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## **February 1996**

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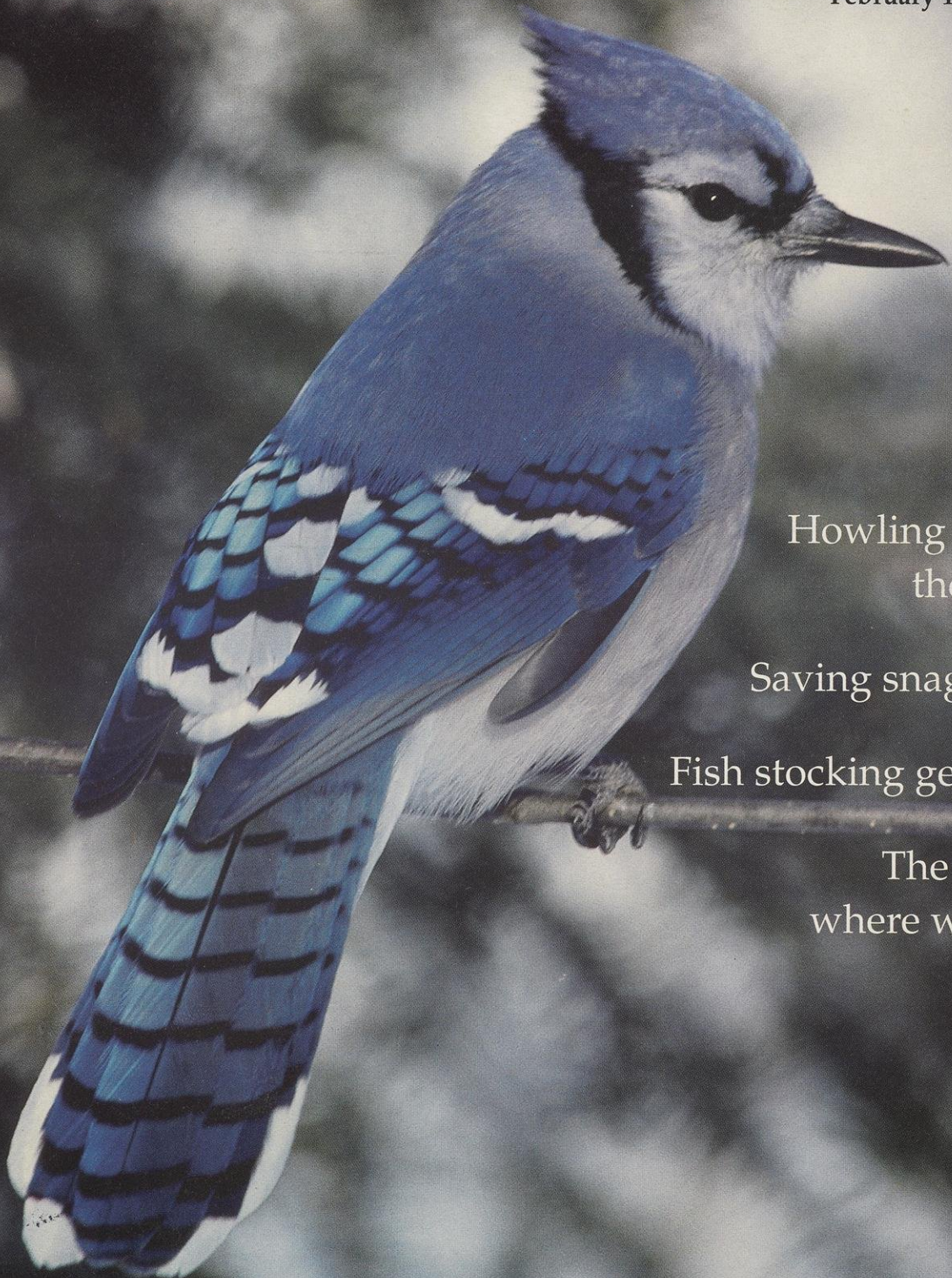
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# WISCONSIN NATURAL RESOURCES

February 1996 \$3.00



Howling down  
the road

Saving snag trees

Fish stocking genetics

The forest  
where we live

# WISCONSIN'S PRICKLY RODENT

The misunderstood porcupine is a boon to the Northwoods.

Alan D. Martin

The Common Porcupine (*Erethizon dorsatum*) is a wonderful, necessary member of Northwoods wildlife, and I'm glad it is here. Throw stones if you want, but I'll stand by porkies.

They kill trees, you say? Well, owls, wood ducks, hooded mergansers and woodpeckers need homes, and porcupines are part of nature's snag-making team.

Porcupines hurt my dog, you say? Well, most dogs learn from that first painful mistake and don't go near porcupines again. Only one of my family's six hunting dogs hasn't gotten a snootful of quills in recent years, and only one needed a second dose to learn the lesson. The other grouchers bark, from a distance, at the quill-pig.

Because of such mishaps, some porcupines are shot on sight. That's a real shame because the porky isn't only the prickliest Northwoods resident, it's also one of the most interesting.

Porkies are the second-largest rodent in Wisconsin after the North American beaver. They can weigh 30 pounds or more in summer but their weight drops dramatically during the lean months of winter. Porcupines live in the northern two-thirds of the state in a territory that extends in a V-shape from about the Ellsworth area in Pierce County down to Wisconsin Dells and back up toward Green Bay.

Porcupines, like most rodents, are vegetarians — their winter diet consists of conifer needles, buds and bark of pines, hemlock, maples and birch. How these critters survive on such foods with a protein content of only two to three percent is pretty amazing, but it gets the job done.

Porcupines are sloppy eaters who drop a lot of greenery that provides a welcome snack for white-tailed deer during deep snows. If you spot a small pile of freshly-snipped branches on a winter walk, it's likely porcupines are nearby. Their winter dens are easy to find: just follow your eyes and nose. Porcupines winter in caves and hollow logs. They travel the same

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# WISCONSIN NATURAL RESOURCES

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*Martin Jennings*

Hatchery fish and wild stock swim from different sides of the gene pool.

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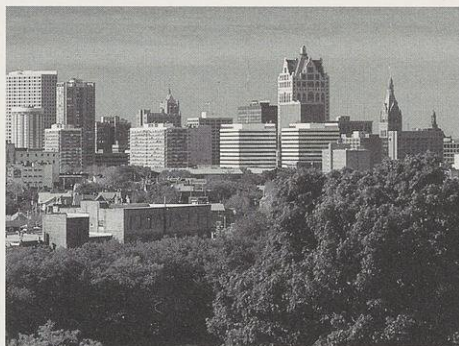
There's a lot of life in dead trees.



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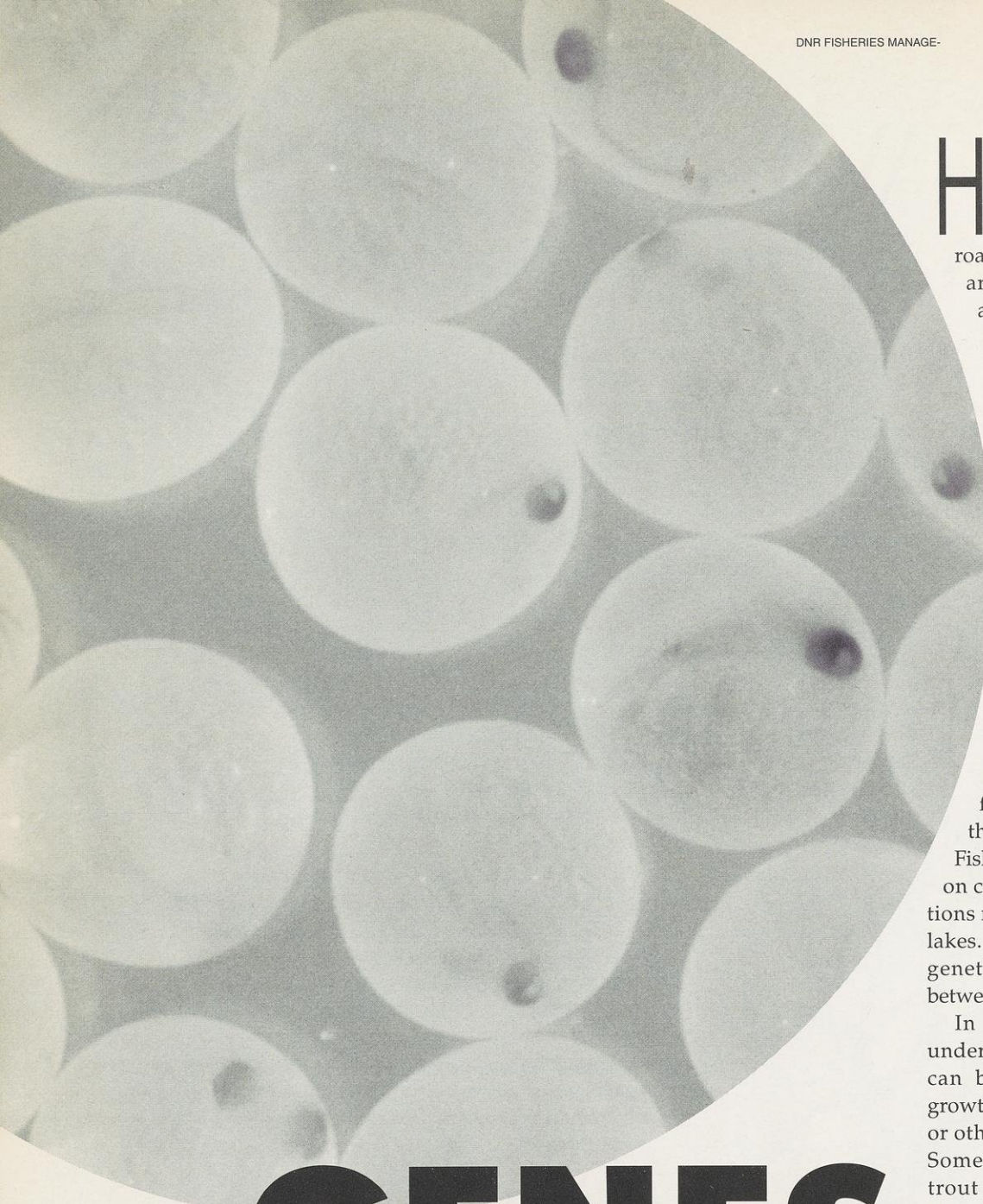
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FRONT COVER: Seeing a blue jay (*Cyanocitta cristata*) livens a winter day.

SCOTT NIELSEN, Superior, Wis.

BACK COVER: Frosted grasses.

NEIL HINTERBERG, Columbus, Wis.



**H**uman powers of observation have evolved over time to the point that we now can explore genes, the molecular codes and roadmaps that interpret evolutionary history. Advances in genetics are helping fish biologists make sound decisions regarding artificial propagation and stocking. As they gather research on the water and experience in the hatchery, biologists are discovering that conserving natural resources means protecting genetic resources, too.

### Comfortable hatchery vs. cruel nature

It's a common mistake to assume that the goal of fish genetics is to make a "better" fish. Sport anglers, thrilled by the thought of a bigger, feistier fighter at the end of the line, find the idea of a "superfish" tempting. Fish managers, however, must focus on conserving existing fish populations rather than developing Jaws for lakes. To understand the issues in fish genetics, consider the differences between aquaculture and conservation.

In aquaculture, fish are reared under well-controlled conditions and can be selectively bred for faster growth, conformity, disease resistance, or other attributes, just like livestock. Some put-and-take operations like trout ponds, where fish of catchable size are quickly harvested, use fish that are selectively bred to perform well in artificial hatcheries.

Fish found in lakes and rivers are very different from those raised for aquaculture or a brief existence outside the hatchery. Nature — with its diseases, predators, competitors, unpredictable food supply, and variable physical conditions — doesn't provide the consistent, controlled conditions of a hatchery. No amount of selective breeding can improve the ability of fish to survive all of nature's challenges, which places that nice, plump hatchery fish at a disadvantage in the stream.

Genes — the DNA codes governing

# GENES

## MAKE ALL THE DIFFERENCE

The secrets to successful stocking in natural lakes and streams lie deep within a fish's DNA.

*Martin Jennings*

physical and behavioral traits — determine a fish's ability to cope with its environment. Wild fish are adapted to the conditions of natural waters; fish produced for aquaculture are adapted to hatchery conditions.

Wild fish adapt through natural selection, meaning some individuals survive and reproduce while others do not. Generally, the best-adapted fish pass on their genes to the next generation. Artificial selection occurs when humans do something to determine which individuals will survive and reproduce — for example, by choosing brood fish with a rapid growth rate.

The traits chosen in selective breed-

ing for aquaculture are not necessarily the same traits favored by nature. In fact, many studies have shown that domesticated (artificially selected) fish perform poorly in natural waters. The concept of producing a "better" fish through artificial selection is valid for an aquaculture pond, but not for lakes and rivers.

It's difficult to produce hatchery fish with genes that will make them behave like wild fish. There's potential for domestication in any hatchery: A worker might inadvertently influence the traits for future populations by choosing to transport a quiet, calm fish for stocking, rather than handle a vig-

orous fish that is thrashing about. The trout that comes to the hatchery worker's shadow at feeding time is unlikely to flee in response to a blue heron's shadow.

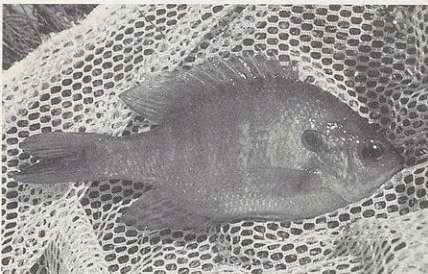
Producing fish that do well in the hatchery is much easier than rearing wild-type fish. But the issue is not how well fish perform in the hatchery or how many fish are stocked — it's how well fish survive after stocking. It's better to produce fewer, smaller wild fish in the hatchery if they will survive better than domesticated strains. Remember: The number of fish stocked is not always a reliable indicator of the number surviving to be caught.

*(opposite)* Survival in the hatchery won't guarantee these eggs will make it in the wild.

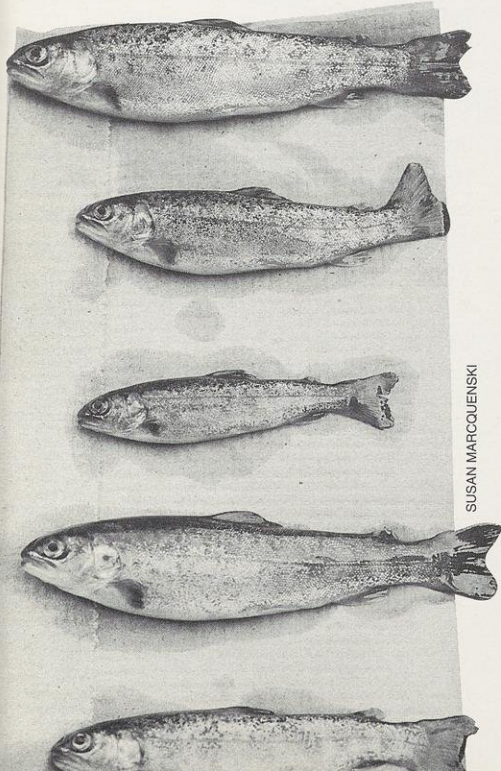
*(below)* Healthy stock from one place does best when transplanted locally.

*(bottom)* Managers inspect fish for a variety of qualities that will maintain quality brood stock and wild fish that survive.

