Bottle gentian *(Gentiana andrewsii)* frequent the moist meadows and bottomlands.

Fischer Creek, a 123-acre addition to the Manitowoc County park system purchased by the state's Stewardship Fund, stretches along a mile of Lake Michigan shoreline between Manitowoc and Sheboygan. It is the only substantial public access to the lake in the area.

Although it's still a work in progress, the Fischer Creek property could turn out to be one of the best state land pur-

chases of the '90s. The tract is a mixture of young forest, marsh and grassland crossed by the creek, a Class II trout stream with spring and fall runs of fish from Lake Michigan. The property's diverse habitat and location along the lakeshore migration route will make it a destination for local birders, particularly in the spring. Some ancient burial mounds add archaeological interest.

The property cost $1,300,000, of which the state's Stewardship Fund paid $1.1 million and Manitowoc County $200,000. Manitowoc County is developing a management plan for the area and will oversee its operations.

It's likely that the greatest value of the property will be for non-consumptive recreation such as birding, walking and photography. An advisory committee's tentative plans identify Fischer Creek as a "passive park," where development will be limited to trails, picnic areas, parking areas near the highway and two access points. Some development work will begin in 1997, but visitors should not expect to find parking, toilets, tables or even signs any time soon.

To find Fischer Creek, exit I-43 at Manitowoc County Highway XX about two miles north of the Sheboygan County line. Take County XX east through Cleveland to County LS, and then turn left, following LS north until it crosses the creek about a mile and a quarter north of Cleveland. The Fischer Creek property is located between LS and the lake, roughly centered on the creek.

Perhaps the best time to visit the property will be during the spring warbler migration, which usually occurs from the last week in April through the first two weeks in May. In the summer, look for cedar waxwings in the trees along the bluff; great blue and green-backed herons will be wading the creek, and kingfishers will be perched along it. September brings the return flight of "confusing fall warblers" and the start of fall color.

A number of other parks, forests and wildlife management areas can round out a weekend or a week in the outdoors within an easy drive of Fischer Creek, including Sheboygan Marsh County Park, Kohler-Andrae State Park, the northern unit of the Kettle Moraine State Forest, the Point Beach State Forest, and the Collins, Brillion and Killsnake state wildlife areas.

So what good are 123 acres of scattered woods, old fields, marsh and beach in a post-environmental age? Well, Fischer Creek is no Denali or Yellowstone, but many of our greatest interpreters of nature have been inspired by much less. Aldo Leopold had a rebuilt chicken coop on an abandoned farm; Thoreau wrote about a middling little pond and a few acres of domesticated woodland. The capacity of a tract of land to enlighten us is not a function of its size. As Thoreau wrote in his Journal, "The question is not what you look at, but what you see."

By that standard, Fischer Creek will have much to offer. □

Dave Crehore is Public Information Officer for DNR's Northeast Region with headquarters in Green Bay.

Check out the shallow creek for wading herons and kingfishers on the hunt.

Stately symbols

Q.

Does a water spaniel say "Wisconsin" to you?

A.

Only if it can talk.

David L. Sperling

Wisconsin icons, the symbols we choose to represent ourselves to the world, are a strange mix. How from a past that includes fur trading, mining, forestry, wheat agriculture, educational reforms, papermaking, breweries, dairy farms, the birthplace of the Republican Party and the stronghold of Progressives and Socialism do we end up paying homage to a wood violet, a honey bee, a water spaniel and the Polka? And why didn't the beer stein, the cheese curd and the bratwurst end up on a cranberry-red state flag? No matter. Such are the twists and turns of history, politics and the fervor of the moment.

SCOTT NIELSEN

The musky and the American badger had long associations with Wisconsin before they were named official state symbols in the mid-1950s.

Still, something drives us to periodically pick symbols. Occasionally we select them very carefully to meet the dictionary definition of a "symbol" — some physical manifestation of an ideal, a principle or a unique feature with which we choose to identify ourselves, our aims and our culture.

Truth is, it's not always that well-planned. Here's a rundown on our state symbols, courtesy of the official State Blue Book.

The sugar maple *(Acer saccharum)* was selected by school children in a statewide vote in 1893. Oaks, pines and elms were also favorites, but the maple won out. A second vote of school children in our centennial year, 1948, reaffirmed support for the sugar maple. Legislators created a new section of the statutes to authorize the designation of official state symbols. So a state tree, state flower and state bird were all selected during the centennial session and became official state symbols in 1949.

State flowers were first nominated in 1908. When the official tally was taken on Arbor Day 1909, school children selected the **wood violet** *(Viola papilionacea)* over the wild rose, trailing arbutus and the white water lily in a close vote.

During the 1926–27 school year, the state Federation of Women's Clubs sponsored bird studies in the public schools. School children chose the **robin** *(Turdus migratorius)* two-to-one over the nearest competitor.

The legislative session of 1939 included spirited debate over the mer-

DIANE ULLEDAHL

MILFORD HOPP

PATSY GAGNON

Our favorite animal to watch, the white-tailed deer, almost bumped off the badger for state animal honors. Our readers sent in more photos of deer than any other entry.
(below) Flexicalymene celebra, a marine arthropod, was named state fossil because its skeleton is found in sedimentary rocks throughout southeastern Wisconsin. These days the trilobite's fame is more widespread on T-shirts sold at the UW-Madison Geology Museum.

its of a state fish. A joint resolution recommended the **muskellunge** *(Esox masquinongy masquinongy)*, but the proposal died in the assembly. A 1941 proposal reached floor debate, but died before reaching the other house. The push for a state fish lay at the bottom of the legislative barrel for another 14 years. In 1955, the muskie was proclaimed the state fish without a dissenting vote. Go figure! The dedication ceremony was held at the June 1955 National Musky Festival in Hayward.

Although badgers had been associated with our coat of arms, the state flag, the University of Wisconsin, the official seal and Cornish miners since the days of the Wisconsin Territory, it was four elementary school students from Jefferson County who discovered the animal had no official status in Wisconsin. One would think the badger was the only logical choice for state animal. However, a feisty contingent of northern legislators wanted to anoint the white-tailed deer due to its strength, regal stature and the economic value of deer hunting. In one of those divine compromises that only politics can forge, the **American badger** *(Taxidea taxus)* was named the state animal and the **white-tailed deer** *(Odocoileus virginianus)* was anointed the state "wildlife animal" in 1957. Whew! So who ever saw a domestic badger?

The **mourning dove** *(Zenaidura macroura carolinensis linnaus)* was named the state symbol of peace in 1971 following a decade of statewide debate. Doves are considered an excellent game bird and are widely hunted in most of the rest of their range, including states surrounding Wisconsin. Proposals to hunt doves here resurface periodically and hunting proponents and other conservationists square off at the table.

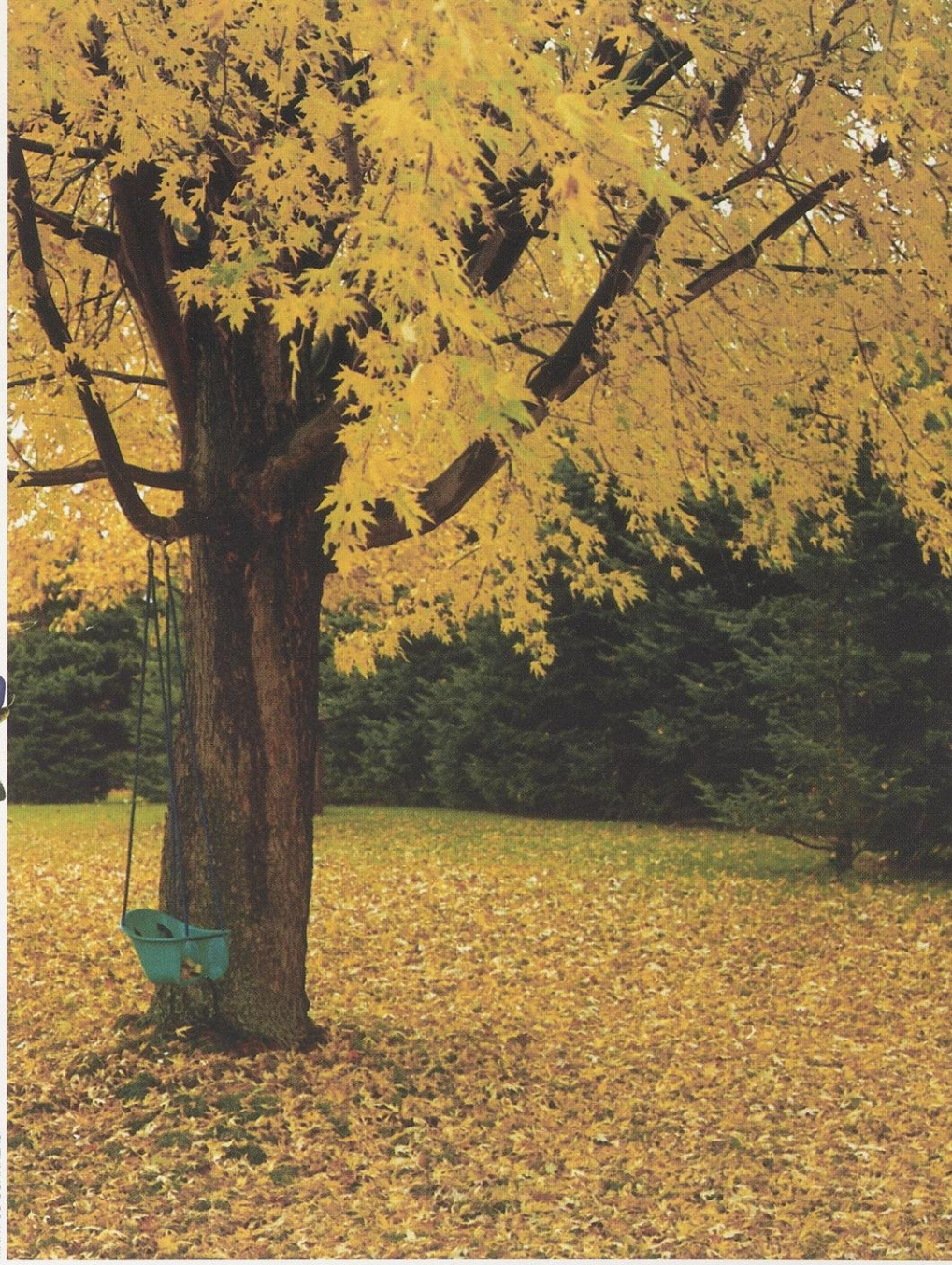
I recall one heated debate more than a decade ago when dove hunting was again being considered. Former DNR Wildlife Bureau Director John Keener was one of the dove hunting supporters. Although he was recovering from a stroke at the time and spoke very deliberately, Keener maintained his composure and his wry sense of humor. One of the more adamant dove protectionists cornered him in the hall to express her frustration. She spit out, "I'll bet you even know how many doves can fit on a Weber grill!" Keener's eyes sparkled, and he slowly replied in a slurred, gravelly voice, "Would that be end-to-end or side-by-side?" May our differences always be sprinkled with a sense of respect and humor.

In 1977, the third grade class of Holy Family School of Marinette was studying the legislative process, hands-on. With encouragement from the Wisconsin Honey Producers Association, they asked the Legislature to select the **honey bee** *(Apis mellifera)* as the state insect in 1977. The news set the school circuit abuzz. Attempts to poll elementary school students to choose a state bug by popular ballot failed. The monarch butterfly, dragonfly, ladybug

UW-MADIS
GEOLOGY MUSE

(clockwise from right) School children voted the sugar maple, American robin, white-tailed deer, honey bee and wood violet their official state favorites.

ROBERT QUEEN



MARY JO SCHARLAU

STEVEN BACK

KARL SCHROETER

and mosquito were contenders for the title, but their lobbyists let them down. The honey bee won out.

The Wisconsin Geological Society proposed a state fossil in 1985 to encourage interest in our geological heritage. The **trilobite** (pronounced "TRY-low-bite") *(Calymene celebra)* is one of a class extinct marine arthropods that were ubiquitous in the warm, shallow salt sea that periodically covered Wisconsin hundreds of millions of years ago. The three-lobed creature had a tough, furrowed exoskeleton that was shed as the animal grew and molted. Many specimens ranging from less than an inch to 14 inches in length have been preserved in sandstone formations throughout the state.