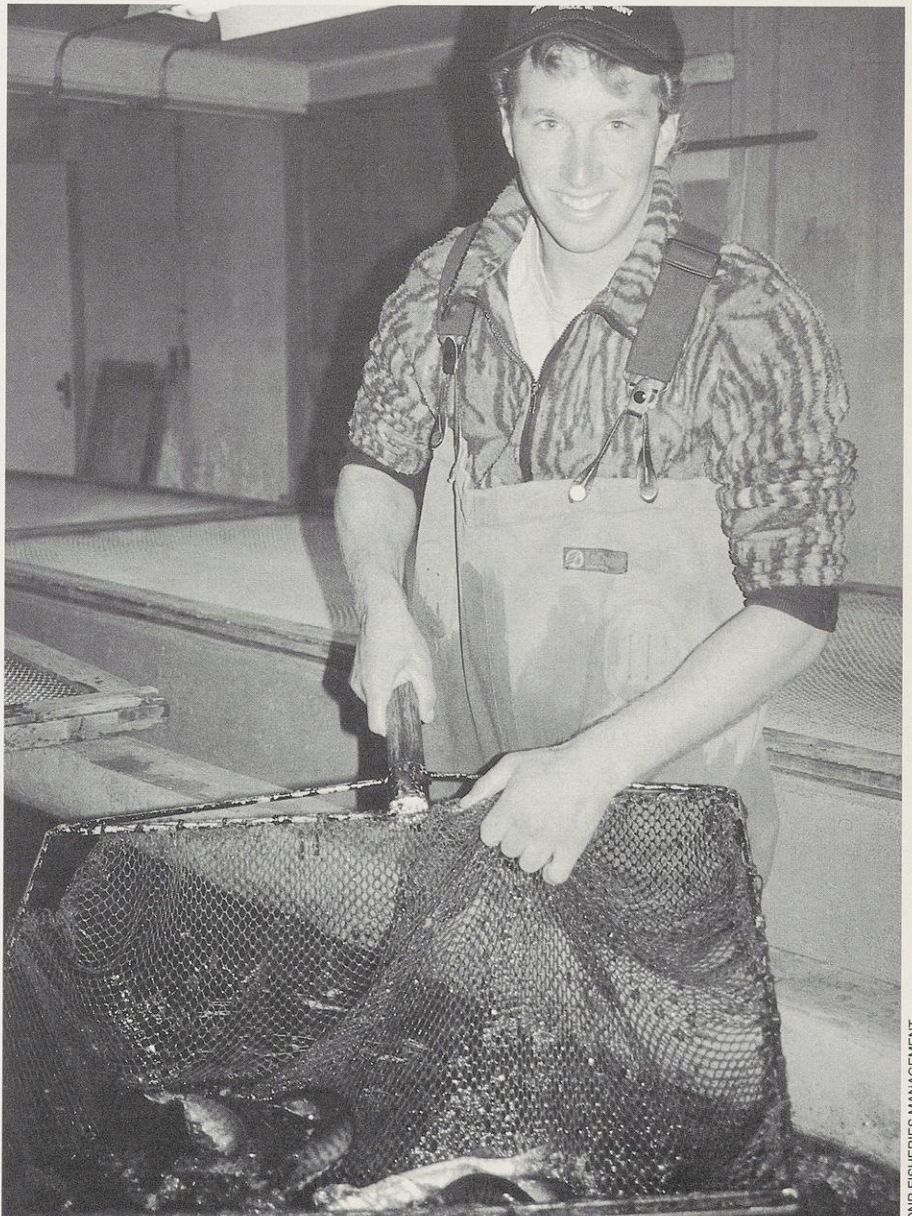
*(right)* Hatchery workers now vary their routines and minimize contact with fish to maintain wilder qualities in stock.



JOHN LYONS



SUSAN MARCQUEENSKI



DNR FISHERIES MANAGEMENT

## The ins & outs of fish breeding

Within a population of fish, individuals have different forms of most genes. This genetic variation produces fish that respond differently to the same environmental conditions. A population with lots of genetic variation can cope with change better than a population with little or no genetic variation. For example, if an entire population carries the form of a gene that makes the fish susceptible to a certain disease, an outbreak would cause a catastrophe for fish and anglers alike.

Hatchery fish can quickly lose genetic variation through inbreeding — mating with relatives. If four parents are used to produce 100,000 fish, the offspring will be on average much more similar to each other than if 50 parents were used to produce 100,000 fish. To preserve the long-term ability of the fish to evolve, hatcheries must maintain genetic variation by increasing the number of parent fish. The principle applies whether the parent fish are in the hatchery, or whether eggs and sperm are collected from wild fish.

Genetic variability doesn't only occur within a given population; it also occurs *among* populations. To recognize differences among populations of a single fish species, fish managers refer to a group of fish with distinctive biological characteristics as a "stock." In a "stock transfer," one group of fish is put into waters containing native fish of the same species, but of a different stock.

Is there any evidence that moving fish stocks around can be harmful? Little work on this topic has been done with warmwater fishes, with the exception of the largemouth bass. Many anglers in north central and southern states have sought to have Florida largemouths stocked in local waters. Compared to largemouth bass typically caught in most northern waters, these fish are huge! But it's important to consider two points: First, is there a sound biological reason to expect the fish to perform well outside their native range, and second, how would a transfer affect the resident bass?

To address these questions, researchers in Illinois studied bass taken from four locations — Florida, Illinois, Wisconsin and Texas. The fish were placed in small lakes with no outlets (so that they could not escape to other waters) located in Florida, Illinois, Minnesota and Texas, and their rates of survival and growth were monitored.

By the criteria of survival and growth, the local fish performed best in each of the four locations. What about reproduction? Again, the local stocks were as good or better than all others in each of the four lakes. Clearly, bass from another region could not improve the local fishery. In each case, nature had already produced the fish best adapted to local conditions.

The next phase of the study addressed the question of how non-native stocks affected the original residents. Although survival and growth of the introduced bass was often poor, the fish that did survive lived to reproduce. All of the fish in the experiment had distinctive genetic marks that allowed the researchers to tell which stocks produced the offspring that appeared in each lake. The researchers discovered that, just as with the adults, the offspring of local fish had the edge.

Fish mate randomly, so the native stock in each test lake didn't remain pure for long. Hybrids — the offspring produced from the mating of native and stocked bass — had poor growth and survival rates compared to the pure local stock. Unless all the introduced fish died before reproducing (as they did in Minnesota) the lakes eventually produced nothing but hybrids. The net result diminished the fishing quality of the test lakes by replacing native fish with relatively poorly per-



Wild fish need the right stuff to succeed in the hatchery and stream life. The fish that becomes accustomed to the shadow of an automated feeder won't be wary when the shadow of a predator looms nearby.

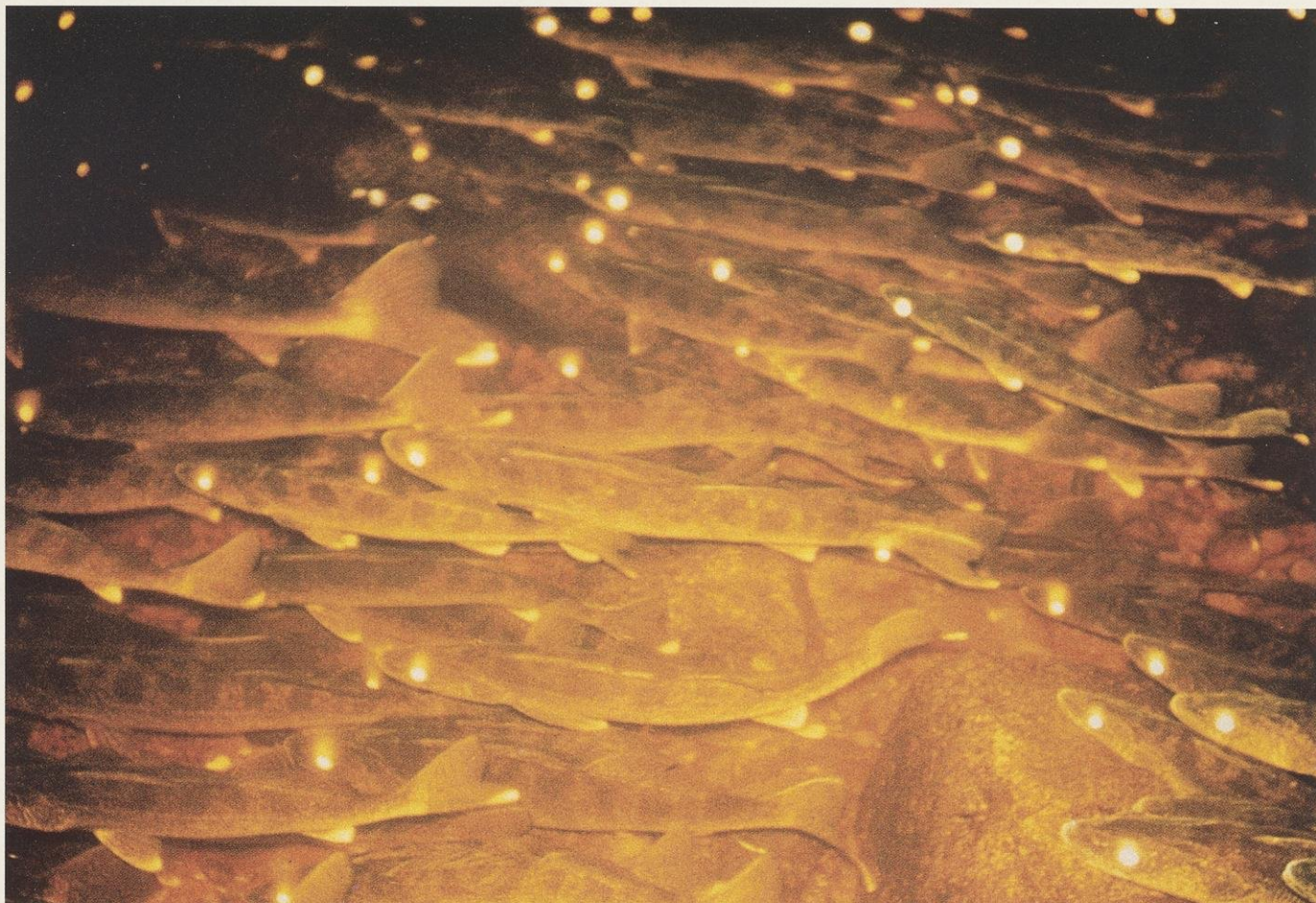
DNR FISHERIES MANAGEMENT

forming hybrids. Geneticists use the term "outbreeding" to describe what occurs when genetically different populations combine to produce offspring with poor survival rates.

Due to the success of plant and animal hybrids for agriculture, it's easy to assume that hybrids are inherently "superior." This is a common misapplication of genetic theory. Performance is best judged in the context of the animal's environment. When we stock fish in lakes, rivers and streams, the proper time scale for evaluation must extend beyond one generation. A mule may show "hybrid vigor" but doesn't reproduce very well, just as a tiger muskie grows and fights well but fails to reproduce.

Another genetic mechanism was likely at work in the bass study. Over long periods of time, populations evolve groups of genes that work well together. Genes very finely tuned to control the timing of an embryo's development, for example, may not work well in combination with genes from other populations. Breaking up the "gene team" produces an inferior





MICHAEL STAGGS



SCOTT NIELSEN

(above) Spawning behavior is inherited, not learned. Fish survive and adapt better when stocked in habitats similar to the waters where their parents lived.

(left) Fish that grow well in one region may not be as vigorous when transplanted. Nature is already producing the fish best adapted to grow and reproduce in a particular lake.

fish, and once that break occurs, it is essentially irreversible — unless you have a few thousand years to let nature sort it out.

In another study, biologists in Illinois, Minnesota and Iowa stocked fry from two walleye populations — one that runs up rivers to spawn and another that spawns in rocky areas of lakes — in a reservoir containing both

river and lake habitats. Offspring from the river-spawning fish were found only in the river during the spawning run, while offspring of the lake-spawning fish remained in the lake. The study demonstrated that spawning behavior is inherited, not learned — so stocking fish in a water lacking appropriate habitat is unlikely to produce a self-sustaining population.

Both studies are worth noting for future stocking projects: If the wrong fish are stocked and decline after a year or two, we'll have wasted money that could have been spent on activities proven to help fisheries, such as habitat restoration. And, if even a few introduced fish manage to breed with the existing population, it is possible that the resulting population will be less suited to the lake than the one that was originally there.

### Can we conserve genes?

Fish biologists use size, shape, life history characteristics and genetic information to define a fish stock. The genes partially reveal the degree of isolation one stock has from another. If one

group contains genetic information different from that found in other groups, the conclusion is that the two groups have not interbred in the recent past. The challenge lies in determining the degree of difference, so that a stock selected for transfer will not put unique genetic resources at risk, and will not be placed in a geographic area to which it is not suited.

Opponents of policies promoting the conservation of genetic resources argue that such policies are simply impractical. So much damage has

already been done, they say, it's too late to do anything about it. However, studies of intensively managed fishes such as brook trout in eastern states demonstrate that stock differences remain despite a history of stock transfers.

Another argument is that hatcheries would be faced with the impossible task of maintaining scores of distinct stocks. Before this issue can be addressed, we need to look at the current stocks of managed species, define the geographic boundaries in which they survive best, and review the genetic impact of past stock transfers. Wisconsin DNR fish biologists are studying the genetics of stocks from Wisconsin, Minnesota, and Illinois to find the best ways to conserve genetic resources.

From the sport angler's point of view, stocking has been a success. Many anglers insist on stocking, even when it is not warranted biologically. Stocking can be a positive, beneficial way to manage fish; however, many lakes produce an excellent fishery without it. If stocking is done without regard for genetics, it can damage the future of fishing.

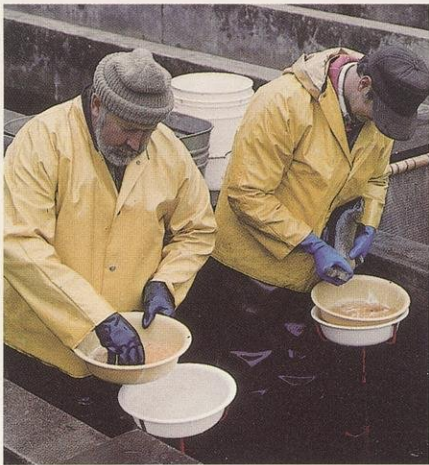
No single tool, including stocking, is effective or appropriate in every

case. Through groups like the Walleye Committee — made up of DNR biologists and representatives of many other organizations with a stake in the future of Wisconsin's fisheries — we hope to develop reasonable guidelines for stocking. The newly renovated Spooner and Woodruff hatcheries will have facilities to better address genetic concerns.

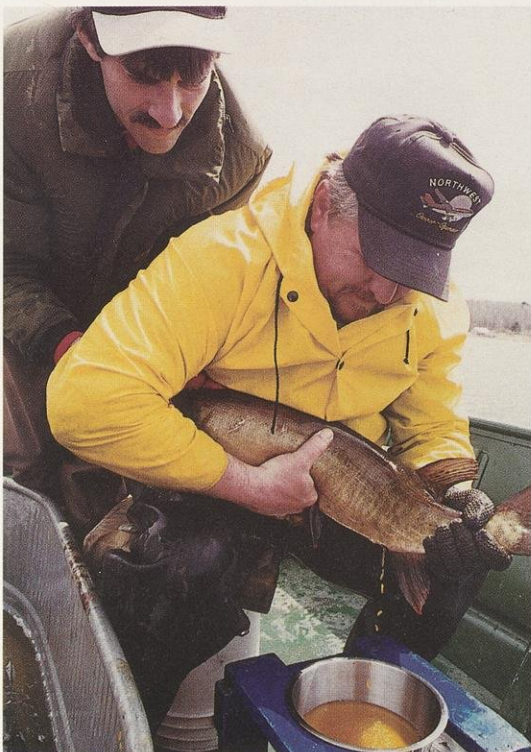
We need to protect the genetic differences occurring within and among fish populations today if we are to have thriving fisheries tomorrow. Once those genetic resources are lost, they are irreplaceable. By maintaining the integrity of distinct fish stocks, the fish that survive will be those best adapted to the waters in which they live. This is the most biologically sound and economical approach for long-term fisheries management. □

*Martin Jennings leads the Northern Lakes Fisheries Research Group for DNR in Spooner, Wis.*

Fisheries crews collect milt and eggs from many wild fish. They aim to conserve the genetic variety from proven performers, fish that thrive in the wild.



DNR FISHERIES MANAGEMENT



JEAN B. MEYER



JEAN B. MEYER



# Critter condos

Properly handled, dead wood on your land  
can provide a big boost to life.

**O**n a sunset stroll through your woods, you find a forest full of activity — a snowshoe hare bounds for cover, a red squirrel scampers up a balsam fir, a blue jay scolds from a branch above. As the curtain of darkness falls, your senses heighten. Your nose intercepts the pungent, earthy odor of leaf mold, fungi, and rotting wood drifting on the breeze. Your ears snatch a few “who cooks for you, who cook for you all?” notes of a barred owl. Suddenly, your sense movement above. Your peripheral vision just catches the floating form of a flying squirrel as it leaps and glides from a snag.

The smooth, barkless skeleton of this dead tree stands stark and whitewashed in the moonlight. It's then you realize that in your forest, even a dead thing has a life of its own.

The more you know about dead wood and the types of wildlife that depend on it, the better you'll be at providing homes for wildlife on your land. Consider some of the following points and try out some of the techniques on your back lot or woodlot, and you'll be well on the way to becoming a wildlife realtor!

## Snags meet the critters' criteria for habitat

Standing dead or dying trees, called “snags,” may look ghostly and uninhabited, but they teem with life. Over 70 kinds of Wisconsin mammals, birds,

reptiles and amphibians, plus swarms of insects, spiders, millipedes and other invertebrates use snags for dens, nesting and feeding sites, caching food, perching, preening and courtship.

Just as the style, size and location of housing affect where you live, the style, size and location of dead trees determine what kinds of wildlife you'll find in, on or under them. Snags make good homes for cavity nesters such as wood-

ters, a solid exterior and usually a few limbs attached — they make the best den trees. As snags decay, the wood softens and the limbs gradually fall off. Soft snags, with their pulpy wood fibers, make good forage sites for insect-eating birds and excellent nest sites for woodpeckers and songbirds such as black-capped chickadees.

A tree's characteristics determine its snag and cavity potential. For example, sugar maple, elm, black and white oak, hickory and butternut are excellent cavity trees. These hardwood trees grow to large sizes, decay slowly, and produce hard, upright and long-lived snags. The beech tree, common along Lake Michigan and Green Bay, also makes a good cavity tree because it is prone to heart rot.

Softer trees, like aspen and birch, have short lifespans and rot quickly. These rapid growers make superior soft snags of high value to wildlife since they produce cavities more quickly than hardwoods, and provide habitat for swarms of insects that feed many forest songbirds.

Snags of medium value to wildlife come from white ash, basswood, red maple, white pine, red oaks, yellow poplar, box elder, black cherry and black walnut. Coniferous snags generally do not last as long as hardwoods, though pine and tamarack make excellent nest and perch sites for osprey when located next to water.

**Size.** Human condos come in all sizes and so do critter condos. In general, the larger the snag, the more kinds of wildlife it can host. While small



(above) Raccoons naturally use hollow trees and logs for den sites but have adapted well to urban hollow structures like storm sewers.

(left) An Eastern bluebird finds food and shelter in old snags.

peckers, bluebirds, nuthatches and squirrels. Riverside snags, with their tangled masses of gnarled roots, provide shelter for brown trout and burrowing sites for muskrats; their upper limbs may be used for nesting by herons, egrets, bitterns and cormorants.

**Style.** Snags come in two styles: hard and soft. Both are important to wildlife. Hard snags have rotten cen-

HERB LANGE

snags are important in their own right, they can only host small creatures such as the red-breasted nuthatch, downy woodpecker, house wren, bluebird and white-footed mouse. But large snags can suit small *and* large wildlife such as pileated woodpeckers and raccoons. "Wolf" trees — big trees with large sprawling canopies — have great potential for cavities. In addition, wolf trees are often abundant nut and fruit producers.

**Location.** Snags are most commonly associated with forests — many a forest mammal, from bat to bobcat, bear, pine marten, porcupine, red squirrel, and gray fox use snags for dens and lookouts. So do many forest birds. Woodpeckers are the primary excavators, drilling out new homes in snags. When abandoned, these cavities become residences for other creatures like saw-whet owls, nuthatches and great-crested flycatchers. Besides

woodpeckers, the only other bird that is a primary excavator is the black-capped chickadee. Chickadees lack the powerful chisel-like beak of woodpeckers and can chip out cavities only in soft snags.

Snags located near waterways and wetlands offer great benefits to wildlife. Wood ducks, hooded mergansers, common goldeneyes and buffleheads need tree cavities for nesting. Herons, egrets, eagles and ospreys build their nests high atop snags standing in or near water. Snags also serve as lookout towers for fish-eating birds, such as belted kingfishers.

Snags located near open fields attract some types of hawks and owls. From high atop their lookouts, these birds use telescopic vision and radar-like hearing to detect mice, rabbits, squirrels and other prey. The flicker, unlike its woodland-dwelling woodpecker relatives, prefers to nest in snags along woodland edges bordering farm fields or open grasslands. Kestrels and eastern bluebirds will often move into old flicker holes. Colorful bluebirds frequently nest in snags along farm fencerows and adapt well to fence posts and nest boxes, too.

Backyard snags can attract house wrens, black-capped chickadees, red-bellied woodpeckers and flying squirrels. If a snag poses no threat of dropping large branches on people, leave it in place.

## Let sleeping logs lie

After a snag has toppled over, it doesn't lose its value to wildlife. Downed and rotting logs provide moist and earthy homes for salamanders, moles, shrews, earthworms, millipedes, centipedes and more. Squirrels will cache their food within the soft fibers of fallen trees. Hollow logs can be used by foxes and bears as winter dens. The next time you go camping, watch how chipmunks sprint from downed log to downed log, using them as runways to scurry through the forest. If it's springtime, listen for drumming ruffed grouse, performing their courtship dance atop mossy logs.

Toppled trees also are important in

## The life of a dying tree

The decline of a tree begins when heart rot fungi invade the tree through a wound. The core begins to rot slowly — barren branches appear, perhaps a good site for an eagle nest or a perch for broadwing hawks and flycatchers. Insects and beetles feast. The bark loosens and woodpeckers soon follow, in search of food and potential home sites.

Using their specialized bills, woodpeckers chip away at the softened wood to create a cavity large enough for nesting. They raise their young, feed on the insects harbored within the decaying wood, and move on. The empty cavity then becomes home to another creature — perhaps an owl, squirrel, bluebird or bat.

Eventually the battered ghost of a tree topples, or remains as a soft stump, maybe half its original height. Carpenter ants invade — a healthy lunch for a passing bear or raccoon. Salamanders, snakes and mice move in while a nearby hawk perched high upon a neighboring snag takes note.

The tree decays further until new plants and mushrooms sprout in the remaining organic matter. So life goes on...and on.

forest regeneration. Some rotten logs, known as nurse logs, provide a growing medium rich in nutrients for tree seedlings to get a healthy start in life.

Ever “snag” your line while fishing? As frustrating as it is to lose a lure, every good angler knows that fallen logs in a pond or stream provide trout, bass and other fish with a sheltered, shady place to rest and feed. Downed logs in or near water are especially vital and should be spared at all costs. And while you’re cutting your line free, you’ll probably startle a few turtles lazily sunbathing on a log.

The loose bark of diseased and fallen trees shelters a multitude of tiny creatures. Just turn over a rotting log and watch the insect activity. The swarming, creeping, slithering tangle of ants, spiders, beetles, worms and slugs provides a nutritious cafeteria lunch for many birds, mammals, reptiles and amphibians.

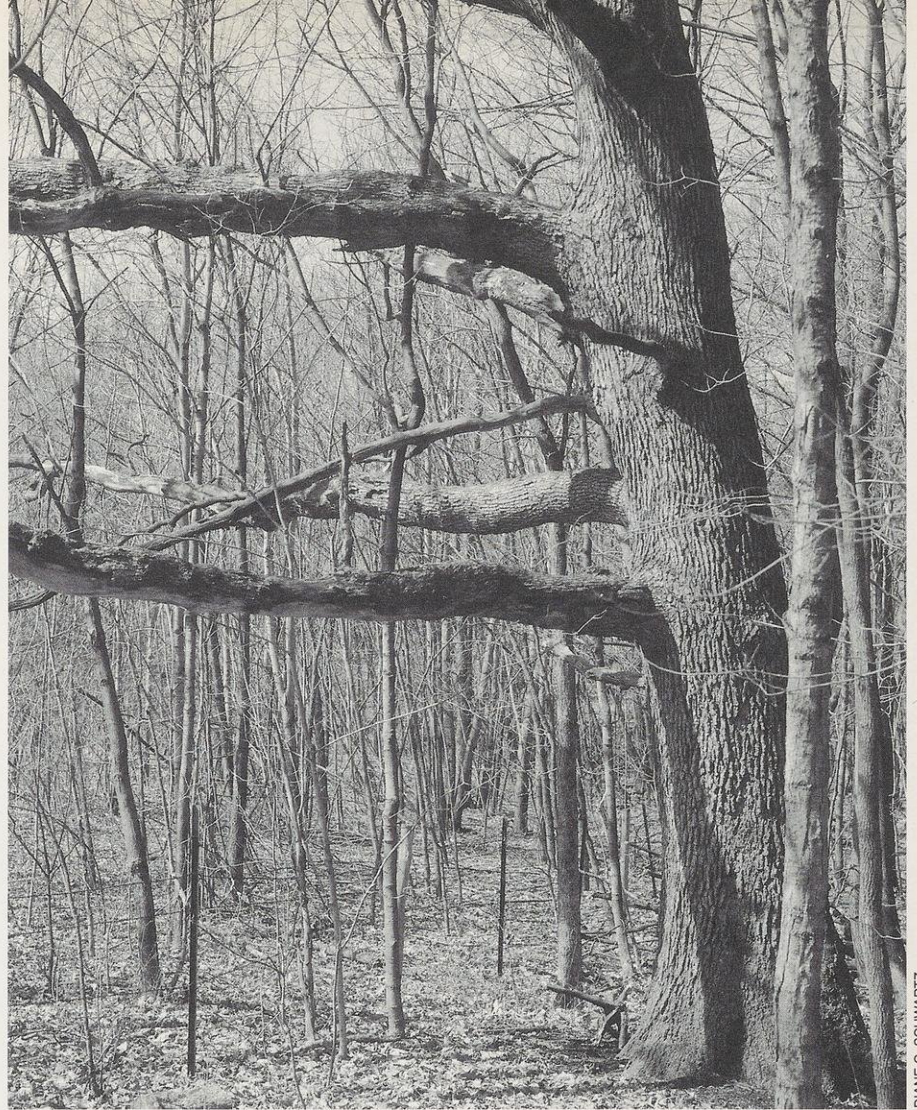
Pileated woodpeckers actively seek out elm and aspen trees infested with wood boring insects, and black bears lap up ants found in rotting logs. Brown creepers, small brown birds with curved beaks, search for insects hidden under loose bark as they spiral up the trunk.

Other cavity dwellers are voracious insect eaters, though the insects they eat may not live in dead wood. A house wren can feed 500 insects to its young every summer afternoon and a swallow can consume 1,000 insects every 12 hours. In fact, these birds act as natural pesticides and help keep insect populations in check.

Dead wood is good wood for wildlife, and it does not always pose a threat to your woodland. For years, however, this was not the prevailing attitude.

In the past, loggers cut down all dead trees during timber harvests. Dead trees had limited value as timber, harbored forest insect pests, and were potential fire and safety hazards. In recent years cavity nesting bird populations have declined due to a loss of large trees with natural cavities.

Today, loggers, foresters and wildlife managers work together to protect these valuable trees and the



DIANE G. SCHWARTZ

A “wolf” tree, like this Green County specimen, is a snag with sprawling canopies and limbs that can accommodate large den sites and cavities.

insect cafeterias they house. Insects and disease are natural parts of the forest and contribute to the stability, productivity and diversity of life.

## Managing dead wood on your land

Consider this: It takes about 40 years before completely cleared land becomes suitable for most woodpeckers and other snag-dependent wildlife. It takes about 80 years before trees can support the larger cavity dwellers like raccoons and pileated woodpeckers. So, before you cut firewood or implement a timber stand improvement plan, you should identify existing and future snag and den trees.

Snags in advanced stages of decay are easy to identify — they stand out like skeletons. Big wolf trees also stand out prominently. Diseased trees are a

little harder to spot. Look for signs of injury or a rotten core. Dead branches, rotting branch stubs, fungal growth, old wounds, scars and discolored or soft bark are all signs of a dying tree. Also, look for woodpecker holes. Woodpeckers actually seek out trees with rotten cores. When a woodpecker begins pecking away on a tree, it may be in the early stages of decay. Mark it as a future snag tree.

The best den trees, which can be either living or dead, are 15 or more inches in diameter at breast height (DBH), with den openings of four inches or more. If you have large den trees on your property, keep them!

If you want to manage your land for larger birds and mammals, you’ll need to preserve some of the larger trees. Just let them die of old age. The pileated woodpecker, Wisconsin’s largest woodpecker, needs a tree at

# Snag-dependent wildlife

**F** = food    **N** = nest    **P** = perch

## CAVITY EXCAVATORS

Black-backed Woodpecker	<b>F N</b>
Common Flicker	<b>F N P</b>
Downy Woodpecker	<b>F N P</b>
Hairy Woodpecker	<b>F N P</b>
Pileated Woodpecker	<b>F N P</b>
Red-bellied Woodpecker	<b>F N P</b>
Red-headed Woodpecker	<b>F N P</b>
Three-toed Woodpecker	<b>F N</b>
Yellow-bellied Sapsucker	<b>F N</b>

## HAWKS & OWLS

American Kestrel	<b>N P</b>
Bald Eagle	<b>N P</b>
Barn Owl	<b>N P</b>
Barred Owl	<b>N P</b>
Merlin	<b>N P</b>
Osprey	<b>N P</b>
Red-tailed Hawk	<b>N P</b>
Saw-whet Owl	<b>N P</b>
Screech Owl	<b>N P</b>

## OPEN FARM AND MEADOW

Bewick's Wren	<b>N</b>
Eastern Bluebird	<b>N P</b>
Tree Swallow	<b>N</b>

## RESIDENTIAL AREAS

Chimney Swift	<b>N</b>
English Sparrow	<b>F N P</b>
House Wren	<b>N</b>
Purple Martin	<b>N P</b>
Starling	<b>F N P</b>

## WATER BIRDS

Belted Kingfisher	<b>P</b>
Black-crowned Night Heron	<b>N P</b>
Bufflehead	<b>N</b>
Common Goldeneye	<b>N</b>
Common Merganser	<b>N P</b>
Common or Great Egret	<b>N P</b>
Double-crested Cormorant	<b>N P</b>
Great Blue Heron	<b>N P</b>
Hooded Merganser	<b>N P</b>
Wood Duck	<b>N P</b>

## WOODLAND BIRDS

Black-capped Chickadee	<b>F N P</b>
Boreal Chickadee	<b>F N P</b>
Brown Creeper	<b>N</b>
Carolina Wren	<b>N</b>
Great-crested Flycatcher	<b>N P</b>
Prothonotary Warbler	<b>N</b>
Red-breasted Nuthatch	<b>F N</b>
Ruffed Grouse	<b>P</b>
Tufted Titmouse	<b>N</b>
Turkey Vulture	<b>N P</b>
White-breasted Nuthatch	<b>F N</b>
Winter Wren	<b>N</b>

## REPTILES AND AMPHIBIANS

Most salamanders	<b>N</b>
Tree Frogs	<b>N</b>

## MAMMALS

Big Brown Bat	<b>N</b>
Black Bear	<b>F N</b>
Bobcat	<b>N P</b>
Deer Mouse	<b>F N</b>
Eastern Chipmunk	<b>P</b>
Eastern Pipistrelle Bat	<b>N</b>
Fisher	<b>N</b>
Fox Squirrel	<b>N P</b>
Gray Fox	<b>N</b>
Gray Squirrel	<b>N P</b>
Hoary Bat	<b>N</b>
Least Chipmunk	<b>N P</b>
Little Brown Myotis Bat	<b>N</b>
Mink	<b>N</b>
Northern Flying Squirrel	<b>N P</b>
Opossum	<b>N</b>
Pine Marten	<b>N</b>
Porcupine	<b>N</b>
Raccoon	<b>N</b>
Red Squirrel	<b>N P</b>
Red Bat	<b>N</b>
Silver-haired Bat	<b>N</b>
Snowshoe Hare	<b>N</b>
Southern Flying Squirrel	<b>N P</b>
White-footed Mouse	<b>N</b>

(right) Old dead trees are heirlooms on your property providing home, food and wonderful wildlife viewing for years. Save den trees and enjoy visitors like a black-capped chickadee and a deer mouse.





## Cut timber, save snags

If you are managing your woodland both for wildlife and timber production, keep the following rules of thumb in mind:

- Preserve about one to six hard snags per acre and as many soft snags as possible.
- For every 20-acre woodlot, leave the following: four to five snags or den trees over 18 inches DBH, 30 to 40 snag or den trees over 14 inches DBH, and 50–60 snags over six inches DBH.
- Save at least one tree of any size per acre showing potential for den or snag tree development, especially those with broken tops, woodpecker holes or wounds.
- Never cut a wolf tree; they make excellent den trees.
- Check for wildlife before cutting a tree; avoid cutting inhabited trees.
- Leave most snags evenly spaced, but include a few patches where they are clumped together.
- Leave fallen snags on the ground to provide food and cover for wildlife.
- Cut green rather than dead wood for firewood, and cure for several years.