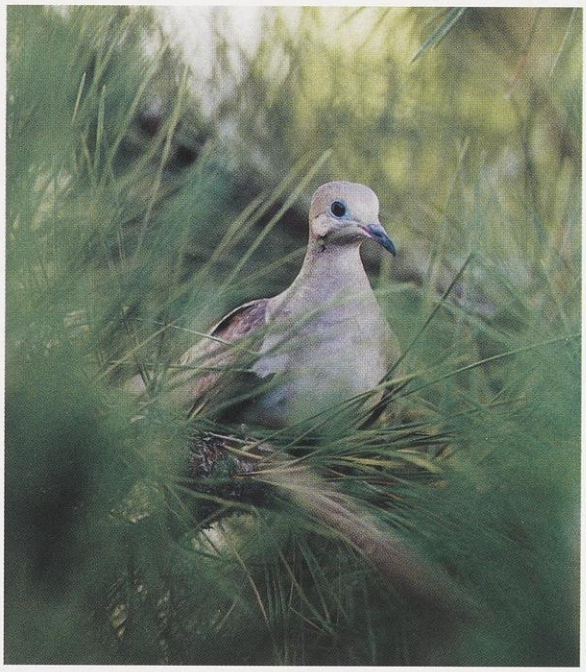
For those who simply must know why the **Polka** was recently given official status over the Chicken Dance, the Twist or the Hokie Pokie, that's a tale best left to another teller...the decision was too recent (1993), and the Cloggers, waltzers and Irish jiggers are still licking their wounds.

We asked you to share your photos of our wilder state symbols: robins, mourning doves, white-tailed deer, badgers, muskies, sugar maples, wood violets, trilobites and even honey bees.

We had entries in all categories, save one: the venerable muskellunge. Well, it wouldn't be a Wisconsin party without a visit from old Sawtooth, so we pulled musky shots from the files.

Thanks for sharing your photos and your stories. □

David L. Sperling edits this magazine. He occasionally sports a robin's egg blue cap and a T-shirt from the old Madison Muskies.

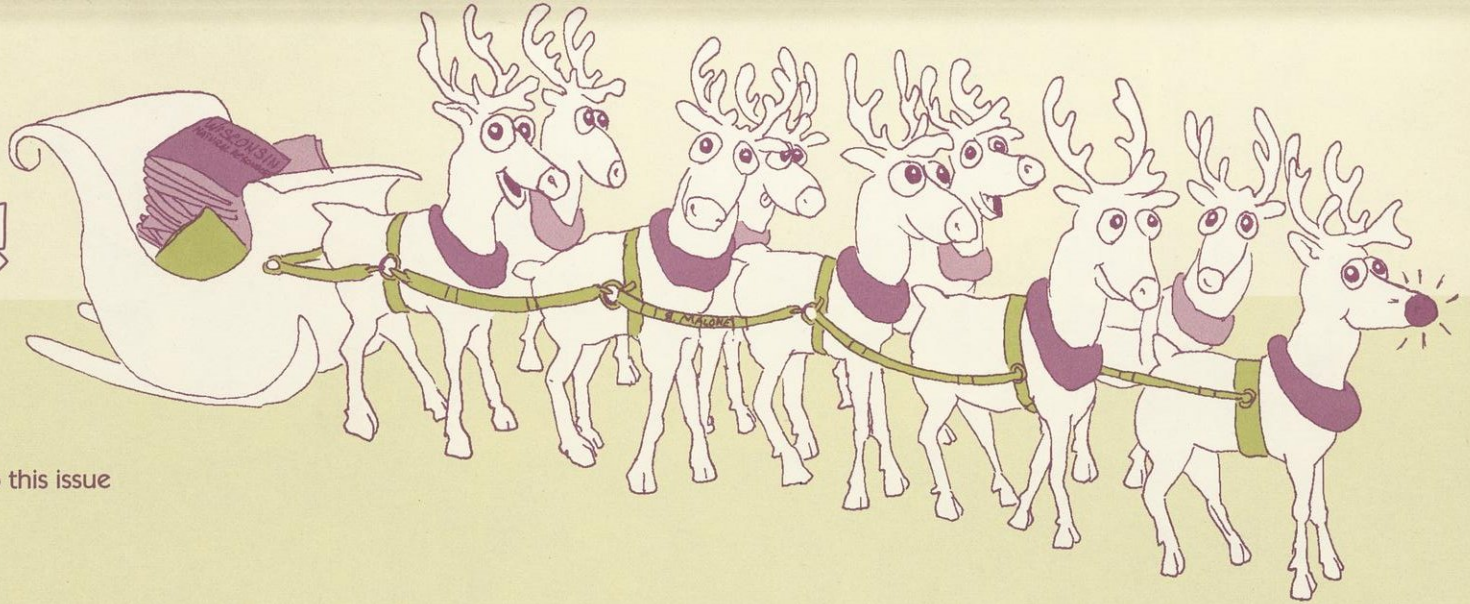


RICHARD WEBER

The mourning dove is our State Bird of Peace and can't be hunted legally in Wisconsin, though it is widely hunted as a game bird in many states.
(below) Wood violets carpet the shady, cooler areas of Wisconsin in many colors and hues.

DUAINE BESAW

The other holiday delivery that's under nine bucks!



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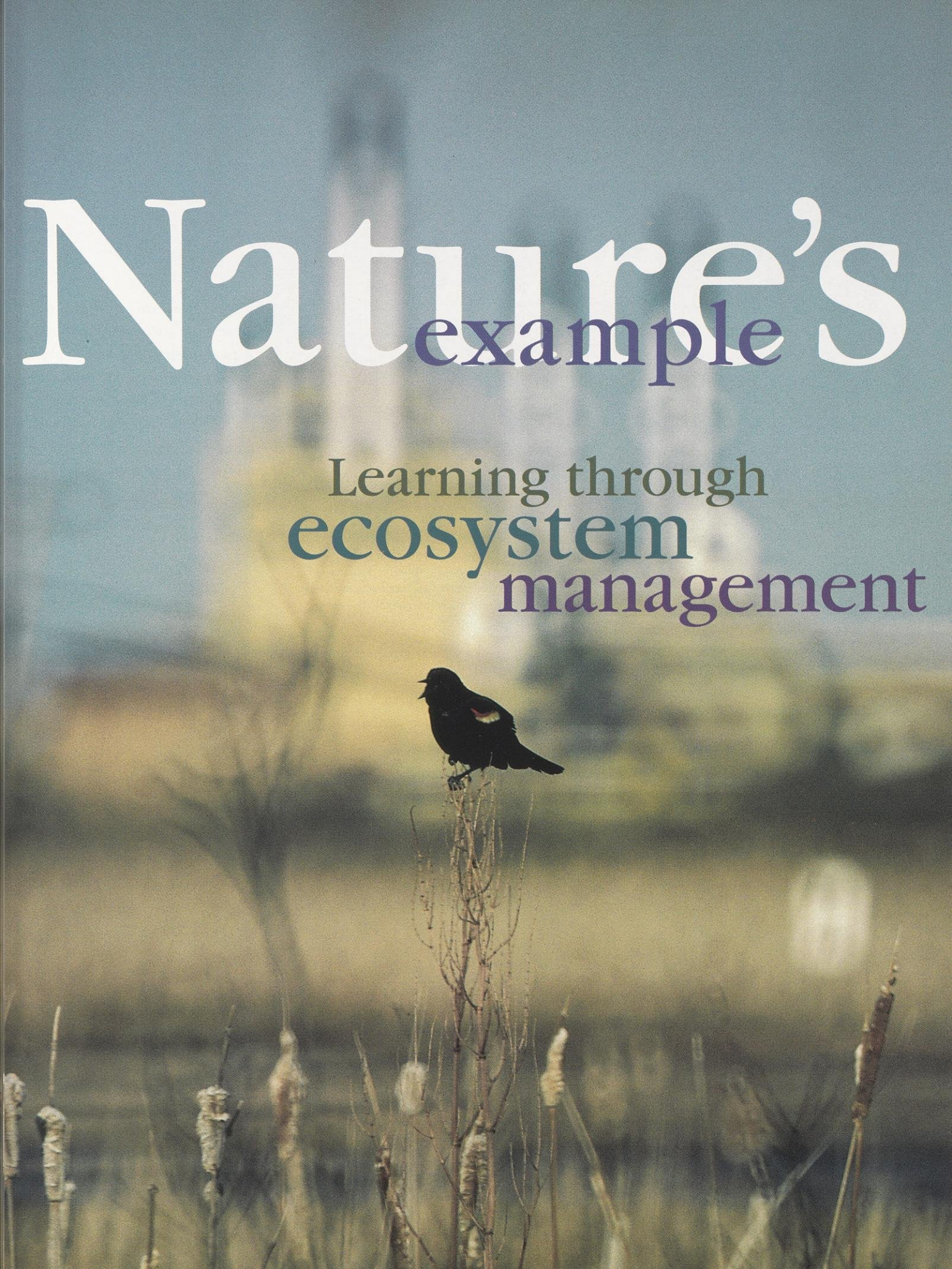
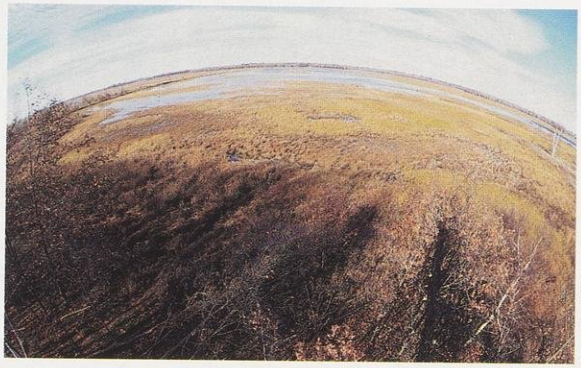
Nature's example

Learning through ecosystem management



How to live and let live?

At its heart, modern society is a quest for convenience. Bigger, smaller, cooler, warmer, faster, slower...as long as it boosts our personal comfort, it will do. Through the deliberate manipulation of our environment, we have tempered the harshness of the elements, the hunger of empty stomachs, the constraints of space and time.



ROBERT QUEEN

We will manage public properties as parts of broad landscapes whose borders are defined by natural changes rather than fences and roads. Team expertise in wildlife, fisheries, forestry, botany and soils will promote a diverse range of natural communities. Human needs are only one of many that need to be met.

Still, we're not quite as comfortable as we'd like to be. Nature keeps getting in the way — and nature is plain inconvenient. It keeps changing: solid as granite one moment, fluid as lava the next. Bountiful with the soil's fruits some years, stingy with the harvest in others. Nature can be amazingly resilient against our greediest needs, yet frustratingly fragile in response to the least of our movements. We mold it to our desires and then discover it has stubbornly adopted a different shape.

We aren't especially comfortable with nature, because as creatures of habit we aren't especially comfortable with change. We have set ourselves as a species apart from all others, only to learn from the hard lessons of extinction and degraded landscapes that we're not as fully in control as we thought. The driver's seat is occupied; we are but passengers in that vehicle otherwise known as life on Earth.

As the passengers capable of reading the map, we do know this much: Fish gotta swim, birds gotta fly — and people gotta live. But how do we live in reasonable comfort without destroying the very world that sustains us?

Two words, ladies and gentlemen: **Ecosystem management.**

Sounds good. Now tell me what it *is*. If you're looking for a convenient definition of ecosystem management, save your eyes and stop reading now. You won't find it here. Encapsulating the idea in a single sentence would do injustice to its many and varied parts.

You will discover that, like an ecosystem itself, the concept of ecosystem management encompasses the variety of life. In applying it, we can more fully explore and understand the human role in nature. By carefully monitoring the natural world, and by closely examining — together — our personal motives, traditions, needs, laws, even fears in relation to nature, we begin a journey of discovery that will never end.

If you must call it something, call ecosystem management a more comprehensive way to look at and adapt to natural change, a means to pursue human convenience without causing major discomfort elsewhere, an opportunity to regain something lost, a personal challenge to leave behind a place worth cherishing for those who have yet to come.

A full-circle view Several decades of environmental regulation have helped alleviate some of our most obvious and specific conflicts with nature. Prompted by law, large industries cut back on the amount of polluting wastes pumped into the air, rivers and lakes, helping clear the skies and waters. Recycling legislation gave individuals the nudge, and now nearly 97% of Wisconsin households participate by reducing waste, repairing and reusing useful items, and recycling glass, plastic, paper and metal. Protected by law, populations of threatened species such as the bald eagle got a boost back up to healthy numbers.