Wildlife don't overlook the woodpile as a hiding place or lookout. Near a woodland home, a ruffed grouse roosts on a woodpile.



least 20–22 inches DBH in order to excavate a nest cavity. Pine martens also need very large trees.

If you find only a few snag or den trees on your property, you can create more yourself using some simple techniques:

To create a snag, select a living tree that's over a foot in diameter — the bigger, the better. Also, try to select a tree that's either diseased or severely deformed, or select one that's crowding more valuable trees. Good trees for creating snags include sugar maple, black oak, white ash, elm and basswood. Use an ax to cut away a 3- to 4-inch band of bark around the entire circumference of the trunk. Make sure you remove the bark and cut well into the sapwood. This technique is known as girdling. It disrupts the flow of nutrients within the living layer of the tree found just underneath the bark. Cut off from sustenance, the tree gradually dies.

To create a den tree, cut off a 4- to 6-inch limb about six inches from the trunk, or chop out a section of bark 6 by 6 inches at the base of a suitable wolf tree. These open wounds allow fungal disease to enter the tree and start the decay process. A natural cavity will form over the years. Elm, ash, box elder, maple and basswood are especially prone to forming natural cavities.

It takes several years for these practices to create suitable nest and den cavities, so you may want to build and place nest boxes for birds and mammals until trees become available. To increase the chances that nest boxes will be used, locate them carefully and don't neglect regular cleaning and maintenance. While some species like chickadees, house wrens, wood ducks and bluebirds will readily take to nest boxes, others, like woodpeckers, simply prefer to wait for the real thing to rot! □

*Part of a series titled "Wildlife and Your Land" produced by Mary K. Judd, Diane Schwartz and Todd Peterson of DNR's Bureau of Wildlife Management.*

STEPHEN J. LANG

IN THE NEXT ISSUE OF

# WISCONSIN

## NATURAL RESOURCES

### FIELD DAYS

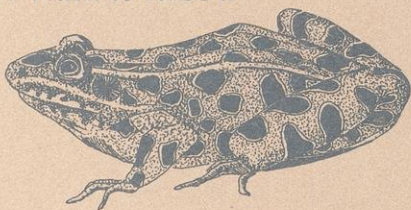
Make a date to join natural resources field trips.

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### STREAMSIDE MASS

Can we help you sort out frog and toad eggs? Want to raise a tadpole or two, or three?



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### OUR NEW TEAM LOOK

How DNR is reorganizing to provide quicker, better service.

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### A MOMENT IN MUD

A celebration of spring ooze and raucous bird calls.



**Help  
Support  
Endangered  
Resources**

**Buy  
Wisconsin's  
New Wolf  
license plate**

**AVAILABLE FOR:**

**AUTOMOBILE**

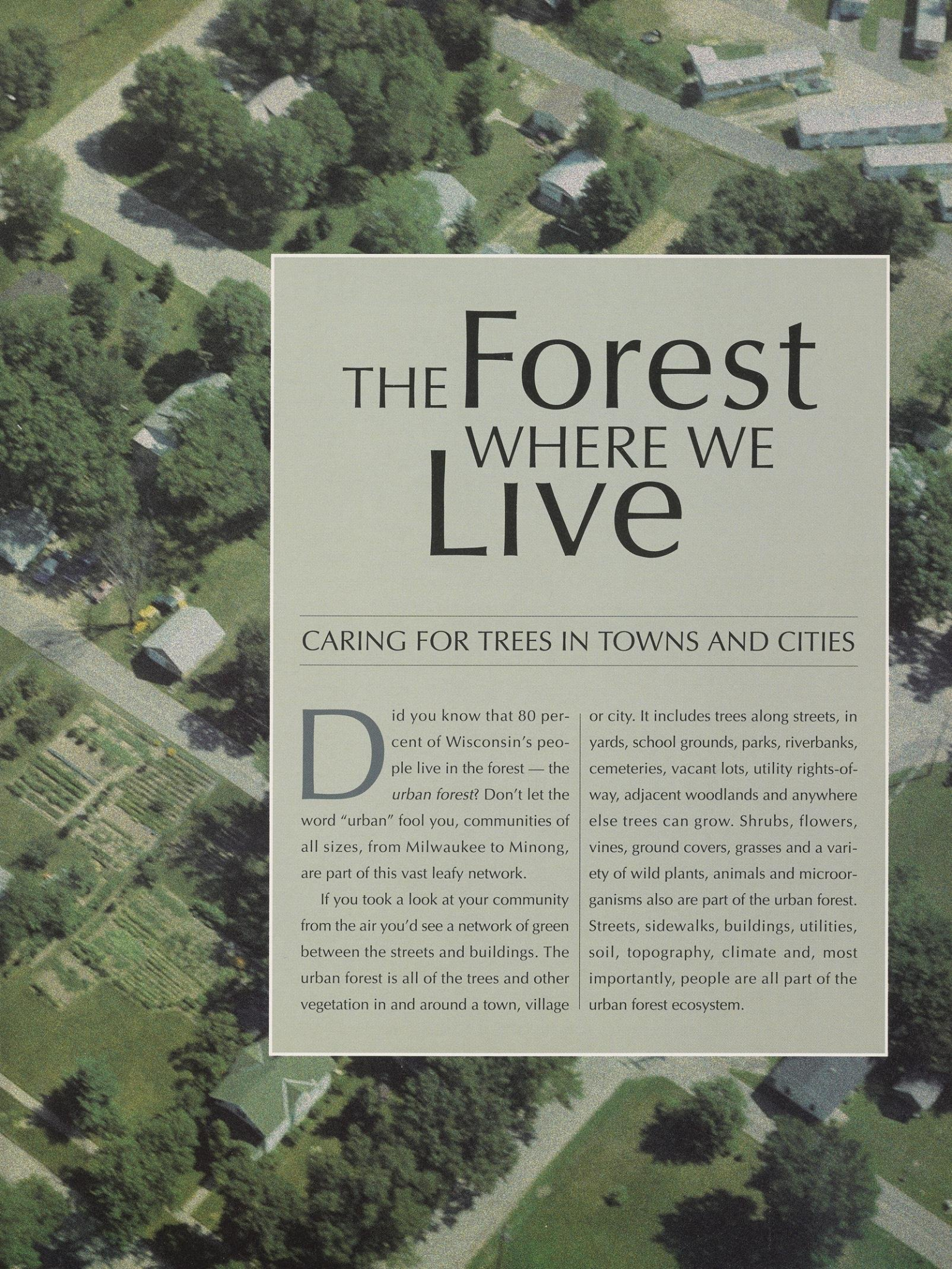
**MOTOR HOME**

annual registration only

**TRUCK**

- 4,500, 6,000 or 8,000 pound gross weight including dual purpose farm and dual purpose motor home
- 2,000 pound gross weight farm truck

See back flap for application and more information.

An aerial photograph of a suburban neighborhood, showing a grid of streets, houses with lawns, and numerous trees. The image is used as a background for the text overlay.

# THE Forest WHERE WE Live

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## CARING FOR TREES IN TOWNS AND CITIES

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**D**id you know that 80 percent of Wisconsin's people live in the forest — the *urban forest*? Don't let the word "urban" fool you, communities of all sizes, from Milwaukee to Minong, are part of this vast leafy network.

If you took a look at your community from the air you'd see a network of green between the streets and buildings. The urban forest is all of the trees and other vegetation in and around a town, village

or city. It includes trees along streets, in yards, school grounds, parks, riverbanks, cemeteries, vacant lots, utility rights-of-way, adjacent woodlands and anywhere else trees can grow. Shrubs, flowers, vines, ground covers, grasses and a variety of wild plants, animals and microorganisms also are part of the urban forest. Streets, sidewalks, buildings, utilities, soil, topography, climate and, most importantly, people are all part of the urban forest ecosystem.

## BENEFITS OF THE URBAN FOREST

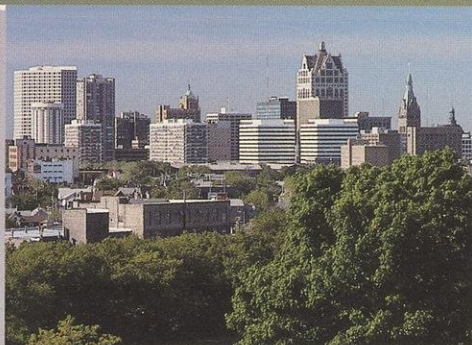
Trees provide more than just beauty to your community. They release oxygen we need to breathe. They absorb and trap carbon dioxide and other pollutants. A large tree canopy softens the blow from a downpour, allowing rain to soak gradually into the ground. Less runoff reduces flooding, pollution, sedimentation in rivers and lakes, and the need to build bigger storm sewer systems. Increased soil moisture helps recharge local aquifers. Trees and green space change sunlight into stored energy instead of heat; they bring water up from the soil through transpiration and cool hot cities through evaporation. Trees properly placed around buildings provide shade in summer and insulation in winter, reducing air conditioning bills up to 25 percent and heating bills by 10 to 20 percent. The less energy we use, the more we can reduce pollution from burning fossil fuels.

Trees contribute to a sense of community. They muffle noise and provide places to rest, meet and socialize. Studies have shown that trees in urban landscapes evoke a “relaxation response” in people. Patients recovering from surgery in a room with a view of trees required fewer strong pain relievers, experienced fewer complications and were released from the hospital sooner than those without such a view. Recent research indicates that trees reduce the incidence of violent behavior in nearby residents.

Trees increase property values by 5 to 20 percent. People linger and shop longer along tree-lined streets. Apartments and offices in wooded areas rent more quickly, and have higher and longer occupancy rates. Businesses leasing office space in wooded developments find their workers are more productive and absenteeism is reduced.

## CARING FOR THE URBAN FOREST

Trees in the urban forest have been taken out of their native habitat and need care to maintain their health, vigor and safety. Restricted growing space, compacted soil, air pollution, dog urine, bicycle locks, lawn mowers, string trim-



Trees add beauty, value and a peaceful feeling to every community.

DNR PHOTO FILE

mers, vandals, car bumpers, road salt, weed killers, storms, diseases and insects make life difficult for urban trees. Small wonder that downtown trees live an average of only eight years and suburban trees live only 30 years, compared to over 100 years for many trees in their native habitat.

In the woods, a tree with a dead limb isn't a problem, but in your neighborhood a dead limb is a hazard. It could fall on your house, garage, car or, worst of all, on a member of your family. Branches that hide traffic signs can lead to accidents. Trees that grow into power lines can cause power outages in storms.

A community forestry program, whether run by local government, a volunteer tree board or even a private property owner, provides the management an urban forest needs. An inventory and management plan guide the selection of tree species to be planted, and outline regular maintenance, including pruning, removing hazardous branches and tracking disease and insect outbreaks.

In communities, trees face an even more deadly foe — budget cuts! Because trees, parks and green space are mistakenly thought to take care of themselves, they are the first to feel the budget ax. Policy makers must understand that trees provide more than just beauty. They are an integral part of a community's infrastructure. With proper care our “green-frastructure” can increase in value and contribute to our quality of life.

## WHAT YOU CAN DO

The following articles will help you care for your own trees, but remember, the urban forest doesn't stop at the end of your lawn. Get involved in your community's urban forestry program. If it doesn't have one, you'll learn here how to get one started.

Each of us living in a community has a part to play in our environment. The urban forest forms a web that joins us all; caring for it will sustain our lives and our communities.

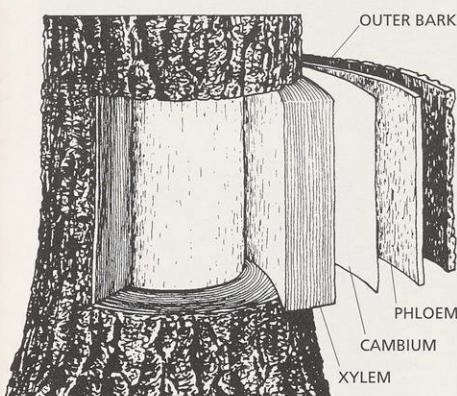
# The sum of its parts

A tree survives through the intricate relationships of leaves to roots, branches to bark, water to air, and people to plants.

**T**rees live longer, grow taller, and have greater mass than any other living organism. To sustain the health and longevity of these beautiful, complex plants in an urban landscape, humans need a basic understanding of how trees function.

## Energy and growth

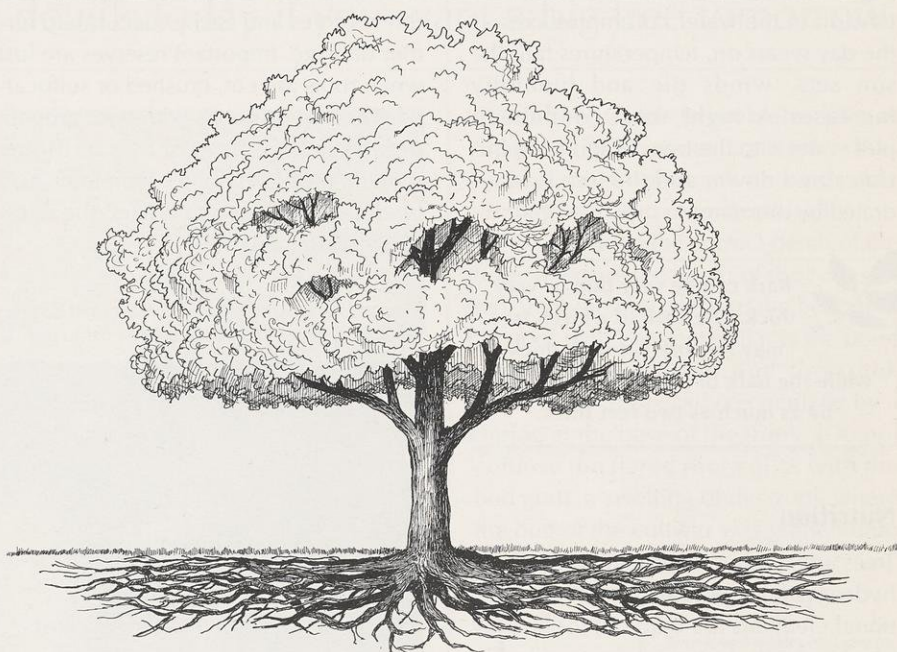
Trees need sunlight to power photosynthesis, the fuel-making system for green plants. To get first crack at the sun, trees keep their “solar panels” (leaves) above the competition by growing ever taller and wider. Leaves use energy from the sun, carbon dioxide from the air, and water from the soil to manufacture sugar, the basic fuel for plants, humans and animals. During this process, leaves also release oxygen into the atmosphere. The sugar is converted into wood, cellulose, and bark, or combined with nitrogen



The cambium separates wood from bark. The system for moving water and nutrients is formed by this thin layer.

and other elements to make starches, fats, oils, and proteins to form fruits and seeds.

Trees grow in both height and diameter. Trees grow taller and branches grow longer due to cell division at the branch



Most tree roots grow laterally in the top foot of soil. Applying organic mulch protects the roots, improves the soil and stimulates beneficial fungi that help trees absorb nutrients.

tips. Trees gain girth from cell divisions in the *cambium*, a single layer of cells between the bark and the wood. Each year as the cambium cells divide, new layers of wood and inner bark are inserted between the previous year's layer of wood and bark. The cambium produces wood (*xylem*) cells to the inside, and bark (*phloem*) cells to the outside.

## Roots

Tree root systems consist of large woody roots and smaller, short-lived *feeder* roots. Although many of the small roots die off shortly after they are formed, the majority of these roots die in winter and are replenished in early spring. Tiny water-absorbing *root hairs* form on the surface of the feeder roots. Root hairs are very short-lived and are continuously replenished during the growing season. Roots grow in length, and the large woody roots, which contain a cambium layer, also grow in diameter.

Roots grow much closer to the soil surface than is commonly believed. Although a few roots may be found in the subsoil, most roots, especially the important feeder roots, proliferate near the soil surface where water and oxygen are more readily available. This is especially true in urban soils, which are typically shallow, compacted, infertile and droughty.

## Water

Water transports substances throughout the tree and sustains its living cells. Water moves upward in a tree because the air is drier than the tree tissues. Only at 100 percent relative humidity does a tree stop losing water to the atmosphere. Like a sponge, air soaks up water vapor from the leaves and other non-woody plant parts in a process known as *evapotranspiration*. The water lost to the atmosphere is replaced by soil water, taken up by the fine root hairs just below

the soil surface. During the day, leaves give off water much faster than the roots can pull water from the soil. Since water molecules bond together very tightly, a continuous water column is pulled up the entire height of the tree. This process is most rapid when air temperature is high, the sun is bright, the wind is blowing, and relative humidity is low. The tension in the water column relaxes as the day wears on, temperatures fall, the sun sets, winds die and humidity increases. At night, roots continue to pull water into the tree, evapotranspiration slows down, and the tree is rehydrated by morning.



**Bark can be very thin or very thick. The bark of a birch tree may be only 1/4 inch thick, while the bark of a giant sequoia can be as much as two feet thick.**

## Nutrition

Trees are composed primarily of carbon, hydrogen and oxygen. Thirteen additional elements are required for healthy plant growth, but most are needed in minute amounts. Soils usually contain adequate levels of micronutrients. Major nutrients, particularly nitrogen, can be lacking in urban soils where topsoil has been removed, and leaves and twigs are raked away. Fertilizer should be applied sparingly and only to correct a specific deficiency identified through lab analysis of soil or plant tissue. Excessive fertilization can damage tree roots and contaminate runoff.

## Moving and storing food

Trees need adequate supplies of water, carbohydrates, minerals, and nitrogen to grow. Like blood, sap transports these vital substances to cells throughout the tree. Xylem sap transports mineral elements up through the tree. Phloem sap, which is bi-directional, carries most of the carbohydrates. Both xylem and phloem sap supply nitrogen.

In young trees, most of the carbohydrates produced in photosynthesis are sent to the roots before bud break. As buds open, the process is reversed, and

carbohydrates are transported to the rapidly growing shoots. As shoots, flowers and leaves finish growing, food is directed to the cambium and roots for further growth. As trees grow larger, shoots growing near the crown draw on food produced and stored nearer the treetop.

Unhealthy or damaged plants have few reserves and easily succumb to further damage. Important reserves are lost when roots are cut, crushed or suffocated. The tree responds with poor growth, premature leaf drop or by sacrificing specific limbs. Although symptoms may be delayed for several years, the damage is often fatal.

## Repair

Trees cannot heal their wounds. They have no means of replacing damaged cells. Instead, trees produce chemical and physical barriers to seal off the wounded area. The tree forms another barrier over the damaged area with a new layer of wood. Together, these barriers form a compartment around the wound. This minimizes and blocks off the wound, reducing the area subject to decay. In general, the healthier the tree, the stronger the barriers, and the greater the resistance to decay. 🌳

Mowers, string trimmers, wires, insects and disease can all damage trees. Wounds don't heal but are walled off to form a scar tissue of sorts; a barrier to resist the spread of decay.



RICHARD RIDEOUT

# Anchoring roots the right way

Pay attention to planting details today if you want a big tree tomorrow.

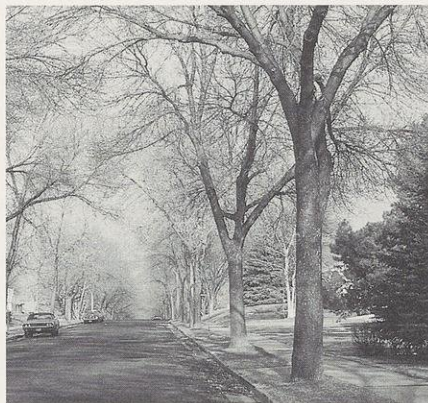
It doesn't take long to plant a tree. But the way you plant a tree today will make all the difference in its health, beauty and function over a lifetime — which could be a hundred years, or more. Plant a tree properly today and you'll be rewarded for decades to come.

## Which tree to plant?

*Plant the right tree in the right place!* This guiding principle should govern your choice. Start by gathering information about the planting site. Your decision should be based on four factors:

**Size:** The tree must have enough space to expand to its *mature size* above and below ground. Check the site for obstructions such as overhead utilities, buildings, or pavement, and be sure to call the statewide Diggers Hotline at 1-800-242-8511 to find out about underground lines. Do not expect that pruning will keep a tree within bounds. It won't!

**Needs:** Each tree species has specific requirements for soil type, pH, amount of moisture, exposure to wind, sun, and pollution. Review your site carefully and narrow the list of species to those that can prosper under the conditions of your site.



Well-planted and tended trees create a sense of neighborhood.

RICHARD RIDEOUT

**Diversity:** So what if everyone on the block has birches in the back yard! Spend a little time identifying the trees in the immediate area, and select species for your property that will add diversity to the urban forest.

**Function:** You should certainly consider the role you want the tree to play in your overall landscape plan, but this shouldn't be your sole criterion for choosing a particular species. Thousands of trees die every year when design and aesthetics are placed ahead of biology.

Once you have decided which species to plant, take care to select a healthy, well-shaped specimen at the nursery. Poor form or other problems will be exaggerated as the tree grows larger, so take time and choose wisely now.

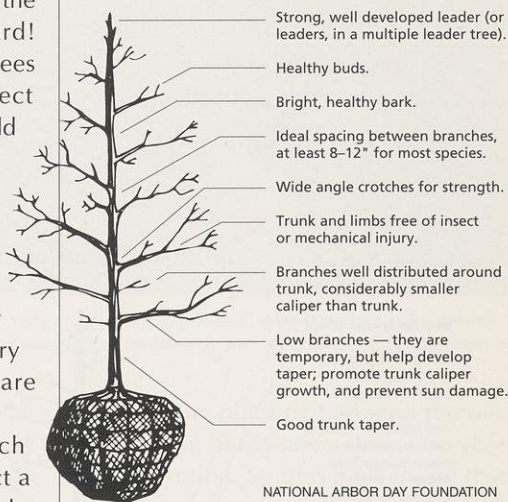
## Preparing the site

For many years, we've been told to plant trees at the same depth as they were in the nursery. Nursery practices often lead to 3–12" of excess soil on top of the roots. Planting the tree at this same

depth likely leads to problems later in the tree's life. These include trunk cracks and rot, crown dieback and, possibly girdling roots and premature death.

To determine the correct depth of the hole, measure the depth of the *root system* from the root collar to the bottom of the root ball. The root collar is the point where the roots end and the trunk begins. It is most easily recognized by a flaring at the base of the trunk. (Do not confuse the flared root collar with the bud graft, a swelling of the trunk where the bud of the cultivar was grafted onto

## Select quality tree stock



NATIONAL ARBOR DAY FOUNDATION

the root stock. The bud graft is usually about six inches above the root flare.) When working with potted, containerized, or balled-and-burlapped plants, scrape the soil away until you reveal the root collar.

Dig the hole slightly shallower than the depth of the root system, and three times as wide. Leave an undisturbed pedestal of soil in the bottom for the tree to sit on. Taper the sides of the hole and use a shovel to rough up the exposed



**Roots:** 90 percent of a tree's roots are in the top 12 inches of the soil. Roots can extend up to three times the height of the tree. The notion that the roots of a tree mirror its crown is more artistic than accurate. The shape of a tree actually resembles a wine glass set on a plate. Root growth can occur any time the soil temperature is above 32° F.

# Choosing an arborist

A tree professional, or arborist, can assist you with tree planting, pruning, fertilization, repair, disease and insect control, removal, and other services. Arborists understand the physiology of trees and base their recommendations and practices on that knowledge.

Here are a few things to look for when hiring an arborist:

**Credentials:** A certified arborist has passed a rigorous exam and keeps up-to-date on the latest research and information through continuing education. Certification through the International Society of Arboriculture is one measure of knowledge. Membership in a professional organization such as the Wisconsin Arborist Association, the International Society of Arboriculture, the National Arborist Association, or the American Society of Consulting Arborists indicates an interest in professionalism.

**Insurance:** Ask for certificates of insurance, including proof of liability for personal and property damage and worker's compensation. Then call the insurance company to make certain the policy is in force.

**References:** If possible, look at jobs the arborist has done and talk with former clients.



A few other tips will help ensure that you and your trees will be well cared for:

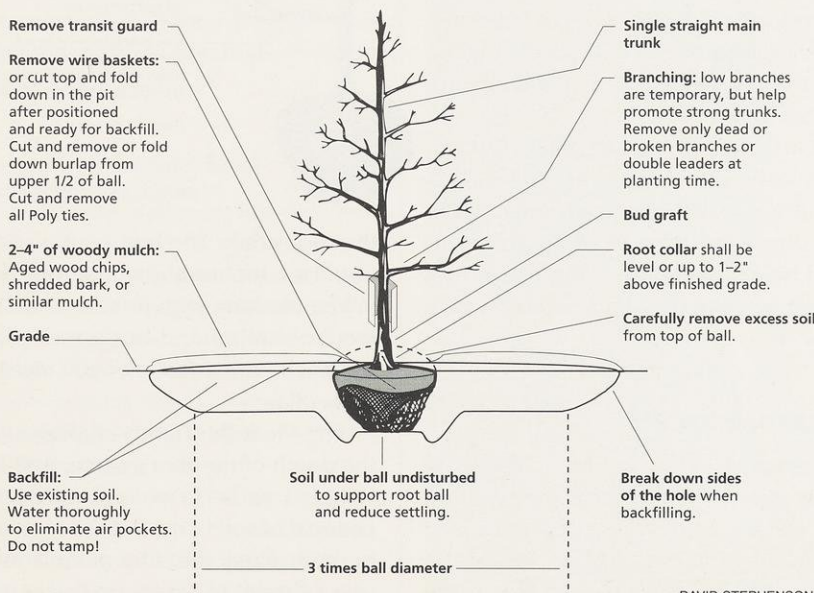
**Estimates:** Have more than one arborist look at your job and give estimates. Arborists are professionals, some charge for the first consultation, others don't: Ask!

**Contracts:** Ask for a written contract which should include: exactly what work will be done, how it will be done and when; what cleanup work will be done; who gets any firewood; whether removal includes stump grinding, backfilling and seeding; the method of pricing the job and the total dollar amount you will be charged. Read it carefully and get your questions answered before you sign it.

Finally, keep these points in mind before you make any decisions:

- Don't choose an arborist solely on price. Getting the job done properly and safely is more important than a low bid.
- Beware of arborists who recommend topping a tree. Topping is appropriate only in extremely rare circumstances.
- A conscientious arborist will never use climbing spikes unless a tree is to be removed.
- Beware of door-to-door "arborists" offering a bargain, especially after storms.

## Recommended tree planting technique



DAVID STEPHENSON

walls. Using a rototiller, shovel or spading fork, loosen the soil over an area outside the hole at least five times the diameter of the root system and eight inches deep. If the soil is compacted, loosen it up even deeper.

## Planting the tree

At the nursery, tree stock come in three different types:

**Bare root:** Because the roots have no soil on them, they must be kept cool and moist at all times. Before planting, inspect the roots. Damaged or broken roots should be clipped using sharp hand pruners. Spread the roots out as you set the tree down on the pedestal. The root collar is plainly visible to judge proper depth. Bare root trees should be planted when dormant.



#### Tree facts:

- There are over 20,000 different kinds of trees in the world.
- A large leafy tree may take up as much as a ton of water from the soil every day.
- Trees make up an estimated 80 percent by weight of the 49 trillion tons of green plants on the planet.

DAVID STEPHENSON

Demonstrations show trees planted too deep, in too small a hole, and planted properly for healthy, long-term survival.

**Potted or containerized:** Cut and remove the container first, then carefully set the tree in the hole. Cut any large roots that encircle the outside of the root ball using sharp hand pruners. If the root collar is not visible, dig down until it is and remove excess soil from the top of the root ball.

**Balled-and-burlapped:** Remove the rope around the trunk, peel the top of the burlap back and check for the root collar. Carefully set the tree at the proper depth without disturbing the root ball, then remove excess soil from the top of the soil ball. Snip as much of the wire basket off as possible and peel the burlap down at least half way so the roots can expand into the native soil without restriction.

Whatever type of planting stock you're working with, make sure to place the root collar even with the soil surface, or one to two inches above grade. It's better to plant on the shallow side, as newly planted trees often settle a little. Plumb the tree and you're ready to begin backfilling.

Use the soil removed from the hole as fill. Don't use new soil, because it disrupts soil water movement. Break up large clumps of soil and discard large rocks and other debris. As you shovel soil over the tree roots, don't pack it down. Water and gravity will pack the soil naturally. Refill any air spaces that are caused by watering.

It's best not to fertilize at the time of planting. Wait at least one or two years, until the tree has recovered from the shock of transplanting.

Recreate nature's litter by applying a mulch of wood chips two to four inches thick over the entire area you rototilled or loosened with a shovel. Avoid plac-



CINDY CASEY

Avoid staking if possible. If you must stake trees, tether trunks with a soft 2–3" wide strap to a stake several feet away and remove the straps after a year. Guy wires left on this tree choked off growth, girdled the limb and will kill it.

ing wood chips directly in contact with the trunk. Mulch will keep the soil cool and moist, return important nutrients to the soil, encourage beneficial fungi and keep lawn mowers away from the tree.

Staking or guying new trees may be necessary if you're planting in a very windy spot or are planting bare-root stock, but it's best to avoid staking if possible. If you must stake, use wide bands of nylon strap or carpet to support the trunk and make sure the tree has room to move a little. Wire, even surrounded by a garden hose, causes serious damage to the trunk and should not be used. Don't pound the stakes

through the planting ball, and remove all staking hardware within one year after planting. Studies have found that trunk wrap does more harm than good, so it should not be used.

A young tree needs all the energy it can get, so don't prune it. The leaves on the branches will help the tree produce the energy it needs to get established in its new location. Broken or dead branches and double leaders should be removed right away, however. Otherwise, it is best to wait two or three years for the first pruning. 🌱

# A well-trimmed tree

Pruning improves a tree's structure and helps keep it healthy.

A bit of judicious pruning benefits a tree at many stages of life. Properly pruned young trees will grow into handsome, structurally strong trees; they will require little corrective pruning when older, and will pose less of a hazard from weak branches. Mature trees need periodic pruning to remove dead wood, crossed or rubbing branches, and to thin the crown to reduce the "sail" effect.

## Before you begin

Get out the whetstone! Pruning shears and saws should be sharp for your own safety and to make clean cuts in bark and wood.

Pruning should always be done at branch junctions. Where two branches, or a branch and the trunk meet, there is an area called the *branch collar*. The ideal pruning cut leaves the branch collar intact while removing the rest of the branch. On larger branches, undercuts are necessary to prevent cracked branches or torn bark.

Pruning paint or wound dressing is



KEN OTTMAN

Pruning mature trees is a job for professionals. (left) They prune branches extending beyond the natural outline of the crown maintaining at least two-thirds of the tree as live crown.

usually unnecessary. Such sealers can actually hamper a tree's natural defense system, causing problems instead of preventing them.

## Pruning a young tree

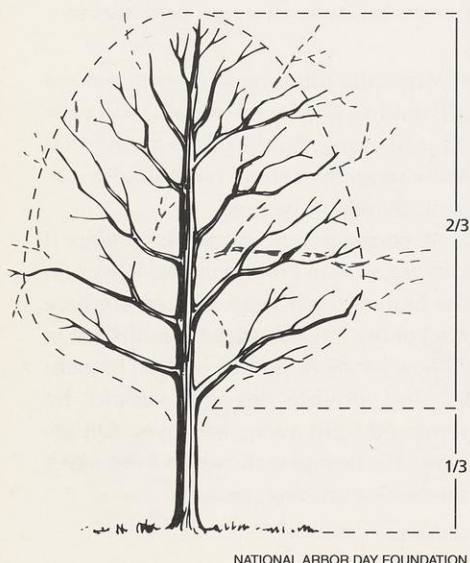
It's best to prune a young tree over a period of years. By pruning trees when young, the need for heavy pruning can be substantially reduced or avoided as the tree ages.

The first pruning on a young tree should take place about two to three



**Eight good reasons not to "top" your tree:**  
starvation, shock, insects and disease, weak limbs, rapid new growth, tree death, ugliness and cost.

years after planting. Pruning at this point will have the greatest impact on the future structure and form of the tree. Each cut has the potential to alter tree growth, so remove no branch without a reason.