The law underpins many an environmental success story, but over time it has become apparent that the wielding of the legal stick just isn't enough. Our seemingly benign actions outside the scope of law have done damage of a more insidious kind: Landscapes chopped up by scattered development leave only fragments of habitat for other species, sending many into decline and eliminating some altogether. More people intent on using lakes, parks and forests for a variety of recreation strain the resources and compromise the outdoor experience. In

manipulating natural resources like timber, soil or ore for survival and for economic gain, we've made some errors that may be difficult to correct.

The scientific view of nature has evolved from the separate study of resources like fish, wildlife and forests to a broader understanding of the interactions in an ecosystem. We place resources in separate compartments and try to manage them individually. This view is changing. Like it or not, the evidence is clear: We are part of, not separate from, nature. Like other species, we are both actors and the acted upon within ecosystems.

That's a very important piece of knowledge. It signals a shift in thinking, an adjustment in previous attitudes of control. It means, in essence, that we must calculate nature's losses as our own.

No one likes to lose, and the process of ecosystem management aims to make winners of all the players in an ecosystem. It recognizes that natural areas, urban communities and managed properties such as farms and timber lands all add value and quality to life. It acknowledges the two-way link between thriving natural resources and a thriving economy. It provides an opportunity for citizens to work with government in a balanced, common-sense approach to environmental protection. It encourages integration and collaboration among diverse interests, responsibility and involvement from individuals.

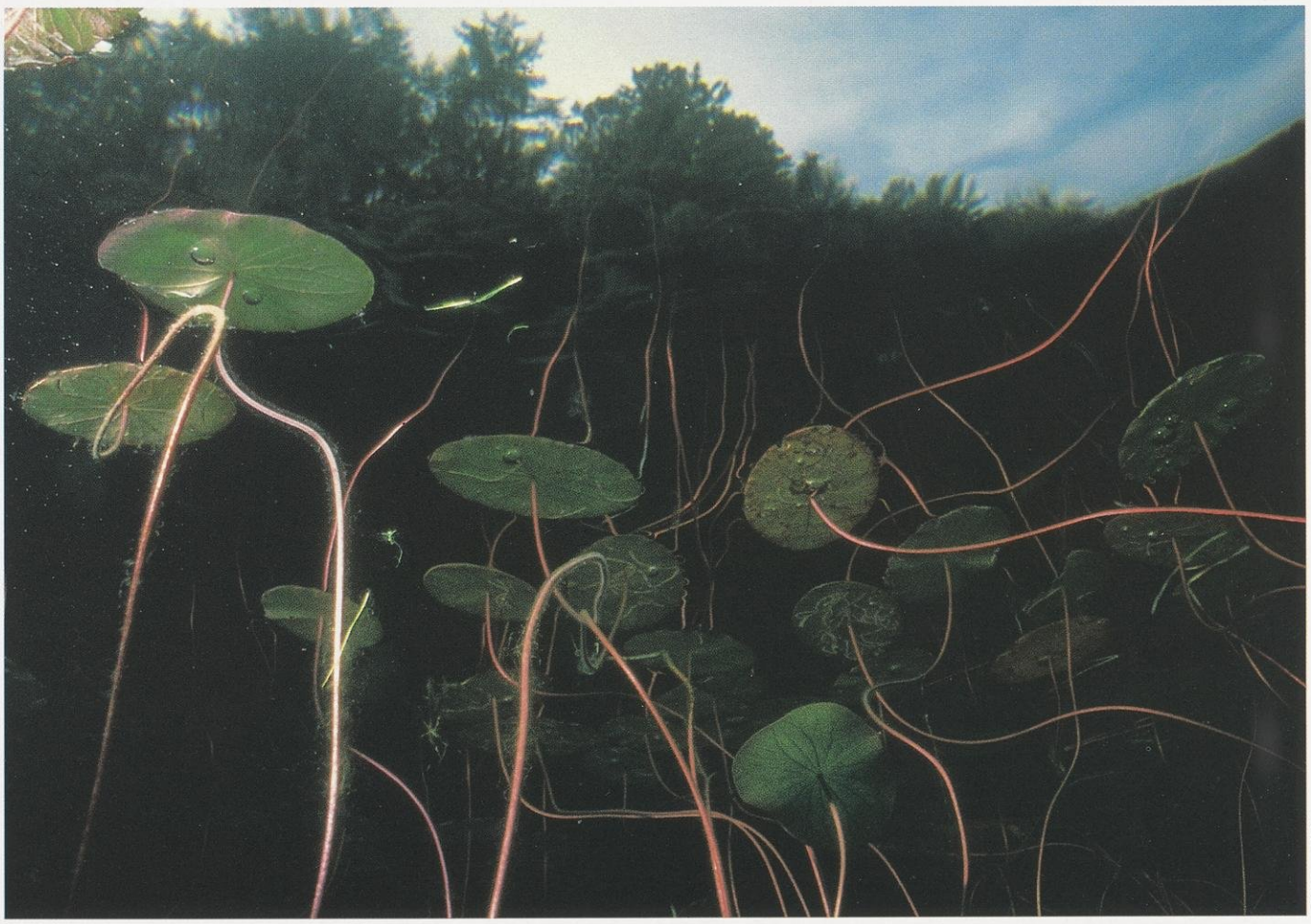
Think **community**. Think **environment**. Think **economy**. Now think of them all together, and you'll have the scope of ecosystem management.

Thinking through a problem, thoroughly

Consider a typical environmental problem: a lake with a declining perch population. Anglers are unhappy because there are fewer fish to catch; resort owners on shore are unhappy because fewer anglers are staying at their cottages. The solution: Have the Department of Natural Resources stock the lake, year in and year out.

Now, take a look at an ecosystem management approach to this issue, with the help of eight themes to guide your thinking:

Context: Using ecosystem management, resource managers wouldn't see this problem as a single-species issue. Realizing that a focus at any one level — genes, species, populations, ecosystems, landscapes — would not be enough, they adopt a "systems" perspective, seeking connections to the problem at all levels. What about the health of other aquatic species in the lake? How's the water quality in the watershed, the air quality in



ROBERT M. KORTH

Ecosystem management in action

Formerly a shallow lake in decline, Fox Lake in Dodge County today has excellent prospects for recovery due to citizens active in the Fox Lake Protection and Rehabilitation District and the Dodge County Land Conservation Department. In 1995 the interested parties joined with staff from the Department of Natural Resources to begin discussing the lake's problems. Years of nonpoint source pollution, drained wetlands, and intense recreational boating and fishing pressure had nearly destroyed what was left of Fox Lake's natural amenities.

The result of their effort was the Fox Lake Restoration Plan, a blueprint for future action notable for its emphasis on ecosystem management. The plan makes clear that to restore and maintain the public benefits Fox Lake is capable of providing, three elements are necessary: First, lake residents, lake users, local governments and other stakeholders must understand how the lake "works" — that is, they must learn more about shallow lake ecosystems in general and Fox Lake in particular. Second, there must be an ongoing examination of the causes and disturbances responsible for changing the lake's condition. Third — and perhaps the most critical — if those disturbances are caused by human actions, the community must adjust its working relationship to the lake and act to restore key ecosystem processes.

A lake drawdown, careful water level management, wetland restoration, "zoning" the lake for different activities, and fishing and boating regulations are a few of the tools mentioned in the plan for restoring the lake. Interested citizens have held open houses to explain the plan's points and to solicit ideas and opinions. For the plan to succeed, lake residents and users need to be patient and must be willing to cooperate in the best interests of the lake. By participating in the restoration in some way, whether as part of a group or simply through their own actions as individuals, stakeholders in Fox Lake can turn around their community's most valuable natural asset.

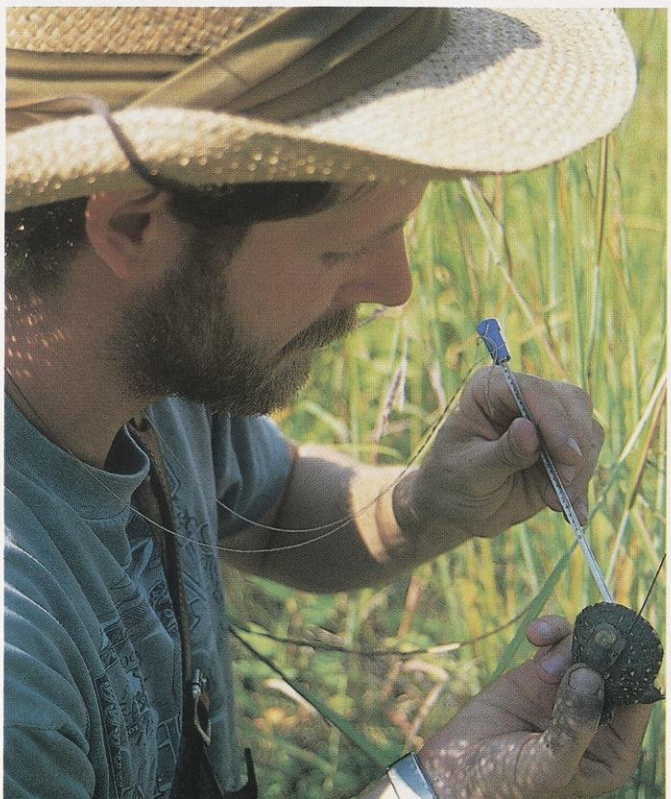
MARK SESING

Managing water levels, stemming nutrient flow, and eradicating carp were just a few tools in the toolbox for restoring Fox Lake.

the region? What's happening to similar sport fish populations in other parts of the state, the Midwest, the nation, the world?

Boundaries: The context helps determine the ecological boundary in which the problem will be addressed. In addition to examining this particular lake, managers might want to look further, at the watershed as a whole. Administrative boundaries — townships and counties, for instance, or the scope of action of another state or federal agency — need consideration as well. Managing lands along ecological boundaries requires greater cooperation among all interested parties, institutional or private.

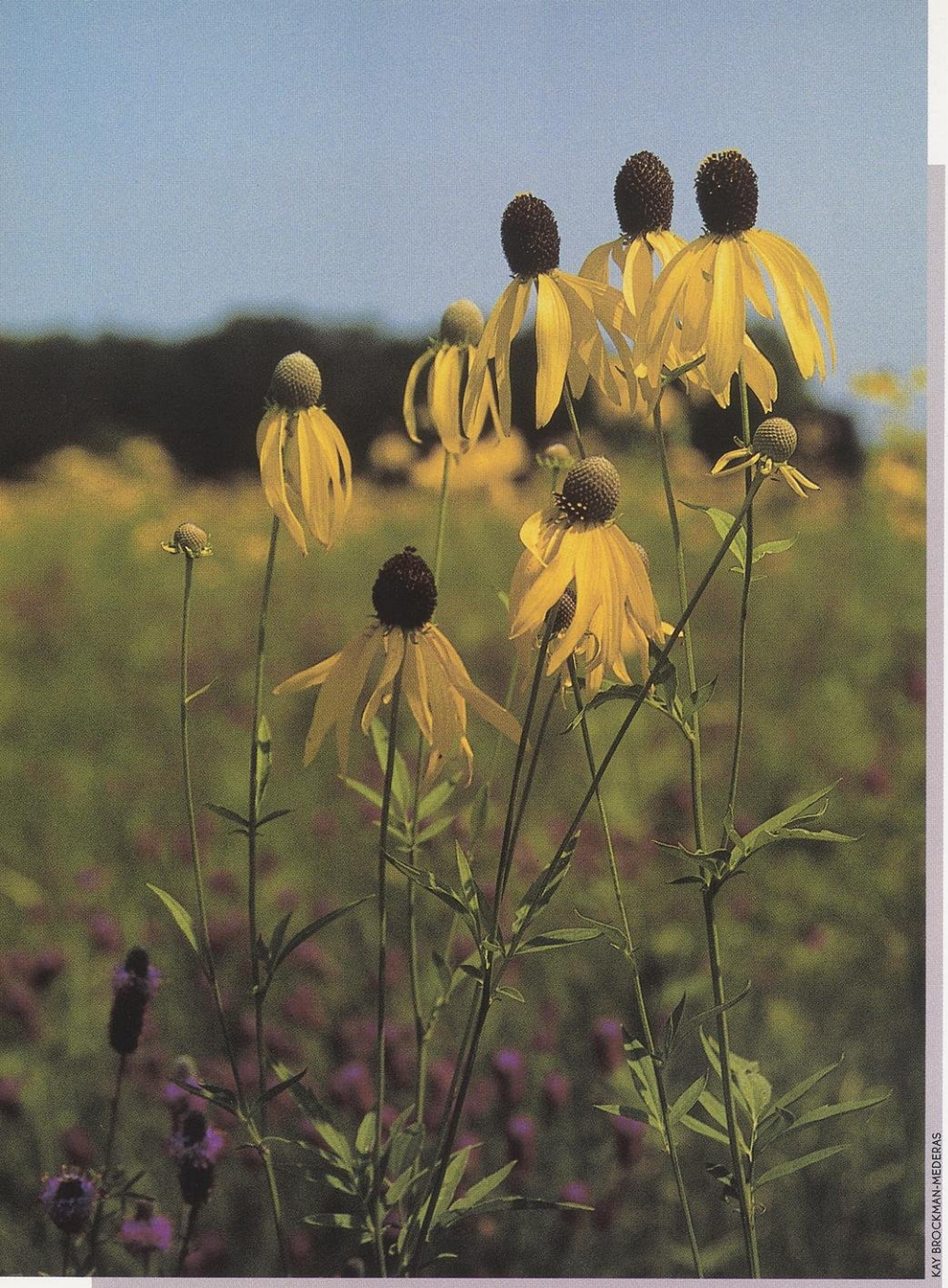
(left) Looking at ecosystems from many perspectives, like from the lake bottom up to the surface, helps us view the whole ecosystem. (below) By monitoring animal health and mapping ornate box turtle territories we better understand the needs of all neighbors in the community.



ROBERT QUEEN

Integrity: The idea here is to protect the patterns and processes contributing to the natural diversity of life in an ecosystem. If soil runoff from the watershed is harming the reproduction of zooplankton (the microscopic aquatic animals fish feed on) and encouraging the growth of lake weeds, which are smothering native aquatic plants that provide habitat for fish and birds, and muddying the waters of a favorite sandy swimming beach, then it's time to address that issue with ecosystem management.

Data: Careful research and data gathering provide one of the bases from which an action can proceed. Besides conducting their own research, DNR managers would collect information from other institutions, organizations and individuals before forming a plan of action. In the case of our lake, the U.S. Forest Service manages a quarter of the acreage in the watershed and The Nature Conservancy owns a four-acre wetland adjacent to the lake; both groups would likely have data on a variety of natural resource concerns. Plus, the local angler's group has kept a record of the lengths and weights of all trophy fish caught in the lake for the past 10 years, a company planning to build 40 new condominiums in the township has recent soil samples, and the resort owners have tallies of the number of guest anglers who stayed at their establishments going back 20



KAY BROCKMAN-MEDERAS

Ecological solutions have elegance and beauty. Black-eyed Susans, yellow coneflowers and purple prairie clover are mixed with Indian grass, big bluestem and other grasses to restore GHRA grasslands. Such plants provide nesting cover and shelter for songbirds, upland game birds and waterfowl.

Ecosystem management in action

In east central Wisconsin, landowners are helping wetland and prairie species survive by selling conservation easements or parcels of land to the Department of Natural Resources. In the 530,000-acre Glacial Habitat Restoration Area (GHRA), the goal is to restore 11,000 acres of drained wetlands and 38,000 acres of grasslands. By purchasing parcels and easements strategically located within a larger region, the Department is piecing together a patch work of habitat for ducks, pheasants, meadowlarks and other species that can thrive side-by-side with agriculture. Property owners involved in the GHRA learn about landscape restoration and gain a greater appreciation of land stewardship. About 6,000 acres have been placed in easements or purchased in the GHRA since 1992. Additional acres have been enrolled in the Conservation Reserve Program, Wetland Reserve Program, and other state/federal incentives to stem soil erosion, restore wetlands or establish grasslands, shrubs and trees.

years. All this information could prove useful in plotting a course of action.

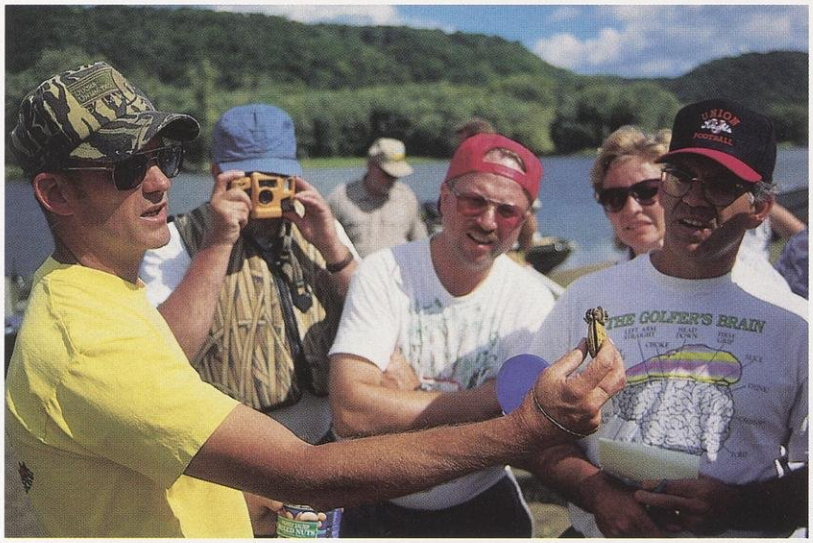
Monitor: It's necessary to track the results of any action to evaluate its success or failure. Monitoring creates a feedback loop of vital information. For instance, lake property owners in the watershed could help by creating "lake watch" groups to take regular samples and track water clarity as an indicator of runoff.

Adapt: Scientific knowledge isn't written in stone. Ecosystem management is a flexible process, able to adapt in response to previous actions. It allows for uncertainty. If the information collected and analyzed on a planned activity indicates movement in the wrong direction, we can adjust mid-course. It's a continual process of *plan–do–check–act,* with all partners, stakeholders and interested or affected parties included in the reevaluation. If curbing runoff in the watershed isn't helping sport fish populations bounce back as much as hoped, it's time to consider other alternatives.

People: People are a part of the ecosystem management process. Goals are shaped not only by scientific knowledge, but by human values; decisions made with citizens, rather than for them, are likely to be more successful. On our lake, the need for resort owners to make a living and the desire of anglers for recreation will not be ignored — nor will they be addressed as the only issues worthy of attention.

Change: Resource management organizations will change internally to fully implement ecosystem management. The reorganized DNR, for instance, is now based on watersheds rather than human-designated boundaries. Environmental science curriculums offered in schools and universities must take a more interdisciplinary approach to prepare students for the many-layered issues they will encounter throughout their careers.

Individuals will need to change, too. It's time to accept personal responsibility for using natural resources as caretakers,



ROBERT QUEEN

We need to keep showing people how ecological changes reach throughout the ecosystem. Here teachers see how zebra mussels are extending their range down the Mississippi River.

not just consumers.

Is the ecosystem management approach more complex than traditional resource management techniques? Absolutely. But, by incorporating a variety of opinions and desires, integrating research, and remaining open to options for adaption and change, ecosystem management can offer long-term solutions to problems at a number of levels.

Ecosystem management doesn't promise a quick fix. It will produce decisions a greater number of people can live with and support.

Ecosystem management in action

Agriculture is a necessity of human life resulting in a major alteration of the environment. Can we grow our food using methods that enhance, rather than disrupt, natural processes and still allow farmers to make a profit? A team of interested people called the Agricultural Ecosystems Research Group aims to find out.

The group includes farmers, local town residents, a natural landscape consultant, and representatives from the Department of Natural Resources, the University of Wisconsin, the Department of Agriculture, Trade, and Consumer Protection, the Public Service Commission, Madison Audubon Society, Fox-Wolf Basin 2000, Aldo Leopold Foundation, Viterbo College, U.S. Fish and Wildlife Service, National Biological Survey and Natural Resources Conservation Service and a team of researchers from DNR and the UW-Madison College of Agriculture and Life Sciences. Members come and go depending on the particular project under consideration. Some of the organizations were specifically recruited to join the group; others heard about it, and just started attending. Anyone is welcome, as the team seeks a spectrum of opinions and experience.

The ad hoc group advises researchers, and shares information and ideas on issues to address. The merits of specific research projects or data collection methods are debated, with the ultimate goal of finding a solution to problems. Research results are shared with the committee who interpret the findings in reasonable guidelines for farmers and other rural landowners. "Our private farmer members are very important members of this group," says DNR's Jerry Bartelt. "Often they provide the 'touch of reality' that is needed to make sure our results will be useful and accepted by other farmers."

JERRY BARTELT

One research partnership is examining if switchgrass can provide wildlife cover and be harvested later in the growing season as a source of fuel.

Currently, the group is working on several studies involving grasses, grazing and aquatic habitats. One way to control nutrient and pesticide runoff into surface waters is to have grass buffer strips planted along streams and ponds. Wildlife use the strips, but the unproductive land represents a loss of income to the farmer. In southwestern Wisconsin, team members are investigating how rotational grazing could allow farmers to use the strips without damaging water quality or habitat for fish, aquatic insects, birds, small mammals, reptiles, amphibians and native vegetation. Team researchers are also looking at ways to manage switchgrass for biomass energy, grazing, and wildlife habitat; comparing native warm-season grasses to determine which species and genotype are the most productive in Wisconsin and which could be used for pasture or to produce biomass energy. In another study, researchers and farmers are comparing sorghum types to determine the best variety for wildlife food plots and cover.

Ecosystem management in action

Ecosystem management methods can be used to broach long-standing, seemingly unsolvable problems. In northern Wisconsin — home to 12,000 of the state's 15,000 miles of shoreline — the touchy issue of lakeshore development has been raised in public forums hosted by the Department of Natural Resources and the Governor's Council on Natural Resources. The topic — formerly guaranteed to spark heated debates over property rights, government regulation, and personal vs. public lake use — received a thoughtful airing.

The rapid pace of change up North prompted the forums. With a sharp increase in the number of permanent residents, scarce lakeshore property and greater demand for all forms of water recreation, the "ribbon of life" (the slice of land from the ordinary high water mark to 500 feet upland that provides critical habitat for numerous plants and animals) is in danger of disappearing altogether on many northern lakes.

ROBERT QUEEN

We are drawn to the lake, but we need to better protect the shore to protect the water's finest qualities. Maintaining a natural mix of plants on shore and in shallow waters sustains fish, clean water and would buffer the problems development brings.

Lakeshore property owners, lake users, developers, local government officials, conservation group representatives and other forum participants discussed ways to protect the very things people treasure about the North: natural beauty, outdoor recreation, peace and quiet. Some participants went on to join task teams and map out strategies for action. It's the beginning of a long journey toward a common goal shared by a diversity of people and organizations.

Part of the team If much of this sounds familiar, that's no surprise: The Wisconsin Department of Natural Resources has used different aspects of ecosystem management on many occasions in the past. Now the agency is making a commitment to more fully engage in ecosystem management in all of its activities. To that end, the Department has established Geographic Management Units (GMUs) in each of its five regions.

Partnerships with agencies and landowners can get more done in an ecological region or corridor.

ROBERT QUEEN

GMUs are based mostly on the state's major river basins, and most field staff will be assigned to a GMU. This new structure brings together teams of employees with different types of expertise to take an interdisciplinary approach to issues.

The teams will conduct their work with the assistance of citizens who want to become more involved in natural resource and environmental issues. Citizens can help shape goals and priorities, assist in gathering and sharing information, be at the table when plans are charted and options weighed. They will help resource managers explore incentives to prompt appropriate action, rather than relying on more laws to force compliance.

Sounds good. Now tell me — again — what ecosystem management *is*. It's *you*. You with a 360-degree view of the world. You, working with family, neighbors, colleagues, government and elected officials to protect the integrity of the ecosystem and provide the goods and services humans need. We now know environmental regulation can only go so far. For years people have been demanding less government, more voice, and a cleaner environment. Now the time has come to work together and find the incentives that will bring out the steward in all of us.

Front Cover: It's a race and a balancing act to maintain a region's natural qualities amid inexhaustible human demands for resources.

Cover photo by John M. Sehr

Written by Maureen Mecozzi

Design by Moonlit Ink

If you have questions about ecosystem management practices at the Department of Natural Resources, contact Violet Lehmann, Integrated Science Services, P.O. Box 7921, Madison, WI 53707, or call 608-266-4359.