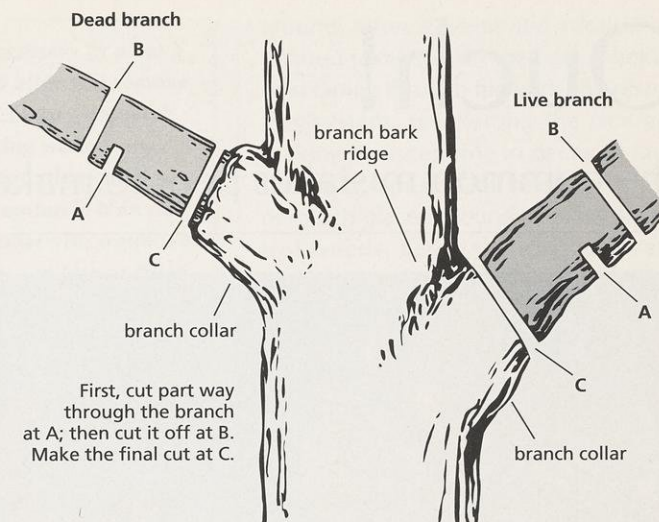


NATIONAL ARBOR DAY FOUNDATION

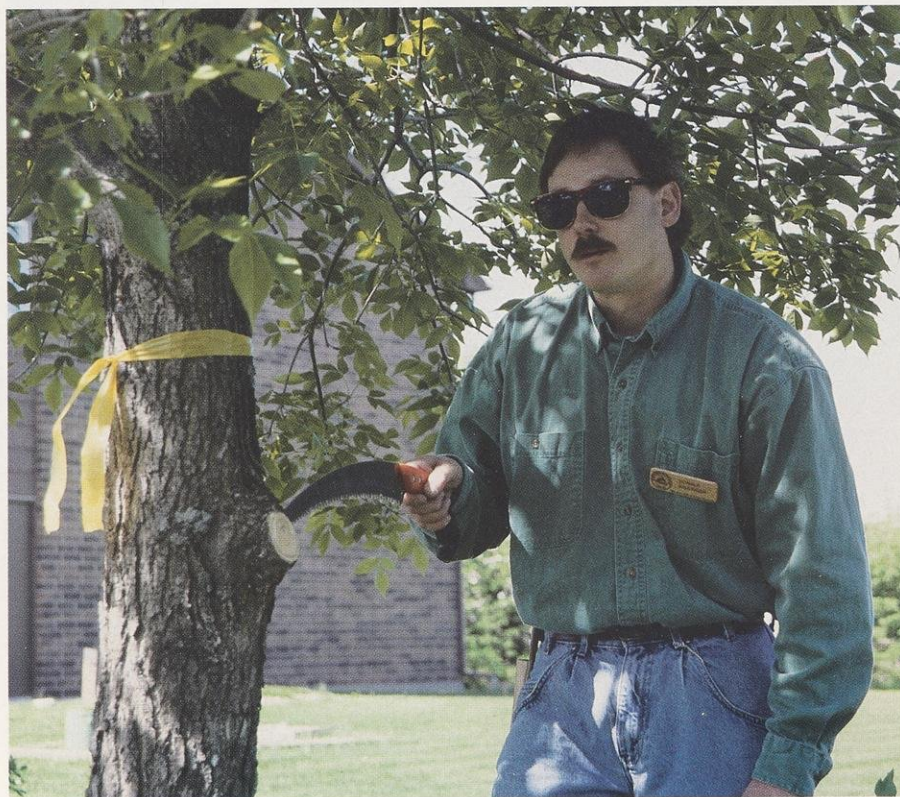


RICHARD RIDEOUT

(above) Stubs left above the branch collar are routes for disease and decay.  
(right) Proper pruning tips to avoid bad breaks.



UNIVERSITY OF MINNESOTA EXTENSION SERVICE



BARB BRUNING

DNR urban foresters, like Don Kissinger, demonstrate proper pruning cuts.

Stand back from the tree and look for branches that are broken, dead or diseased. Remove these problem branches first. If the tree has a double leader, one of them should be removed. Branches that are growing back into the center of the tree, and those that are rubbing against other branches also should be removed.

Take another look at the tree's overall form and structure before you prune any healthy branches. For most species, the

main lateral or scaffold branches should ideally be spaced eight to 12 inches apart vertically and be evenly distributed around the trunk. The branches that are to remain should be no more than one-half the diameter of the trunk. Leave some branches lower down on the trunk — they'll help develop good trunk structure and may be removed during the second pruning. Never remove more than one-third of the total live crown at one time.

The second pruning takes place about five to seven years after planting. Again, remove defective branches first. Lift the crown and provide clearance for pedestrians, vehicles and structures by pruning the lower, temporary branches. Stand back and look at the form of the crown. Branches that extend outside the natural outline may be cut back to the branch collar.

### Pruning the big trees

Mature trees need occasional pruning to remove dead or hazardous branches, to restore damaged crowns, and to keep roadways and sidewalks clear. Only experienced and knowledgeable arborists should prune mature trees. Arborists use a technique called "drop-crotching" to remove large branches and will never "top" a tree.

### When to cut

The best time to prune is when the tree is dormant — after the leaves fall off in autumn, and before the buds begin to swell in the spring. The next best time is in the summer, after leaves are fully formed. Spring flowering trees are best pruned after the flowers have dropped. Try to avoid pruning any tree during leaf formation in the spring, or during leaf drop in the fall. Storm damaged limbs, dead branches, or branches that may be hazards should be removed as soon as possible. 🌳

# Ouch!

The common mistakes people make when tending their leafy charges.

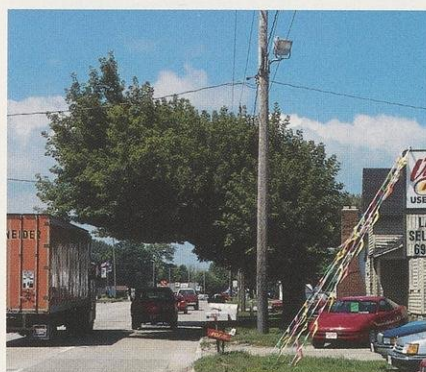


KIM GORENC SEBASTIAN

City tree problems. (above) Maple scorch from drought, trunk damage, root damage or road salt. (bottom left) Box elder boxed in by wires above and traffic below. (bottom right) Car damage and concrete heaving take a toll on trunk and roots.

**A**lthough we may not realize it, many things we do in our yards harm trees, and it may be years or decades before the damage shows. Consider the following:

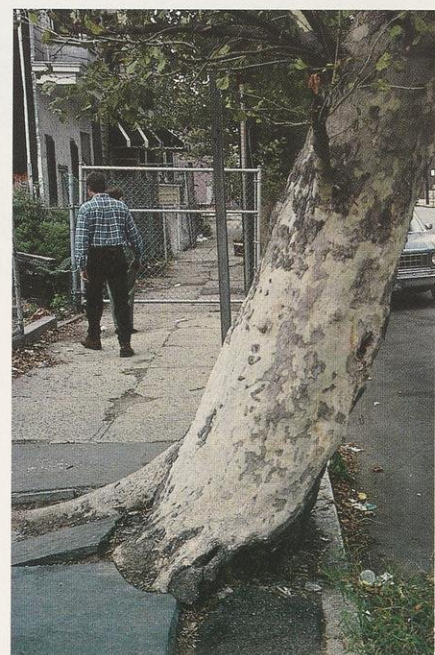
**Wrong tree for the site:** Often a tree is doomed before it is even planted. When we like a certain species of tree, we plant it even though it cannot tolerate the site conditions. We plant tall trees under power lines or salt-intolerant trees next to roadways. Trees that need full sun are planted in shady areas. Short and wide trees are planted next to walkways. Poorly drained areas become home to trees that cannot tolerate wet roots. Trees are planted too close together or too near buildings. Acid-loving plants are put in alkaline soils. Before choosing a tree, evaluate the site carefully and be sure the tree you choose is appropriate.



PETER JON RUDQUIST

fully and be sure the tree you choose is appropriate.

**Planting too deep:** Roots of a properly planted tree spread laterally from the trunk. If the tree is planted too deep — a common mistake — the roots will grow up toward the surface to get the oxygen they need to survive. As the



DAVID STEPHENSON

trunk increases in size, it will someday come in contact with the roots growing laterally or encircling the main roots. Soon the tree is girdled and killed by its own roots. This may not happen for 20 or 30 years, but that's the time the tree is at its highest value. Planting too deep can also cause root or trunk rot, internal cracking and crown die back.

**Topping:** Topping trees is a crime against nature. Often done to reduce the height of a tree for safety, topping — incorrectly pruning major leading branches so that stubs are left — accomplishes just the opposite. The stubs are entry points for disease and decay. Topping also causes a flush of fast growing but weak sprouts below the cut. The larger the sprouts get, the more hazardous they become.



**It is not necessary to paint a tree wound after you remove a branch. In fact, research shows that painting wounds may actually do more harm than good to a tree. The only exception is if an oak tree is pruned or otherwise wounded between bud break and two or three weeks past full leaf development (generally April 15 to July 1). Oak trees are most vulnerable to oak wilt during this time.**

**Lawn mowers on the loose:** Lawn mowers and weed whips kill more trees than nearly anything else. Be careful not to bang against trees with lawn mowers, or use trees as pivots to spin mowers

around. A tree's "veins and arteries" are located just beneath the bark. Nicking or scraping through the bark will disrupt this system, weakening the tree and making it susceptible to decay. A large nick or scrape can kill the tree. A layer of mulch placed around trees helps control weeds, keeps the roots cool and moist, returns important minerals to the soil — and keeps lawn mowers at a safe distance away from the trunk.

**Herbicide damage:** Using broadleaf herbicides or "weed and feed" products can damage trees. A tree is a large broad-leafed plant. Products that kill your dandelions or lawn ivy can also kill your tree. Read product labels carefully and be extremely wary about using herbicides around trees. 🌱

When trees are planted too deep or in a small diameter hole, it may take a long time for trouble to surface. These roots eventually encircled this tree, squeezed and girdled it cutting off the supply of nutrients and water. It died before its time.



RICHARD RIDEOUT

## When you want to know and do more

If you have questions about your individual trees or home landscape, begin by contacting your community tree board or the staff at your local forestry or parks department for assistance.

Next, try your county's university extension office. Brown, Dane, Kenosha, Milwaukee, Racine and Waukesha counties have full-time extension horticulturists; other counties have agriculture or natural resource agents that can point you in the right direction. Extension offices have bulletins and fact sheets on tree problems. UW-Extension has just begun a Tree Care Advisor (TCA) program

which trains citizens in basic tree care; check with your county to see if there are any TCAs available. If not, you could help start such a program in your county.

A commercial arborist or tree service is your best bet if you need someone to visit your property to diagnose a tree problem. Take a look at "Choosing an Arborist" on page 6 for a few tips.

If you have a question about trees on public property or want to get involved in an urban forestry program, go to your local government first. All communities will have someone in charge of the trees. It may be the city forester or park director, or it may be the director of public works, the street superintendent, or a citizen tree board.



Disease surveys are part of the maintenance individual trees need in the urban forest.

RICHARD RIDEOUT

If your community doesn't have a program, DNR Urban Forestry Coordinators can help you start one. Coordinators provide information and can put you in touch with volunteer groups and consultants. Cost-share grants to fund urban forestry projects for communities are available. Urban Forestry Coordinators are located at DNR offices in Eau Claire, Green Bay, Madison, Milwaukee, Pike Lake State Park and Wausau.

If you'd like to do some research on your own, take a look at "Urban Forestry" by Robert W. Miller, the *Journal of Arboriculture*, and the *Wisconsin Ur-*

*ban & Community Forests* newsletter. Check your local library under arboriculture, forestry, horticulture, trees and urban forestry. The Internet, and organizations such as American Forests, the International Society of Arboriculture, the National Arbor Day Foundation and the Wisconsin Arborist Association, are other good sources of information.

The DNR urban forestry program has produced a selected bibliography describing a number of useful resources. Write: Urban Forestry Resource List, P.O. Box 7921, Madison WI 53707 or contact your DNR District Urban Forestry Coordinator.

# Hot wires and high branches

Trees and utilities can coexist — with careful planning and regular maintenance.

**M**idwestern landscapes are graced with lush green ribbons of trees that are essential to life. Across the land, the green ribbons are interwoven with silver strands — electric, telephone, cable television, water supply, wastewater and natural gas lines necessary for living in the modern world. We need both the green ribbons and the silver strands, yet they are often in conflict.

## Jolted by volts

Trees and utilities frequently share a common corridor and compete for space. Conflicts between trees and most utilities are generally not serious, and can usually be dealt with by leaving a little distance between the two. Conflicts between trees and overhead *elec-*

Trees topped under utility wires. (right) Side pruning and better tree choices can prevent such losses.



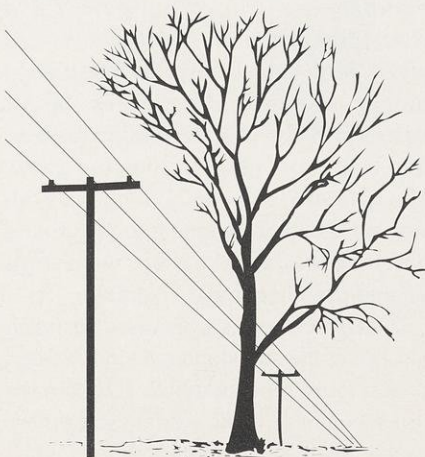
DAVID STEPHENSON

*tric* lines, however, can have serious, widespread consequences.

Because trees contain so much moisture, they, like humans, are prime conductors for electricity. Overhead electric lines are not insulated. If you touch a tree limb in contact with a power line, you can be electrocuted. Trees *must* be kept clear of electric lines for that reason alone.

Conflicts between trees and overhead power lines can cause major disruptions in our high-tech, computer-driven, electricity-dependent society. Power outages and surges threaten life-saving medical devices in hospitals and interfere with public safety systems in police and fire departments, airports, schools, businesses and homes. Power outages caused by trees are costly to repair, resulting in higher electricity rates.

By law, utility companies must manage vegetation within and along power line rights-of-way to keep a “clear zone” around their facilities. These same state laws enable utility company employees and their contractors to enter all proper-



You can kill a tree by:

- planting it too deep
- banging a lawn mower into it
- changing the grade by as little as three inches
- trenching near it
- compacting the soil around it

ty to take care of any potential or real hazard at any time. Although utility companies make every effort to contact property owners well in advance of trimming work to discuss options, when emergencies arise, they can and will enter your property without prior notice.

For many years, utility crews and contractors topped trees, stubbing off limbs for clearance. Research has proven that topping causes long-term problems and increases maintenance time and costs. A healthier, more economical approach now used by many utilities makes use of *directional pruning* to train the tree to grow outside of the clear zone and coexist with the power lines.

Several Wisconsin communities have ordinances that restrict planting beneath overhead power lines to low-growing species. Wisconsin's private, investor-owned electric companies all offer customers advice on selecting appropriate species for planting near lines. Wisconsin Public Service Corporation was one of the first utilities in the country to be named a “Tree Line USA” by the National Arbor Day Foundation for managing trees near overhead and underground utilities — proof that the green ribbons and silver strands can coexist for the benefit of all. 🌳

# Building for growth

Trees on construction sites need protection to add property value in the years to come.



DAVID STEPHENSON

Drastic grade changes bury trees or expose roots. In either case, the trees are doomed.

A four-year-old home sits neatly in the midst of 30 or so trees, the remains of a once-thriving maple forest now subdivided into half-acre lots. Although it's July, it looks like the last days of fall: What leaves are left have turned a dull, sickly yellow. The trees are dying, and the homeowner who shelled out \$80,000 for a wooded lot wants to know why.

An arborist could spot the problem halfway down the block. The telltale signs of a grade change are evident: The trees look like telephone poles stuck into the meticulously leveled-and-groomed lawn. Few will survive, and the homeowners, drawn to the lots precisely because of the trees, will be disappointed for a long, long time.

## The problems begin down below

Careless handling of building materials and equipment above ground can rip branches and tear tree bark. The real damage, however, occurs below ground. Soil compaction and altered soil slope or grade within a tree's rooting area are the two primary causes for tree decline at construction sites.

Compaction is caused by heavy equipment — trucks, bulldozers and stockpiles of wood, sheetrock, bricks and other building materials. The weight damages roots and squeezes the air spaces from the soil, decreasing the oxygen tree roots need to live and grow. The hardened soil can no longer absorb water. Instead of soaking into the ground where roots can take it up, water runs off and trees become dehydrated.