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ROBERT QUEEN

A hundred years of Wisconsin weather

Dick Kalnicky

We remember the big snows, the floods and the dry spells. Do weather trends emerge from tracking the highs, lows and lengths of the seasons?

Everybody talks about the weather, but a few of us try to figure it out. In Wisconsin, dozens of cooperative observers and several U.S. Weather Bureau offices have regularly observed the weather across the state and accurately recorded conditions since 1891. What do these continuous records show? How do we distinguish normal from extreme weather, and can this knowledge help us see future trends?

Tracking weather patterns teaches us about human nature as well. Most people don't recall the weather last week, let alone last year. We don't remember weather averages, but we revel in memories of the extreme weather that affected our lives. For instance, many people in southern Wisconsin remember a series of soggy days last June followed by a rainfall of more than seven inches that turned back yards into lakes and basements into swimming pools. Last winter, in late January and early February, temperatures dipped to record lows and many schools closed for several days because it was too cold to start the buses and too dangerous to walk outside without plenty of wraps and skin protection.

I remember being a sophomore at Boyceville High School back in January 1963 when school closed for three days because it dipped below -30°F. Imagine what it was like in January 1912, the coldest month in 105 years when the average Wisconsin temperature was -2.5°F!

I also remember the fall of 1969, beginning graduate school at Madison, a full 220 miles southeast of home and that much closer to Florida. My dreams of milder winters were

ROBERT QUEEN

Big snowfalls and drought leave dramatic, but short-lived marks on the landscape and our memories.

(right) The ups and downs of temperature seem to be cycling above and below the norm now. The 1930s through early 50s were warmer than the norm; late 50s through the 80s were cooler than the norm.

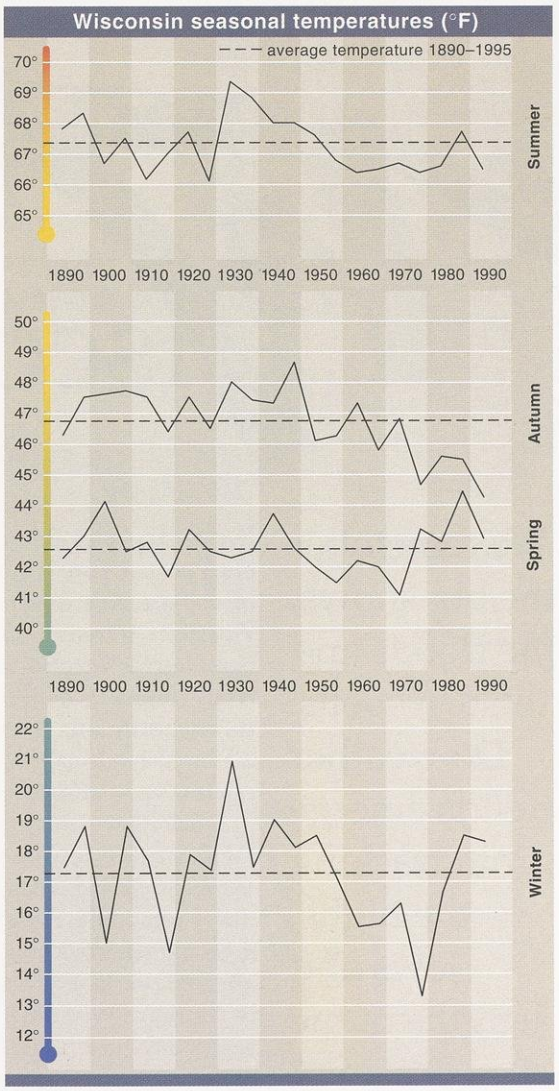
B. WOLFGANG HOFFMAN

Live with it!

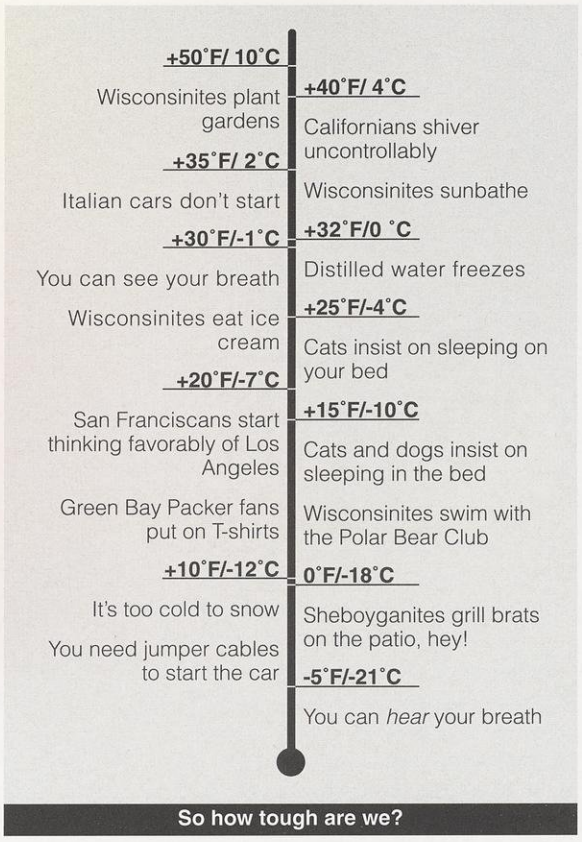
Whether the weather be fair or whether the weather be not,
Whether the weather be cold or whether the weather be hot,
We'll weather the weather, whatever the weather,
Whether we like it or not!

—Words and music published by The Presbyterian Book Store, New York, New York

DNR PHOTO



WEATHER DATA COMPILED FROM MIDWESTERN CLIMATE CENTER, WISCONSIN STATE CLIMATOLOGY OFFICE AND U.S. WEATHER BUREAU



DNR PHOTO

High wind and high water take a greater toll on the Wisconsin landscape than dry, cold or warm conditions.

quickly put to rest by the brutal Januaries of 1970–72 which were a full seven degrees colder than the three previous winters.

Two recent summers in Wisconsin took us from the freezer to the fryer. In 1992, following the eruption of Mount Pinatubo in the Philippines, huge amounts of volcanic ash were suspended in a band that spread worldwide. That summer, it was too cold in my Madison garden for sweet corn to produce cobs — an average temperature of only 65.5°F; a full four degrees below the norm. Only the summer of 1915 was colder since records have been kept. On the other hand, the summer of 1995 was the warmest on record in Madison with an average temperature of 74.6°F.

Drought and flood years are equally memorable. You may remember back to 1988 when the state was so dry that the Mississippi River had too little flow to sustain boat traffic. If you lived through them, the Dust Bowl years coupled with the Great Depression caused major migrations from the Great Plains states.

The weather can be downright devastating when several unusual seasons follow back to back. The great floods of the summer of 1993 took their toll following almost 16 inches of rain. The stage for disaster had been set by high rainfall in 1991 and a cold summer in 1992, which lowered evaporation and raised groundwater levels. This was followed by a wet spring in 1993 when 10.41 inches of rain fell in the Midwest. The ground was simply saturated. The additional 16 inches of rain that summer could not soak into soil fast enough. It cascaded down slopes and waterways, flooding out low lands and river valleys. We actually had more rain in the summer of 1980 (16.24 inches), but those storms followed a dry spring. Consequently, few areas flooded.

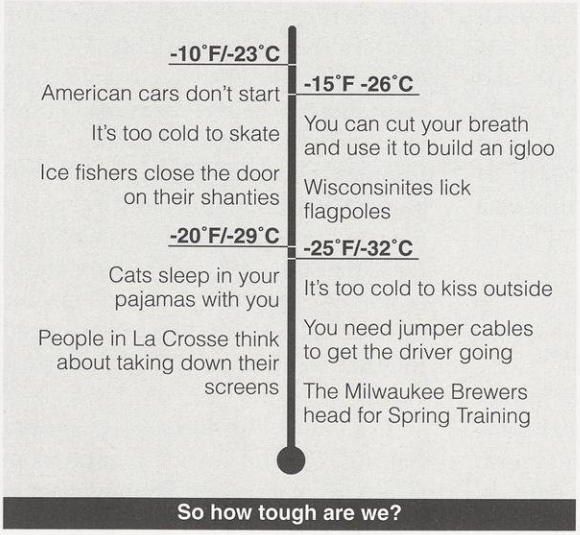
Tracking the temperature

After tracking the weather year to year for 105 years, hindsight provides some trends. Wisconsin's mean temperatures can be divided into four periods: the 1890s through 1920s when temperatures fluctuated both above and below the mean temperature; the 1930s, '40s and early '50s when temperatures were consistently above normal; the late 1950s through the early '80s when temperatures were consistently below normal; and the late '80s through the present when temperatures appear to fluctuate above and below the norm again.

Temperature trends for the winter and summer seasons were nearly identical to the annual averages, but the winters were more variable. Winters during the late '70s were consistently eight degrees colder on average than winters in the 1930s. So, among other things, when your grandparents and parents carp about how much tougher life was during the Depression, remind them that they are only talking about economic conditions. If you are in your thirties and forties, you experienced tougher weather as a child than your elders!

In summer, the differences between the highest and lowest means were about three degrees. That may seem small, but if such subtle changes are

We continue to be fascinated by the weather because so many variables change at the same time that accurate forecasts remain a mix of science, art and technology.



sustained, the landscape ecology would shift dramatically. A mean summer temperature change of only *two* degrees could change the look of the Northwoods, shifting the dividing line between Wisconsin's southern oak savanna and our boreal northern forest about 80–100 miles northward. Eventually the predominant stands of conifers so noticeable north of a line from St. Croix Falls to Wausau to Oconto Falls would not be common until one traveled as far north as the state border between Wisconsin and the Upper Peninsula of Michigan.

Precipitation trends

Except for a short period in the late 1980s, rain and snowfall amounts have been on the high side since 1970, mostly due to really wet summers. The droughts in the Dust Bowl days of the '30s followed several years of back-to-back dry springs and summers. Groundwater levels took a long time to recover from this extended dry period.

I saw a less dramatic example for

DON BLEGEN

The hot ones, the dry ones and the wet ones

warmest weather

month	average temperature
July 1921	76˚F
July 1916	75.6˚F
July 1901	75.3˚F
July 1936	75.2˚F
July 1947	75˚F

dry times

period	total inches of precipitation below the 31.06" annual norm
1929–37	-28.53
1955–58	-15.81
1987–89	-14.10
1893–95	-12.97
1962–64	-12.70

floods and soakers

period	total inches of precipitation above the norm
1982–86	+22.73
1990–95	+19.33
1911–1916	+14.84
1902–1906	+13.95
1977–80	+12.65

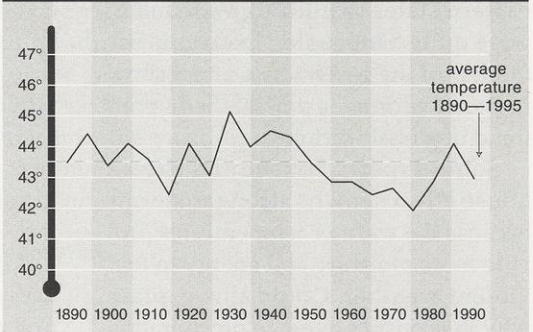
myself on the family farm. In the late 1950s, we regularly harvested crops of hay from lowlands that would be classified as seasonal wetlands. By the 1980s, after several seasons of cool temperatures and above-average rainfall, these fields had mostly become marshland. Groundwater in this area has risen at least four feet. In fact, my parents had to install a sump pump in the farmhouse in the late 1970s in a basement that was within and above bone-dry soil when the house was built in 1959.

Greenhouse or not?

Worldwide, mean temperatures reached their highest levels in the past 100 years during the 1980s and 1990s. Many scientists attribute part or all of these temperature increases to the greenhouse effect — where sunlight reaching the Earth is radiated from the surface and trapped by ozone, water vapor and carbon dioxide in the atmosphere. Although Wisconsin's temperatures in the last 10 years were warmer than they were from 1956–85, they are still well below the average temperatures of the 1930s and 1940s.

However, the fact that average temperatures here have not reached an all-time high does not discount a greenhouse effect. Climatic changes are not constant across the globe; there is substantial regional variety. For example, worldwide temperatures from 1961–70 were somewhat cooler than they were from 1931–60. However in the United States, parts of the West were warmer

Wisconsin average temperatures



An annotated thermometer found on a cruise down the Information Highway.