Grade changes can also be fatal. Dropping the soil slope cuts into a tree's root system, most of which is within the top 12 inches of soil. Adding soil on top of tree roots has a compacting effect —

as little as three inches of fill can literally smother roots. A tree trunk coming straight out of the ground, without the typical flare at the base as trunk changes over to roots, is a good indication that fill has been added and the grade changed.

## Protecting your trees now for tomorrow

You can have a beautiful home *and* trees, but it requires planning and some work. The process begins before any earth is moved. Consider hiring a reputable arborist for assistance. Remember, the existing trees add a great deal of value to your property; it may take decades to replace them should they die. Keep the following points in mind to ensure the survival of your trees during and long after construction or renovation is finished:



**Trees: save energy by blocking winds and shading; intercept rainfall and reduce runoff; filter pollutants from the air; muffle traffic noise; reduce glare and reflection; define space; screen undesirable views; provide privacy; shelter wildlife; and add color, texture and beauty to the urban environment.**

- Inventory all trees on the lot. Record the location, size and species. Include comments on each tree's overall form and health. Use this information to decide which trees should be saved and where the home will be situated.
- Mark out the proposed location of the house on the site with stakes and string. Determine how much room is needed for machinery to maneuver during construction. Allow for a single entrance and exit corridor for all machinery

equipment and materials — preferably the location of the future driveway.

- Select the trees to be saved and think carefully about future landscaping needs. Leaving undisturbed groups of trees is far more beneficial than saving single specimens.
- Contact utility companies to see if a single wider corridor can be used to provide electric, gas, phone, water and sewer service rather than crisscrossing the yard and severing the root systems of many trees with equipment and service lines.

**A shade tree positioned on the west side of a home can keep it 20 percent cooler than a home without a tree. Trees are nature's air conditioners. The cooling effect of one tree is equal to that of five room air conditioners running 20 hours a day.**

- Meet with the builder and subcontractors to outline "tree protection" areas. Roots of trees can extend outward two to three times the height of the tree. Fence these areas off and do not allow equipment or materials within them.
- Include a landscape protection clause in all contracts. Document tree conditions prior to any site modifications with video or pictures.
- Be sure the trees have adequate moisture before, during and after construction.
- Add mulch under the dripline of the trees you want protected to minimize compaction, conserve moisture and add important nutrients back into the soil.
- Prune any large dead limbs and live limbs which may be damaged by construction machinery or the structures you are building.
- Monitor the construction process once it has begun. Visit the site regularly to

inspect and take pictures or videotape. Your presence will alert workers of your concern. Should damage occur, notify the builder immediately, and take action to ensure continued health of the affected trees. 🌳

Public trees get trapped too as roads and sidewalks expand.



PETER-JON RUDQUIST

It will take years for the owner of this beautiful new home to discover why the mature trees died. Adding fill gives mature trees that telephone pole look and isolates tree roots from the water and oxygen they need to thrive.



DAVID STEPHENSON

# Growing together

There can be no urban forest without help from urban forest dwellers.



KIM GORENC SEBASTIAN

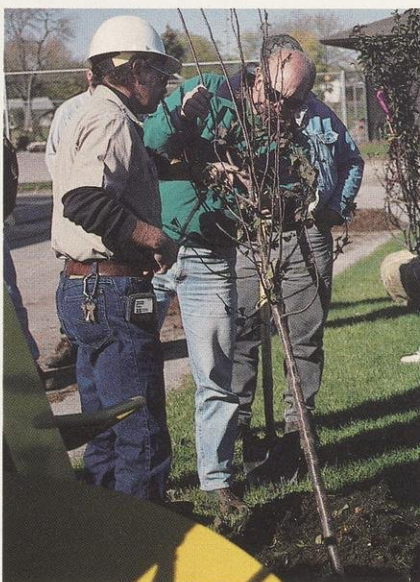
Community Arbor Day celebrations can build support for community trees at an early age.

**T**o survive, an urban tree needs routine care and maintenance; to thrive, it needs committed people. A community tree program guides the planting, management and care of trees in a town, village or city. Properly tended, trees become important community assets that appreciate in value with each passing year.

An effective tree program has four critical elements: Community support, adequate funding, ordinances, and a clear line of responsibility.

## A board for trees

People readily recognize the trees in their back yard, but have a harder time envisioning the "forest" that encompasses their community. A municipal tree board — generally a group of volunteers — can greatly contribute to the greening of a community by increasing public awareness of how trees add substantial value to their town. In larger communities, where tree care is provided by a parks-and-recreation or public works



DAVID STEPHENSON

Planning, training and care preserve our quality investment in community trees.

department, a tree board may serve as administrator, advisor or advocate. In smaller communities, a tree board may take more of a hands-on approach by making routine decisions regarding trees, lining up volunteer help and literally planting the local landscape. DNR's

**In Appleton, an ordinance has been created to recover damages from those who injure public trees.**

were responsible for caring for street trees adjoining their land, Turk said. The care was uneven as residents weren't properly trained or regularly encouraged to maintain trees. Hartford's new ordinance makes the public works department responsible for street trees. A regular maintenance schedule was considered a small price to protect the community investment in a healthy stock of trees. 🌱

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Design by Moonlit Ink  
Front cover aerial photo by Allen J. Prey  
PUBL FR- 108-96

# BUY WISCONSIN'S WOLF LICENSE PLATE

- A \$25.00 tax deductible fee is required for original issuance of the endangered resources plate and each year at renewal. This fee is a contribution to the Endangered Resources fund.
- If you would like personalized plates, a \$15.00 fee is required EACH year in addition to the regular annual registration fee.
- A \$4.00 fee is required in addition to the \$15.00 fee if you are changing from one personalized plate to another or if you change to a nonpersonalized plate of any type.
- No refund or adjustment will be made for a change of choice or spacing after the plate has been ordered, or if the application is incorrectly or unclearly completed.
- The department may refuse to issue OR may recall after issuance, a request which may be offensive to good taste or decency, misleading or conflict with the issuance of any other license plates.
- Be sure to include your original title.
- If you have questions or want to check on a request, call 608-266-3041 (TDD 608-264-8703).

## HOW TO APPLY

1. If you want personalized plates, choose 1-6 characters. If you want nonpersonalized plates, mark application and omit steps 2-4.

acceptable: small letters, symbols, signs, hyphens, apostrophes, etc.
2. If you choose 6 characters, no spaces are allowed. If you choose 5 characters, you may request up to 2 spaces between any of the characters. Indicate this request with diagonal lines.
3. Use capital letters or numbers. The letter O and the number zero are the same. The following are not

Carefully distinguish between:  
Letters L or I and Number 1  
Letter Z and Number 2  
Letter S and Number 5  
Letter B and Number 8  
Letter G and Number 6  
Letter U and Letter V

4. Provide meaning of request, i.e., what does this represent?

(application on back)

## • • • • • TRACK THE TERRITORY • • • • •

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Address \_\_\_\_\_

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☐ 1 Year—\$8.97    ☐ 2 Year—\$15.97    ☐ 3 Year—\$21.97    6 issues/year

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☐ Bill me

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JJF68

# HOW TO APPLY (continued)

5. Send the following items:
- Signed application;
  - Check or money order made payable to: Registration Fee Trust;
  - Your Wisconsin title (not a photocopy), if titled in your name OR an application for title and assigned title if not currently titled in your name;
  - Registration fee if you do not have plates or if your plates expire within the next three months.

6. Mail to:  
Wisconsin Department of Transportation  
Special Plates Unit  
P O Box 7911  
Madison, WI 53707-7911

**RELEASE OF INFORMATION:** The Wisconsin Department of Transportation uses the information on this form to issue Endangered Resources license plates. Under open records laws, the Department must make certain information available upon request. The Department makes some information available to companies for business purposes. If you want your name and address withheld from such business mailing lists, please obtain form MV3592, Request to Withhold Name and Address from any DMV office.

ADA — The Wisconsin Department of Transportation complies with the Americans with Disabilities Act.

## APPLICATION FORM

☐ I would like nonpersonalized E R plates.

☐ I would like personalized E R plates.

If all personalized choices have been used:

☐ I would like nonpersonalized E R plates.

☐ Call me between 7 AM – 4:30 PM

Phone: \_\_\_\_\_

FIRST CHOICE	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
SECOND CHOICE	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
THIRD CHOICE	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

### FEE CALCULATION:

Personalized plate fee \$ 15.00

E R plate fee 25.00

Registration fee if applicable \_\_\_\_\_

Exchange of plate fee if applicable \_\_\_\_\_

**TOTAL FEE** \_\_\_\_\_

Meaning \_\_\_\_\_

Meaning \_\_\_\_\_

Meaning \_\_\_\_\_

Applicant full name (Last, First, M.I.) \_\_\_\_\_

Street address \_\_\_\_\_ City /state / zip \_\_\_\_\_

Applicant signature \_\_\_\_\_

MV2858 94 s.341.14(6r) Wis. Stats.

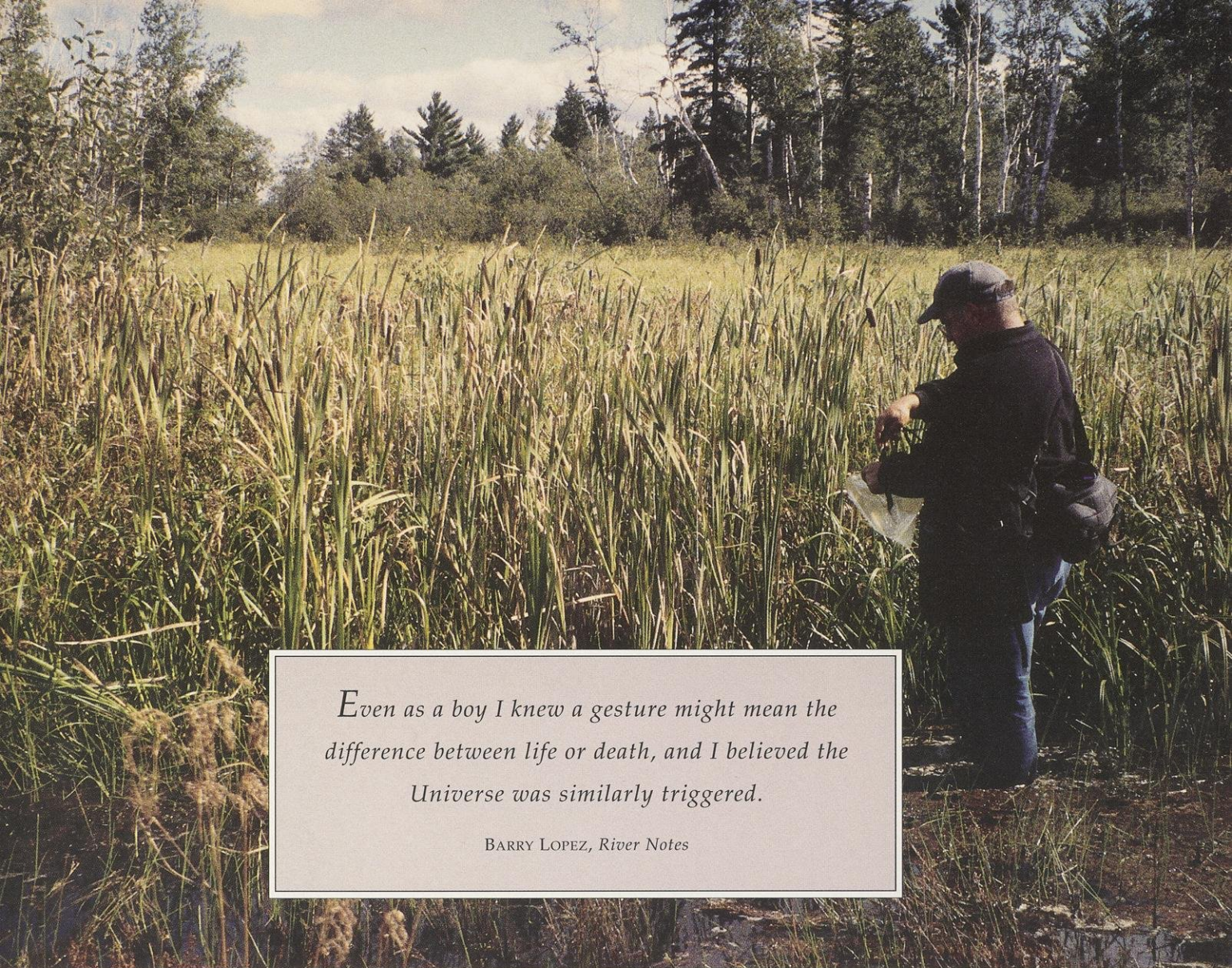


PLACE  
STAMP  
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NATURAL RESOURCES

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MADISON, WI 53707-7191





*Even as a boy I knew a gesture might mean the  
difference between life or death, and I believed the  
Universe was similarly triggered.*

BARRY LOPEZ, *River Notes*

Your investment continues the search for Wisconsin's wild communities. Here, Dan Spuhler inventories rare plants including burreed on a Douglas County wooded wetland.

ERIC J. EPSTEIN

# A moving statement

With an Endangered Resources license plate,  
you can speak on behalf of Wisconsin's flora and fauna.

Marta Anderson Trimble

**T**here's a new animal howling down Wisconsin's highways. In fact, as of October 1995, pack totals of these soft-muzzled, long-legged, clear-eyed, warm-blooded *Canis lupus* look-alikes have surpassed 10,000. Wolves are on the run on Wisconsin's Endangered Resources license



plates, and their howling speaks for people who have chosen to support the 18 wolf packs and scores of endangered animals, plants and habitats clinging to life in our state.

Maybe you've noticed that some of these plates have messages to share, messages as varied as the people who've chosen them.



MONTY SLOAN

Purchases of endangered resources license plates last year provided \$256,000 to inventory wild resources, recover native habitat and restore populations of endangered species.

*(above)* Our endangered resources partners helped restore timber wolves which number 83–86 animals in 18 or more packs this year.

*(right)* A pine barren is surveyed for signs of Karner blue butterflies and their habitat.



ERIC J. EPSTEIN

## Join these members of the wolf pack!

The following is a partial listing of the creative license plates Wisconsinites have ordered to honor endangered resources. See if you can figure them out.

GOOWLL

SAVEWI

DVRSTY

AHW000

DANCEZ

LIFE4S

WLFTRX

FANGS

PROTCT

CRYWLF

RESPCT

WOLVZ

LALOBO

WHFANG



WILDE FAMILY



ROBERT PANEITZ

(top) For Donald and Jean Wilde, their O2BWLD license plate shares the fun of camping and watching wildlife.  
(above) Mixed interests in hunting and environment led Robert Paneitz to say SAVEUM.

Beyond the annual \$25 fee which goes directly to support Bureau of Endangered Resources programs, an annual \$15 "vanity" fee secures six letters of the purchaser's choice. Six letters can be barely more than a gesture, and viewers must puzzle out a longer story for LIFE4S, BROWLF, 4LUPUS, GOOWLL, DVRSTY, DON 8, WLFSNG and NEEDED. What exactly are these people saying?

In a world where we always seem to be going too fast (with a lot of time spent in cars and trucks), it's difficult to stop and consider who we are, what we value, what the surrounding world means to us and what we might wish to say about that to those around us. Displaying an Endangered

Resources license plate registers environmental awareness and provides an avenue for self-expression in the whirling traffic of anonymity.