ROBERT QUEEN

It takes a decade of hindsight to discern long-term weather trends because the changes year-to-year are so subtle. Might just as well relax and enjoy it!

than the norm from 1961–70, while eastern states (including Wisconsin) were quite a bit cooler. Even climatic models of the greenhouse effect show regional variety as part of the overall trend of global warming.

Some experts believe the greenhouse effect spawns stronger storms because the warmer temperatures provide more moisture and energy to fuel violent weather. Could this explain why Wisconsin's average precipitation has been higher since 1970?

Hard to tell.

The changes that we notice year to year are so subtle that only the hindsight of a few decades allows definite patterns to emerge. For instance, average rainfall increases of only two inches over a 25-year period would increase groundwater levels by four feet. A four degree temperature change during our coldest six months can increase our heating bills by more than 10 percent. During the past ice ages, world mean temperatures were only ten degrees colder than they are now.

Wisconsin's climate has changed many times throughout our recent and not-so-recent history. These subtle swings bring big environmental changes that define our floodplains, groundwater levels, native vegetation, food supplies and energy use. In following the past 105 years of weather records, it's clear why the art of long-range weather prediction is so open to interpretation. The daily, seasonal and even yearly swings mask the small changes in mean temperature that could tell us if the next swing will head toward the greenhouse or the ice box. It takes a lot of hindsight to sharpen the forecasts. □

Climatologist Dick Kalnicky obtains grants and contracts, and coordinates cleanups of contaminated lands in DNR's Remediation and Redevelopment program in Madison.

The holiday tree

HOW AN ARBOR DAY SEEDLING GREW INTO A MEMORABLE GIFT.

story and photo by Patricia Bacon

Many years ago when I was teaching fourth grade at Lincoln Elementary in Appleton, the Department of Natural Resources provided each student with a tree seedling on Arbor Day. [*Ed. note: We still do*] I brought my little spruce seedling home and planted it in our front yard. I nurtured that tiny tree for years — guarding it from the lawn mower and keeping the critters on our acre from nibbling it. I even talked to the tree as I mowed the lawn each summer.

Well, that "Baby" grew to be 15–17 feet tall. In the last few years, I even strung lights on it all winter because it was a truly beautiful specimen. Four years ago, when Outagamie County started widening County Highway S from Highway 47 to the Village of Freedom, I worried that our spruce would be in the path of the new route. After careful checking, I was assured the tree would be spared as it was wide of the roadway...then the electric company relocated the power lines right over our tree. I envisioned the trim job the tree would get as it reached the lines, and I started feeling sick. Fortunately, my husband, Dan, convinced the county to move our spruce before that would happen. We need not have worried. The first snowfall in early December brought very slippery roads. That evening, a young man in a pickup skidded off the road into our front yard. My husband helped him push his truck back onto our driveway, we checked that he was okay, and we sent him on his way. Then Dan went outside with a spotlight to see if the recently seeded ditch had been damaged. His head hung low as he came through the door. "Our spruce tree is tipped over and looks badly damaged." I cried. The next day we contacted the driver and his insurance company. The tree was appraised. A landscaping company told us it was severed at the taproot and could not be saved. Then I got an idea. I asked the insurance company if I could cut off the top part of the tree for the holidays. They said sure, but I would have to wait until the claim was settled. That took almost two weeks, until the Thursday before Christmas. That day, my father, daughter Holly and I went "tree hunting" in the front yard. We chopped off a good-sized piece and then tried to get it in the house. TOO BIG. We took a little more off the top. By the time we got it into the tree stand, that tree took up a third of our living room. It had never looked quite that big in the front yard. Holly and I set about decorating it and we took lots of pictures. It was beautiful and was the clear topic of conversation with each new visitor. Telling its story over and over again helped a little, but I sure hated to take it out in the back yard after the holidays. On December 27th, we got a call from the county asking when they could move our spruce and where we wanted it. Hmmm! It took me a while to "graduate" from teaching fourth grade, so over the years we received five or six other Arbor Day seedlings that are now in various stages of growth in the yard. I guess I'll have to adopt them, but none will be as special as that first spruce and the holiday joy it provided. □

When the fabled spruce was a youngster.

Patricia Bacon teaches third grade in Appleton and writes from Freedom, Wis.

The cane maker

George S. Bachay
Story photos by Robert Queen

A sprained ankle on a winter trapline crafted a new opportunity.

After I retired from writing and illustrating a daily newspaper column, I was perfectly happy to stay home and paint pictures of wildlife — for a while. It's funny. After two years of intensely laboring at my lifelong ambition to paint, it became *work*. In following years I painted less, but I learned to discipline myself, and produced better quality artwork.

Living along the Sugar River near Albany, my wife, Theresa, and I spent more time gardening, hunting and fishing. The muskrats beside the river became numerous. They began burrowing into the riverbank and eroding it; trapping the "rats" became a delightful diversion for me.

One December day we had an early freeze and my traps were sealed in shallow water under an inch of clear ice. I went to check the traps and saw a muskrat caught in the set, so I stamped my boot heel down hard to break the ice. Big mistake. By the time I got into the house, my ankle was swollen black and blue.

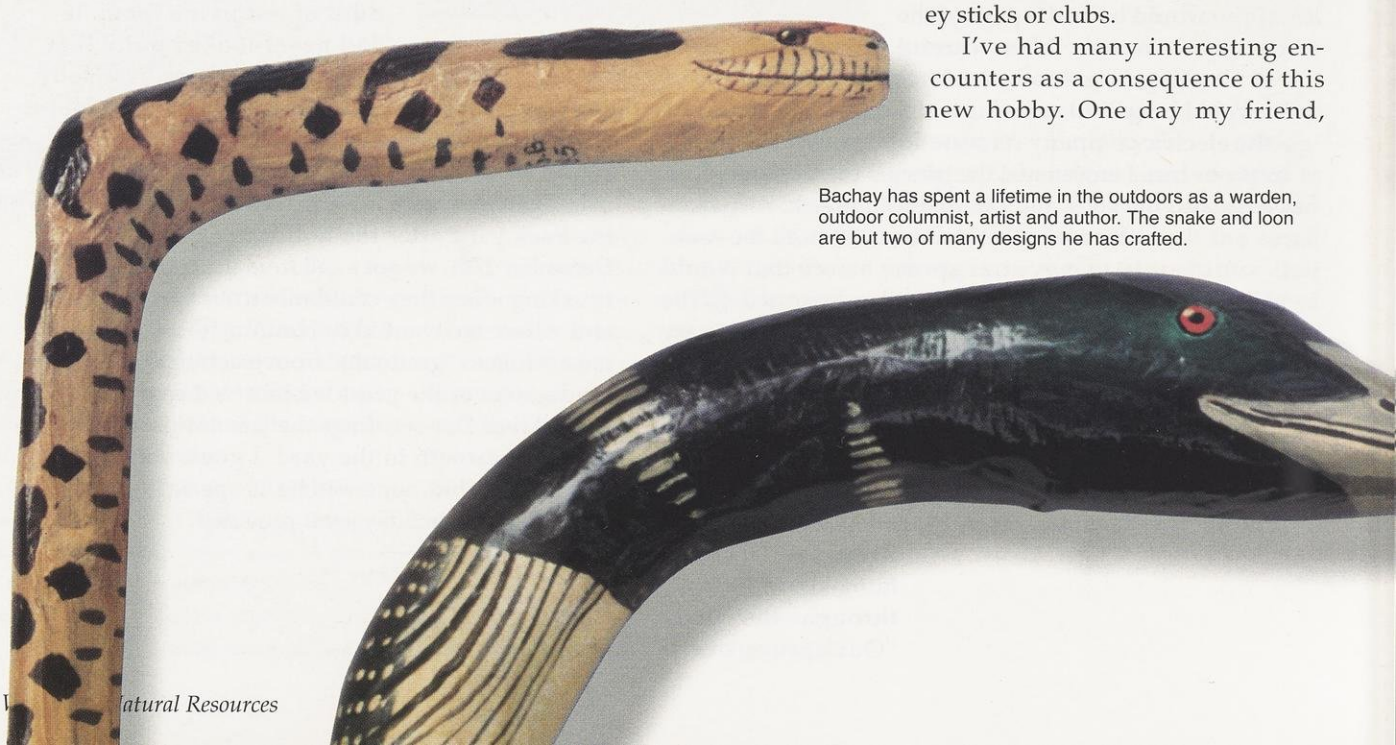
Theresa had me soak the injured foot in hot water, then she wrapped my ankle snugly. I limped back to the trapline with an axe to retrieve the rest of my hardware.

It was darn painful moving along the icy bank. I had to stop often to rest my aching ankle. While I stood near a crabapple tree, leaning on the axe handle, I spotted a vertical sucker growing from a horizontal branch from a tree on the shore. It sure looked like an upside-down cane to me. I chopped it off with the axe and gave it a try. That cane not only provided relief, it began a new art form for me.

I carved that first cane nearly 12 years ago in the shape of a drake mallard. I liked it so much that crafting hunting canes became an obsession like hunting pheasants and rabbits. A folding saw and hatchet soon became partners to my shotgun on my outings.

Since then, I'll bet I've carved nearly 2,000 canes depicting pheasants, ducks, geese, elk, fish, fox and even snakes. The "canes" are also useful as putters, hockey sticks or clubs.

I've had many interesting encounters as a consequence of this new hobby. One day my friend,



Bachay has spent a lifetime in the outdoors as a warden, outdoor columnist, artist and author. The snake and loon are but two of many designs he has crafted.

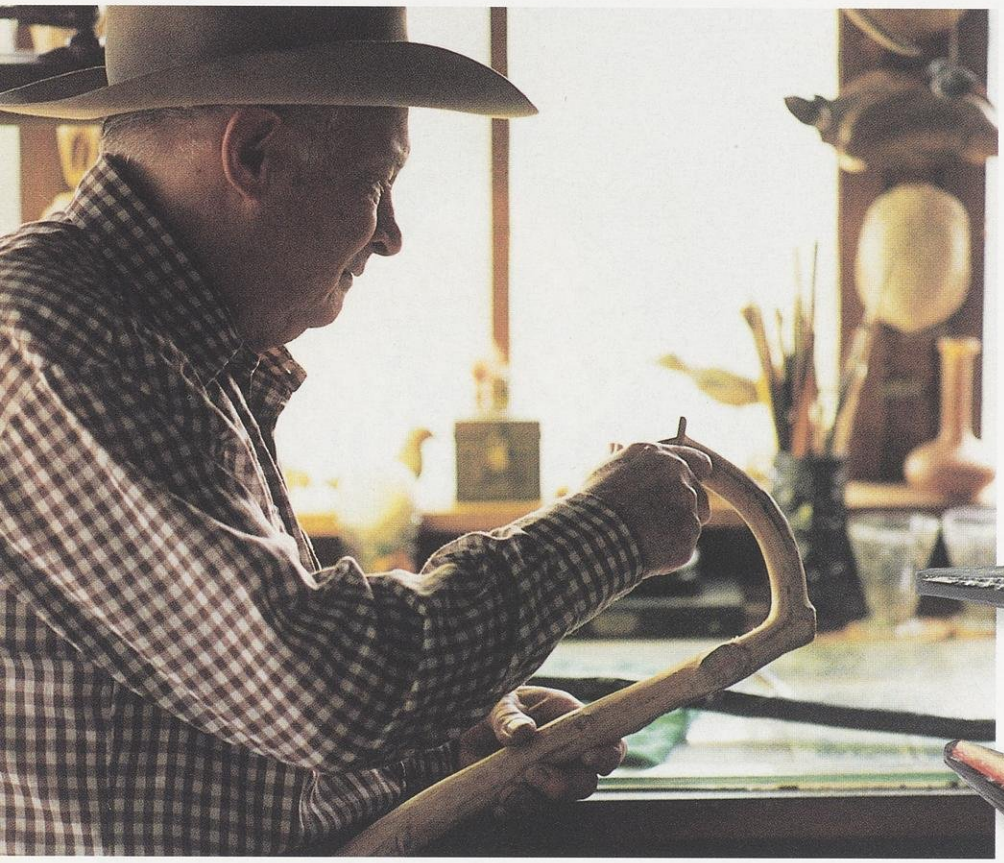
retired warden Larry Johnson, brought me some materials for canes.

"Conservation warden Joe Pelican is retiring, and I'd sure like to send him a hand-carved cane," Johnson smiled. "Here's one that could be shaped like a pelican's head. Wouldn't that be appropriate?"

The crooked portion had a thick, growth providing a perfect pouch on the lower jaw for a pelican head. Joe shed a tear when he received the gift. In subsequent years, many of my DNR friends who were resource managers and wardens have brought over raw stock they pruned while working on stake-outs waiting to apprehend poachers.

Another time, Johnson brought by a flat stone with a swirl on it. "When I saw this rock, I could see that it was just perfect for a ram," Johnson said. Some time later, he sent us a note. "I can't look at a flat rock or a bent stick without thinking of you."

Friends began to bring over stones from the Atlantic and the Pacific so I could paint fish, ducks and game birds. Conservation warden Jill Schartner brought rocks from Lake Michigan and retired warden Jim Amundson brought rocks from Lake Superior.



The canes are hand-crafted and painted from tree sprouts and branches that took odd bends. It takes an artist's eye and skill to find the animal within.

State park manager Alex Olson from Monroe searched and searched, but he couldn't find the right kind of cane.

"We have a big crabapple tree," Olson declared, "but I can't see a cane on it. I'm going to cut it down, load it on my truck and cart the whole thing over here so you can point out where the canes are!"

It wasn't necessary. A week later, Olson found six canes in the rough.

Melissa Griffin from La Grange saw our canes and wanted one for herself. "While I was driving from Wales, I saw a truck loaded with branches that had been pruned from an orchard," she said. "I asked the driver if I could have one big branch. He looked at me kind of strangely and helped me load it on my pickup. That's how I got this cane.

She had scraped the bark and cambium layer absolutely clean — it was *perfect* for a loon.

For me, the reward in painting rocks and making canes is knowing how much our friends appreciate them. Fish Manager Don Bush in Janesville sent us a card: "Thanks for the northern pike cane. It's great. All my friends are envious, especially those who now limp a little!" □

George S. Bachay crafts folk art and fine stories from his Albany, Wis. home. Mr. Bachay is currently pursuing a new passion, writing western romance novels.

1996 WISCONSIN NATURAL RESOURCES INDEX

We annually publish a subject index of our stories each December. An index of our stories 1977–1996 will be available as a file you can download from our Web site after January 1. Please note this is a large file (more than 350,000 bytes and in excess of 100 pages). Web site is located at http://www.dnr.state.wi.us/wnr.

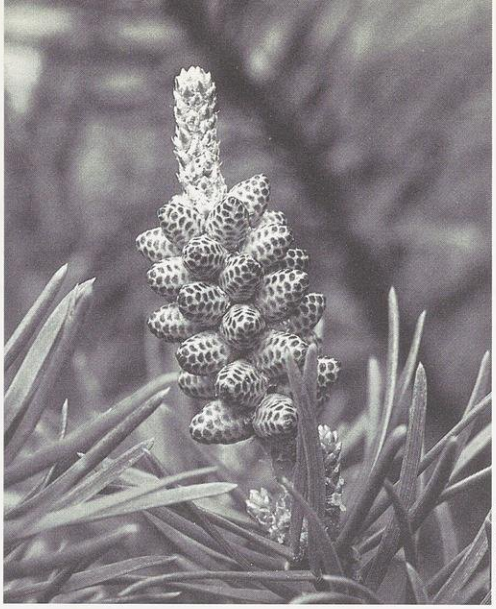
Continued from page 2

When the tree is ready to be pollinated, it secretes a small amount of fluid that collects in the narrow crevices between the scales. At the same time, the mature male pine cone releases a heavy dusting of yellow pollen. These primitive plants rely on wind pollination. Enormous quantities of pollen are released on breezes to drift onto roads, ponds, cars, sensitive noses and the waiting female cones.

Each evergreen species produces a uniquely shaped pollen grain that will only reach female cones of its own species. The wind-borne pollen settles on the fluid within the female cone. It gets trapped and drawn into the crevices to rest on the two ovules at the base of each cone scale. Fertilization is usually immediate, but not always. Jack pines are not fertilized until 13 months after the pollen is trapped.

After pollination, the cone scales thicken until they are tightly pressed together. As the cone grows, it darkens, hardens and encloses the developing seeds. When the cone is mature and the timing is right, the cone dries out, pops open and releases two seeds per scale, each with a tiny wing to guide its flight.

Each species disperses seeds in a different way. White pines open and drop their seeds late in their second summer, then the cone drops off the tree. Some jack pine cones open naturally, others may wait 10–20 years and only open when exposed to intense fire. White spruce cones open and fall their first winter. Black spruce cones mature in one year, but can remain on the tree for several years releasing a few seeds each year. When balsam fir cones mature the scales and a few seeds flake off over a period of several days to weeks, leaving a bare core on the tree. This particular dispersal method is a welcome invitation to red-breasted nuthatches which can easily extract the balsam fir seeds.



SCOTT NIELSEN

To each, it's own cone. These are male jack pine cones which take more than a year to pollinate.

When you are hanging up the holiday lights or looking for a holiday tree, take a good look at the cones. Examine the trees in your yard. Are the female buds patiently waiting for spring? Can you can find the bracts or a few seeds still stuck inside? Can you guess how each cone will disperse its seeds?

An entire textbook of the evergreen classroom may be as near as your front door or back yard. Don't be in such a hurry! Take your time and take a closer look. □

Anita Carpenter checks out each tree in the stands near her Oshkosh home.

Readers Write

CREEPLESS CHARLIE

The article on the "green alien hordes" that invade our forests, prairies and wetlands (June 1996) was most interesting and enlightening. I especially appreciated the information about controlling Creeping Charlie by using seven tablespoons of laundry borax in a gallon of warm water, thus avoiding the use of stronger herbicides in our flower gardens and lawns. That bit of advice is worth the cost of the subscription alone. It works!

Marilyn Foust
Oshkosh, Wis.

BIRD BOOKS

About a year ago, you ran an article mentioning a book by a Mr. Robbins about birds of Wisconsin. I checked with several Milwaukee area book shops and no one can tell me where to find one. Can you help?

Edward Lensby
Glendale, Wis.

You might be referring to one of three books. In our April 1992 issue, we mentioned "Wisconsin Birdlife: Population and Distribution/Past and Present" by Samuel D. Robbins, Jr. It's an encyclopedic 702-page reference which details the populations, distribution, habitat needs, migration patterns, breeding habits and wintering traits of nearly 400 species. "Wisconsin Birds," by Stanley Temple, pub. 1987, is a very handy guide for birders on the seasonal and geographic distribution of Wisconsin birds. Both books were published by the University of Wisconsin Press, 114 N. Murray Street, Madison, WI 53715-1199. "Birds of Wisconsin," by Owen Gromme, is more of a coffee-table book chock-full of illustrations by the late artist and former curator for the Milwaukee Public Museum. It is published by Stanton & Lee.

ACCESS TO CAMPSITES

I am very upset with the DNR's rules that set aside campsites strictly for canoeists. We are senior citizens who have traveled to northwestern Wisconsin to fish for 14 years. We used to stay in the campsites along the Namekagon and St. Croix rivers. We would fish into the night and then sleep in our van that we've equipped with a bed. We loved being in the outdoors where we could enjoy a little privacy.

We feel discriminated against since we can no longer stay in these riverside campgrounds strictly reserved for canoeists. We camp very simply. We buy our fishing license and few groceries, but we don't need all the luxuries of home in our van.

Those canoe campgrounds are equipped with water, simple restrooms and a fire ring. At the campgrounds now available to us, we have not found restrooms or other simple amenities, although there is plenty of room for them.

We sure miss discovering and enjoying those quiet refuges, and we wonder why they are not available to us.

Mr. and Mrs. Elmer Strange
New Virginia, Iowa

We checked on your behalf. We suspect you are describing the campsites managed by the National Park Service.

In truth, most of the 100 or more campsites along the 252-mile St. Croix National Scenic Riverway have been set aside for canoe camping since the riverway was established. The reason was two-fold: first, the Park Service only allows camping at designated sites because the costs of providing water, toilet facilities and fire rings limits how many places can be properly equipped. Second, the sites are filled on a first-come, first-served basis. So a canoeist who planned on stopping at a certain spot has to either get their early or keep going until a vacant campsite is secured. If these sites were filled by car campers, the canoeists would find very few campsites. That would limit canoe exploration to day trips.

Tent and car campers have many alternatives to enjoy the river experience including campsites at five state parks and two state forests that abut the river. Some of the choice campsites at the state parks can be reserved ahead of time.

If you truly want to find a quiet riverside refuge, explore the St. Croix River south of Never's Dam near the community of St. Croix. South of this area tent camping is allowed anywhere along the river, though potable water and toilet facilities are not readily available. For maps and information about the riverway, contact the National Park Service at (715) 483-3284.

A RIGHT TO HOWL

I think your answer to Mr. Lawrence Krak's letter about wolves was one-sided; even tacky. He has a right to his views and he brought out some good points. Does it make sense for Wisconsin to spend money increasing wolf populations while our neighbors in Minnesota pay damages to remove some wolves?

I am almost always "pro-DNR," but on this issue, not so much.

Gary W. Sutherland
Brodhead, Wis.

FISH ART

"Scaling the heights of fashion" (August 1996), encompassed all that was necessary for successful *gyotaku* (fish printing). I am a teacher in the Minneapolis area and have done *gyotaku* before. I received some wonderful tips from this article to make the fish prints even better! This year I will follow our printing with a lesson on fish dissection.

Your magazine has been a great benefit to me as an educator. Many of the articles can easily be applied in the classroom. If students become educated about nature and wildlife, they will develop an appreciation for it and will in turn respect it. Thanks for a top-notch magazine.

Lynn Mais
Victoria, Minn.

COVER COLORS

Your camouflage shot made great copy for the front cover of the August issue, but who would want to go hunting with someone wearing highly visible, shining earrings?

Clarence Peterson
Waukesha, Wis.

I'm a long-time subscriber and enjoy the informative articles. I am pleased to see more effort to encourage women who want to get involved in hunting and fishing. The more people that understand these sports, the better for all sports-minded individuals.

The August cover concerned me greatly. That person is in danger wearing the clothing and sporting the camouflage paint depicted. At turkey hunting clinics I have attended, we were told three colors were absolutely never to be worn: RED, WHITE, or BLUE. Those are the colors of a tom turkey's head. Secondly, given the sharp eyesight of the tom, those bright earrings, shiny gun and circle camo face paint will probably give this hunter away long before she would ever get a good shot.

Dennis R. Fletcher
Brookfield, Wis.

You are right that red, white and blue should not be worn when turkey hunting as a matter of safety. Also, the shiny reflections from earrings and gun stocks can be readily spotted by the wary, sharp-eyed wild turkey. Please understand that the person pictured on our cover was attending a weekend workshop in which she was receiving instruction on the preparations one makes to turkey hunt. She was not actually hunting, nor did she apply her own face paint. Instructors demonstrated face-painting techniques and quickly dabbed some paint on participants. Yes, the blues in her face paint should have been darkened. In a turkey hunting situation, face paints would need to be more carefully blended to mask and conceal the hunter.

Turkey hunters need to be especially careful to know if others are hunting the same property, identify their prey and look WELL beyond their target. Camouflage clothing, turkey calls, realistic decoys and concealed blinds all make the turkey hunter extremely vulnerable if others misjudge whether it is safe to take a shot.

EARLY PLANNING

Last year you carried a short article on a morel mushroom festival somewhere in southwestern Wisconsin. It gave dates, places and a phone number to call. Unfortunately, I misplaced my copy. Could you provide a contact?

R.E. Schluttenhofer
Ashwaubenon, Wis.

We bet you are thinking about the Muscoda Morel Festival, traditionally held each year on the weekend after Mother's Day. (Mark your calendar now: May 17–18, 1997.) Festival managers have changed over the years. We recommend contacting the Village Clerk's office in early May to find a contact (608) 739-3182.

OLD SHACK MEMORY

My wife handed me the August 1995 issue that started the cabin photos contest and she pointed to the bottom of page 14. The hunting shack pictured is a cabin I built in 1978 in Waupaca County in the middle of a woodlot on my 180-acre farm. The older logs in the cabin came from a cabin in Plover which had been built by my friend, author Justin Isherwood.

That cabin was dismantled, reconstructed and expanded on the farm. The additional logs came from 150-year-old white pines that we cut with two-man crosscut saws and milled on-site. The cedar shakes were cut on an antique steam-powered shake mill. Total cost for that cabin, including chimney, well and windows was $450.

That cabin stands on an esker, the remains of a glacial stream, and is surrounded by old growth white pine. It overlooks a pond, also built in 1978. The cabin was indeed a hunting shack for family and friends during the deer season as well as a retreat site for many gatherings. Much music and many stories have been shared at that cabin, but perhaps the best music is the sound of the wind through the old white pines.

Steve Hemshrot
Shell Lake, Wis.

DEER DAMAGE

I enjoyed reading Bill Vander Zouwen's article, "How deer to Wisconsin?" Even though whitetails do much damage to Wisconsin's flora, I believe the photo on page 19 was deformed by corn smut *(Ustilago maydis)* not white-tailed deer *(Odocoileus*

Continued on page 30

Continued from page 29

virginianus). Corn smut can infect healthy or damaged plants by entering through the flowers, tassels and ears. The fact that this plant was eaten by deer and infected happened by chance. The spores have to be in the area to infect the plant. It could have been carried by the wind or by the deer if it brushed against another smut ball or even had some on its teeth.

Jerry Davis, PhD
Biology/
Microbiology Department
UW-La Crosse
La Crosse, Wis.

An absolutely excellent article by Bill Vander Zouwen about deer. Can I write you via e-mail? Do you have a Web site?

Joie Hertzfeld
Chippewa Falls, Wis.

You bet we're wired. Send your letters, comments and questions via e-mail to SPERLD@DNR.STATE.WI.US or to our Web site described here.

SONGBIRD PREDATION

I agree with Viola Pries that hawks are contributing to declines in songbird populations. I've seen the "great wild peregrine" raid our feeding stations. He swooped right over the back deck and took a chickadee. Later, a peregrine hit the front picture window and sat stunned on the ground for about an hour, then flew into a nearby pine and sat there for a few more hours. When I spotted one in a nearby tall tree overlooking the feeders, my husband and I made as much noise as possible to scare it away.

Numerous other times there would be a flash past the windows and small birds would scatter in panic. Like Ms. Pries, we too are feeding less than half the birdseed we used to feed in the same area where we have fed birds for 16 years, and the surrounding area has not changed.

Hawks will go where the living is easy and as more of them move in, we'll have fewer other birds.

Pat Hoff
Florence, Wis.

URBAN RIVER RECOVERY

I was happy to see your article on Lincoln Creek (April 1994) and I couldn't be happier that a testing station was built on the river near 45th and Congress in Milwaukee.

I've enjoyed spending time visiting with DNR staff when they are working at the site.

I suspected for years that someone was polluting this stream, but didn't realize it came from so many sources. I remember catching some small sunfish and dumping them in the stream near the falls. Within minutes, they floated away...dead.

I used to walk up and down that stream with the Cub Scouts and was horrified at the bad water next to St. Michael's Hospital.

Back in the early forties, I used to take my bike and fish under the Sherman Boulevard stretch for crappies. We were poorer then and fresh fish was a treat.

Raymond Vinarski
Milwaukee, Wis.

PACKING OUT AT PARKS

Your magazine articles bring back vivid memories of times I've spent outdoors and you provide a wonderful balance between knowledge and appreciation of our environment as well as a forum for discussion. Can you address the new "carry in/carry out" policy for day users at our state parks?

The policy was piloted last year at Pike Lake State Park and other southern parks. Starting Memorial Day this year, all single-day park visitors have had to take out all trash from their park visits. Many park users don't understand the reasons behind the policy and they come to the park with materials that are not convenient to take home and subsequently need to be disposed of illegally at the park. Could you explain the importance of this policy and what effect it may have on our natural areas?

Mark Goings
Fall Creek, Wis.

State Park Operations Chief Kermit Traska responds: *We have received many comments concerning the new program. Some people are opposed to it because we formerly provided trash receptacles in state parks. However, there have been many editorials and letters of support.*

Our aim is to reduce the amount of solid waste going to landfills; to reduce the presence of wastes that smell, attract insects and draw animals that raid trash bins; to encourage our visitors to be more environmentally-conscious when they come to a park; and to reduce our maintenance costs so we can concentrate our efforts on other priority services such as regularly servicing restrooms.

All of our parks now have posted signs, distribute information and offer free trash bags so visitors can conveniently take their trash with them. We will evaluate the program at the end of each park season to improve it in subsequent years. Overnight campgrounds will continue the practice of providing waste receptacles for visitors.

THEY'RE BACK

As a photographer, I've noticed improvements locally. I've taken a photo of a fledging eagle that is the first successful one I'm aware of in the Pierce County area in 75 years or more. Along the same lines, we started seeing banded trumpeter swans at Lake Eau Galle a couple of winters ago and I've seen several more in the area. I can now photograph Hexagenia mayflies on the Mississippi River. They didn't have big hatches of mayflies on Lake Pepin 20 years ago; it was too polluted. In the last few years there have been huge hatches. The much-maligned DNR can take some credit for **that**.

Don Blegen
Spring Valley, Wis.

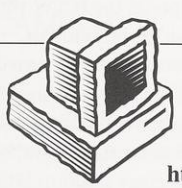
CALLING FROGS NAMES

Correct me if I'm wrong. In the April issue, the author of "All about amphibians" listed the generic name of the Northern Spring Peeper as *Pseudacris*. Isn't it more properly classified as *Hyla crucifer*? I'm not aware if any name change has taken place.

Erich A. Gottfried
Palmyra, Wis.

Dreux Watermolen responds: *Based on genetic analysis, herpetologists recently transferred the spring peeper from the genus* Hyla *to the genus* Pseudacris. *The change is now widely accepted and spring peepers are classified under* Pseudacris *in the most recent editions of "A Field Guide to Reptiles and Amphibians of Eastern and Central North America" (R. Conant and J.T. Collins, 1991, Houghton Mifflin, third ed.) and the recently published "Geographic Distributions of the Amphibians and Reptiles of Wisconsin" (G.S. Caspar, 1996:Milwaukee Public Museum).*

We appreciate your concern for the accuracy of information shared by the Department of Natural Resources.



Connect with *Wisconsin Natural Resources* magazine on the Web. Reach our home page on the World Wide Web at **http://www.dnr.state.wi.us/wnr**. Drop us a note — and remember to sign our guest page.

WISCONSIN TRAVELER

Frozen frogs and a nice warm goat

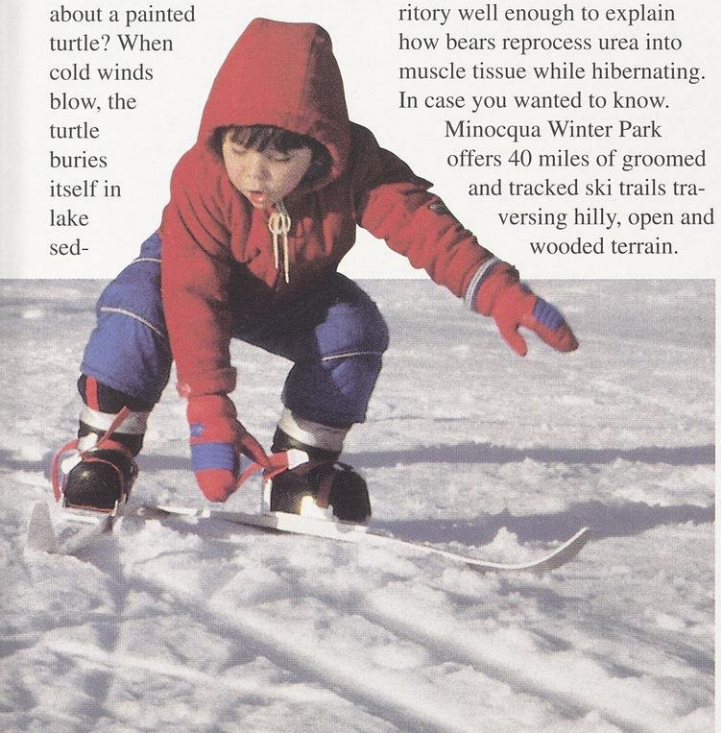
Surviving five months of intense cold and snow is tough enough when you're a human being and (supposedly) smart enough to bundle up and not let the embers die out from November to March. Imagine what it would be like if, in this life, you happened to be a wood frog: The hardy amphibian freezes SOLID in winter, then thaws out in spring, ready for courting. Or what about a painted turtle? When cold winds blow, the turtle buries itself in lake sediments — and dispenses with breathing for four long months.

DON BLEGEN

You can learn about the ways other species cope with Wisconsin's brutal winters in the company of author and former DNR naturalist John Bates, who'll be leading **Winter Ecology Tours** (on cross-country skis and snowshoes) at Minocqua Winter Park in Oneida County.

Bates, whose column "Northwoods Almanac" has appeared in the *Lakeland Times* for many years, also has to his credit the books *Trailside Botany* and *A Seasonal Guide to the Natural Year for Wisconsin, Michigan and Minnesota*. In other words, this is a guy who knows the territory well enough to explain how bears reprocess urea into muscle tissue while hibernating. In case you wanted to know.

Minocqua Winter Park offers 40 miles of groomed and tracked ski trails traversing hilly, open and wooded terrain.

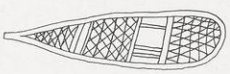


DEPARTMENT OF TOURISM

Although the two-hour tours will proceed at a leisurely pace, they're not recommended for very young skiers or shoers, who may have trouble keeping up.

TRAVELER'S tip: Dress warm, bring BOTH your skis, and don't forget the wax.

Ski tours will be held on December 30 and February 15, the snowshoe tour on January 18. All tours run from 1–3 p.m. The cost: $15 per adult, $25 per couple, $8 for children under 12. Trail passes are required and cost an additional $10 per adult. Each tour is limited to fifteen people, so it's a good idea to make reservations. Contact Minocqua Winter Park, 12375 Scotchman Lake Rd., Minocqua 54548. (715) 356-3309, or Trails North at (715) 476-2828.



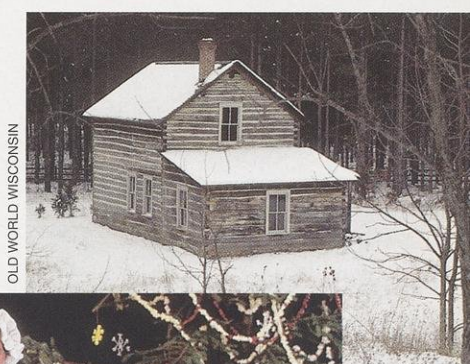
It wouldn't be polite to cast aspersions on Santa Claus, the Jolly Old Soul himself. But it's the same old thing every holiday season, isn't it? Ho, ho, ho. Yawn, yawn, yawn. So how about this: Shake up your Christmas traditions and visit **Old World Wisconsin** — where you can await the arrival of the "Christmas Goat" at the Finnish farmstead.

Yes, you read that right. The Christmas Goat. On November 30, & December 1, December 7 & 8 and 14 & 15, from 11 a.m. until 4 p.m. you can wander through restored pioneer homes and structures on the 600-acre site owned by the State Historical Society. Buildings will be decked out in seasonal finery, and costumed guides will be on hand to explain ethnic holiday traditions.

All Finns and those of Finnish descent are undoubtedly guffawing over the fact that you never have heard of their quaint Christmas custom. If this insouciance has got your goat, get over to Old World Wisconsin to see if that Xmas goat can be got!

Should you work up an appetite waiting for the Jolly Old Goat, you can enjoy a tasty Danish holiday dinner with ethnic holiday music and more at Old World's Clausing Barn Restaurant on December 7 & 8, and December 14 & 15. Dinner seating is limited; please make reservations for this special dinner by calling (414) 594-2922.

Old World Wisconsin is located two miles south of Eagle on Highway 67 in Waukesha County. Daily admission:$7 adults, $3 children 5–12, $6.30 seniors. Admission for the holiday program is $5.50 for adults, $3 for children 5–12. (414) 594-6300.



OLD WORLD WISCONSIN

DEPARTMENT OF TOURISM

(top left) Painted turtle before the freeze.
(bottom left) Warming up to skiing at Winter Park.
(above right) The Rankinen house, one of two Finnish homesteads at Old World Wisconsin.
(above) Keep the spark of many cultural holiday traditions alive. Bring on the goat!