Donald and Jean Wilde of Watertown love to see nature. They visit the bald eagles at Sauk City and camp up North in the national forests. Their O2BWLD plate speaks not only of personal longing, but translates as "let the animals be free and keep 'em like that." Robert Paneitz, active in water quality management in Manitowish Waters, used to be a big-game hunter. Now he's mostly "interested in animals as they are." To Paneitz, SAVEUM means just that: "If we don't have those animals, if we start eliminating them, we are going to get

LUPUS1

HOWLIN

TLODOG

AH0000

YSTONE

NWRNVR

LVNATR

BOWHTR

NEEDED

SAVUS

BIODIV

WLFRVR

BROWLF

NATURL

ECONUT

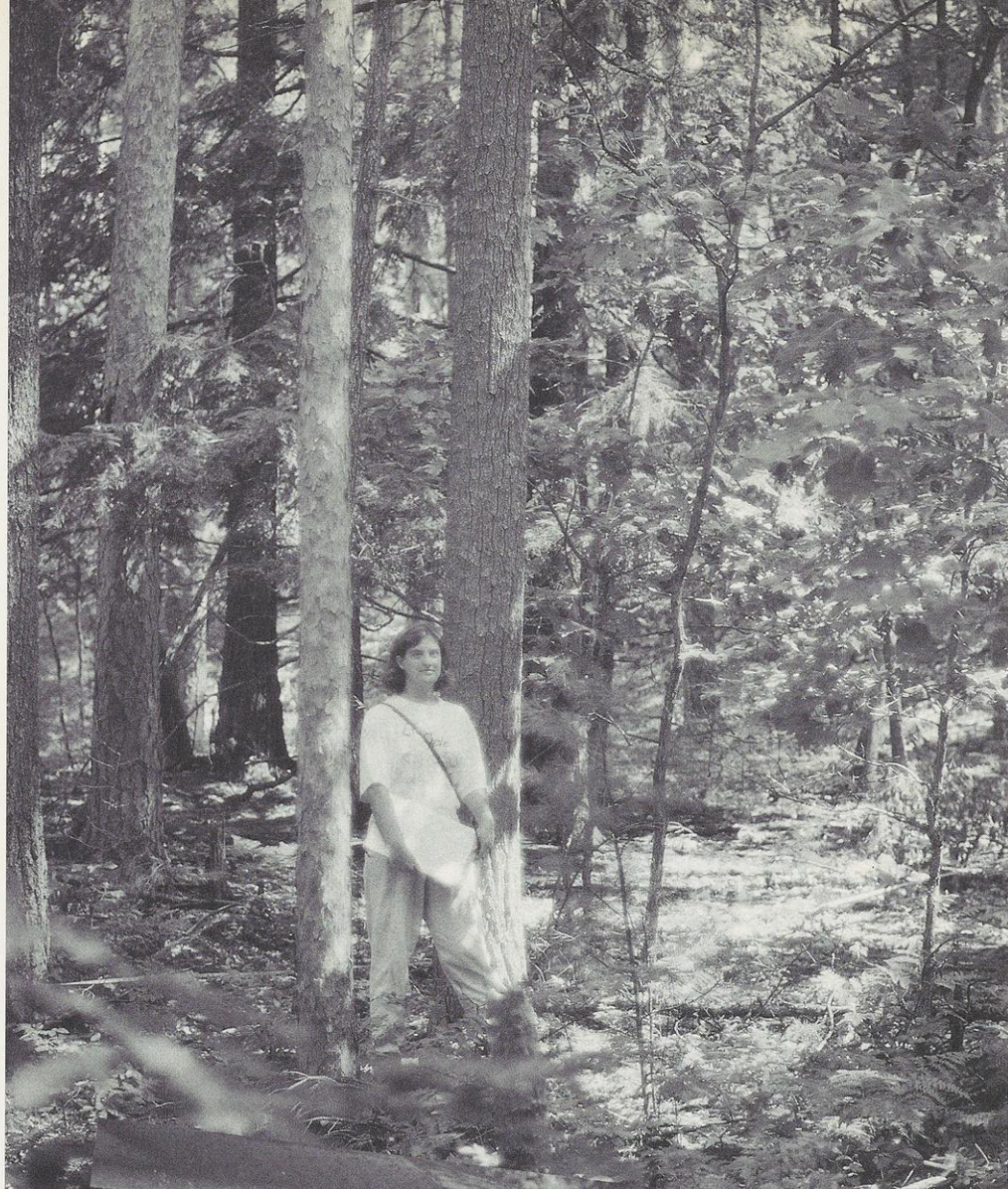
LACOTA

02HOWL

VULFIE

PRESRV

WLFSNG



ERIC J. EPSTEIN



KATHIE CAMPBELL

(top) Contributions provided funds to look for rare plant communities in Coldwater Canyon in Adams County, part of the Wisconsin Dells property recently purchased for public enjoyment.

(bottom) AHROOO with Chee and Greg Du Bois.

ourselves in trouble."

There are those who identify with all animals. People for the Ethical Treatment of Animals (PETA) supporter Ginger Hartman wanted to make a statement. She chose RESPECT to describe her view on animal rights.

4PAWZZ might speak for a lot of animals, but this particular plate is meant specifically for Sandie, a five-year-old sheltie. "The apple of my eye," says Peggy Luckow of Milwaukee. "I saw the wolf on the plate. It looks a lot like my dog."

The dog best exemplifies the human need to reach for wilder things and bring them home. You get the connection when you see a big golden head hanging out the window of Gregory Du Bois's Toyota 4-Runner. That's when the AHROOO is really understandable, confides his partner, Kathie Campbell of Cross Plains: "It's like a boy and his dog." The dog is Chee, a 130-pound Akita.

The HOWLEN trailing loud and clear behind Gerald Wolf's car, however, is pure wolf. Sound is his business — he tests and fits hearing aids — and what better vocalization than howling to identify with his namesake? Wolf's license plate is part of an extensive collection of wolf memorabilia. "I just like it as an animal," Wolf says of the wolf. "I like its family life, the fact that it mates for life."

For wolves today, mating for life is often interrupted by premature mortality. Six of Wisconsin's 35 radio-collared wolves died from July 1, 1994 through June 30, 1995; two from vehicle collisions and two from shootings. Radio collaring helps researchers monitor the movement of wolves across northern Wisconsin and has been an invaluable aid in the state wolf recovery program.

Officially active since 1989, the wolf recovery program has become a successful showcase for DNR's Bureau of Endangered Resources. Although other successful restoration programs increased public awareness of other species, including the trumpeter swan, bald eagle, Forster's tern, pine marten and peregrine falcon, when the Endangered Resources License Plate Bill was signed into law on April 22, 1994, the wolf was destined to be the people's choice. When citizens were asked to vote on plate designs during the following summer, artist Alanna Thay's wolf summoned an overwhelming majority of the 29,000 votes cast.

The wolf license plate stands for all of Wisconsin's endangered species. It's a reminder of the extensive network of DNR staff and volunteers working together at State Natural Areas and on the Natural Heritage Inventory to identify, highlight, protect and manage Wisconsin's wealth of species and habitats. Chosen by people as a symbol of what is precious and worth protecting, the wolf points toward an evolving human environmental ethic.

NWRNVR! In Appleton, Doris Cobb speaks of environmental issues and work close to her heart. "It's now or never, folks!" she says. "We've got to pay attention." A past director of the Outagamie County Housing Authority, she now volunteers at the Mosquito Hill Nature Center and has landscaped her own back yard into a certified "natural habitat" by the National Wildlife Federation.

Andrea Benavente of Madison would also like others to be more aware of the natural world. "I'm such a big advocate!" she says. "People need to be educated. People need to look in their own back yard. We have a back yard right here that needs help." Andrea voted for the wolf design and was one of the first to register her selection, WLFPK, in January 1995.

"People give me the thumbs-up when they drive by," Andrea says.

Are greetings from one pack member to another, like those waves Gerald Wolf receives from other drivers with Endangered Resources license plates just gestures? If a gesture is a body movement that conveys a particular message, then wolf license plates are genuine gestures. They speak for a particular person, their world view, their story. But they also tell Wisconsin's story: We're proud of the wolf's return, proud of a state in which there is RM4ALL.

So thumbs-up to all wolf plate owners. If you, too, would like to run with the wolves, get an Endangered Resources license plate application at any Wisconsin Department of Transportation Motor Vehicle Customer Service Center.

Maybe it is only a gesture, but it just may be the one that points to the happy ending of everyone's story. □

*Marta Anderson Trimble writes for DNR's Bureau of Endangered Resources in Madison, Wis.*

TIMBR

DON8

GRWOLF

GROWLN

UPNTH

SAVEUM

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LOUPS

NDANGER

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K9CAMP

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# Taking the initiative

How the people of northern Wisconsin and the DNR took a fresh look at the future of a special region.

Dave Daniels

Up North. It's as much a state of mind as it is a location on the map. For some, northern Wisconsin has been a temporary escape from the rigors of city life. It's where urban dwellers can hike or camp in the shade of cool green forests and marvel at the clear waters of lakes and streams. The small towns of the region are reminders of times that were somehow simpler.

For others, the North has long been home — a place where families have been raised and lives have become intimately tied to the land. Community names such as Rhinelander, Iron Belt, Goodman and Lac Du Flambeau recall our native and immigrant heritage, and remind us of the resources that fueled the northern economy from the earliest times. It's



(above) Northern issue: Managing congestion at recreation destinations.

(right) Northern issue: Preserving shorelines and northern solitude.

never been easy to earn a living in the North, whether from forest products, mining, or tourism. But for those who have stuck it out, the rewards are many: a sunrise over a quiet lake, the tug of a big walleye on the end of the line.

Clearly the northern third of Wisconsin means many things to residents and visitors alike. For the Department of Natural Resources, recognizing the balance between the psychology and philosophy of the region

can at times be a daunting task — enough to prompt Secretary George Meyer to open a study of the Department's role in the North shortly after he was appointed in 1993.

The study, which eventually became known as the Northern Initiatives Project, brought DNR staff together with hundreds of people from every corner of the North who raised







concerns and proposed ideas. The project fostered new working relationships destined to change the way decisions about natural resources are made in the region.

### The people spoke...and kept on speaking

"We really weren't sure where to begin," said Dale Urso, DNR North Central District director. "The task seemed so large, and the region so diverse." After discussions with DNR staff from across the North during the winter of 1993, one thing seemed clear: the Department probably plays a larger role in the economic well-being of the region than it does in other parts of the state. Bill Smith, DNR Northwest District Director, observed that the mainstays of the northern economy — forest products, outdoor recreation and tourism based on a national reputation for clean air, water and soil — are directly affected by the DNR's administration of the North's natural resources.

Consider the effect that reduced sport fishing bag limits and changing fishing regulations have on the ability of a resort owner to secure advance guest reservations. Or think about the economic impact when more hunter's choice permits are available in the region, attracting thousands more visitors who become customers for northern restaurants, motels and businesses.

Called upon to make more and more decisions with the potential for economic as well as environmental impact, the Department needed a broader view of the region and its people. The Northern Initiatives Project received its formal charge from the Natural Resources Board in June, 1993. The project goals were to:

- Involve citizens in DNR decision-making.
- Foster greater understanding between the public and the DNR.
- Consider long-range resources planning.

Northern issue: How can the North stay "The North" and accommodate all who want to live here?

RON ECKSTEIN

# The people's voice

More than 1,000 people attended 20 public forums and more than 2,000 who answered surveys told us how they feel about northern Wisconsin and how they hope to see it in the future. Their comments were consoli-

dated into a guiding principle and vision statements to help DNR staff carry out their duties with greater understanding of the region's special qualities and needs. Here are a few excerpts from the report:

## THE GUIDING PRINCIPLE

### Keeping the North the North

*Northern Wisconsin is recognized as a unique and distinguishable regional entity...its reputation for clean air, water, healthy forests, pristine resources and abundant public opportunities...undeveloped forests and shorelines are maintained...(and) sound science shapes environmental policy and guides resource management.*

## THE VISION STATEMENTS

### Northern alliance

*Northern Wisconsin is recognized as a region with efficient governments. There is long term regional and local land use planning...there should be consistency of zoning enforcement and long-term planning between villages, towns, cities, counties and the state...the character of the North is protected based on long-term planning which balances protection and development.*

People often feel strongly about their independence in making decisions on their own land, but question their neighbors' decisions. Land use planning is a delicate balancing act between concerns people have about their own land and concerns they have for the character of their communities, regions and the state as a whole.

It is DNR's intent to build partnerships to retain the character of Wisconsin's northern cities and countryside in ways that all the state's citizens value.

### Northern economy

*The North has a strong, balanced and diverse economy...that emphasizes the beneficial multiple uses of wood, water, wildlife and other natural resources...where the harvest of natural resources is legitimate and should not be regulated out of existence.*

Northern Wisconsin's economic and environmental well-being are intertwined. The region's economic foundation of tourism, recreation and forest products depends on

governmental policies at all levels that provide for clean air, water and soil. Public and private partnerships can complement and enhance economic growth without sacrificing the region's environmental integrity. Both public and private landowners need financial and non-financial incentives to achieve long-term stewardship of our Northern lands.

### Northern recreation

*...northern Wisconsin will be recognized as the Midwest's premier destination for planned, quality, outdoor land and water-based recreation...user conflicts are overcome...motorized and non-motorized recreation is balanced.*

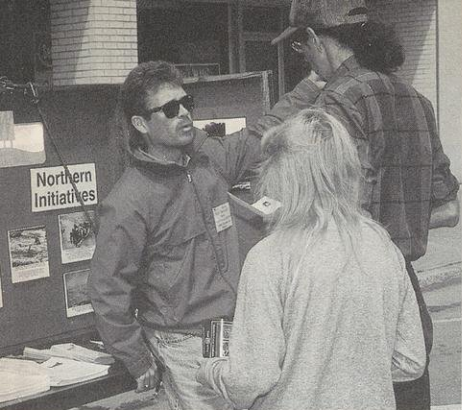
Recreation in northern Wisconsin is many things to many people. We hunt, fish, bike, hike, canoe and pitch tents. We also use the latest motorized equipment to power ourselves across snow and waters or pull a recreational vehicle to a full-service campground. Each is a legitimate activity, and each has the potential to cause conflicts among users. We will work with lake property owners, friends groups, local governments and recreational groups to manage recreational uses on thousands of miles of roads, trails and watery byways across the North.

### Northern education

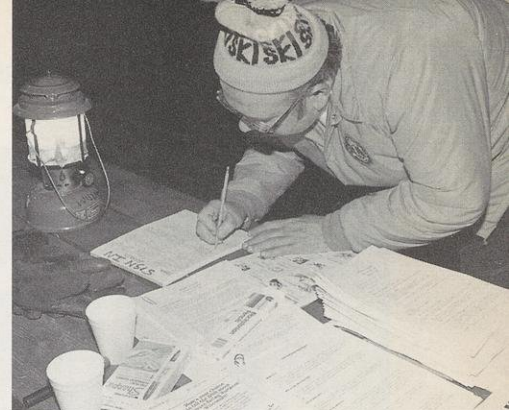
*...northern Wisconsin has educational opportunities that foster responsible attitudes toward our place in the natural environment.*

School systems, tourism, businesses and local citizens all have a responsibility and an opportunity to educate about the unique natural resources found in northern Wisconsin. DNR will place a premium on using its educational resources to train others and to learn from local education efforts.

For a copy of the Northern Initiatives report, write David Daniels, DNR North Central District, Box 818, Rhinelander, WI 54501.



(TOP PHOTOS) DON BRAGG



ROBERT QUEEN

Outreach on the Northern Initiatives plan included 20 listening forums and mail surveys. One recurring concern from citizens? Balancing benefits and costs of mining developments like the Flambeau Mine near Ladysmith.

- Recognize the role of DNR in the North.
- Reshape DNR's programs and decisionmaking.

A wide-ranging public involvement effort kicked off during the winter of 1994. "It was with a clean sheet of paper, and an open mind that we asked citizens from across the North to tell us about the natural resource issues and concerns facing the region as it relates to the DNR," said Urso.

"Our project motto became, 'You talk, we'll listen.'"

And people talked! During town

meetings, at presentations before civic and local government organizations, and in response to DNR questionnaires and surveys, people shared their concerns and hopes for the region. Many said that this kind of project "should have been done long ago."

Most people identified the following key issues as critical to northern Wisconsin in the years ahead:

- The pace of change in the North
- Impacts of shoreline development
- Mining
- Forest management
- DNR's role in the North

#### • Land use

A draft report on the Northern Initiatives Project was presented to the Natural Resources Board at its September 1995 meeting in Hayward. The revised report endorsed by the board — "Northern Initiatives: A strategic guide for DNR management in Northern Wisconsin in the next decade, 1996-2006" — contains a guiding principle, four vision statements and associated issues and strategies.

Some editorial license was taken by DNR staff to clarify and reduce duplication, "but the visions, issues and the strategies contained in the report are substantially as presented by the public," said Urso. "This report truly marks a change in emphasis for this agency, from one of decision makers deciding what's best for the region, to a recognition that resource management can and should be a collaborative effort between the Department and the customers it serves."

Although the report is short, it is long on substance, and puts the Department clearly on record as willing to tackle some of the tough resource issues facing the agency and the North in the decade ahead.

### Moving from proposal to action

The question remains: What are we going to do to bring the report to life and begin implementing the strategies it contains? As Myron Schuster, chair of the Governor's Northern Resources Council put it, "The time for planning has ended. Now it's time to move to the next stage of the project."

The next stage is action — and things are happening. Right now, the entire Department of Natural Resources is being reorganized to better



ROBERT QUEEN

Staff took opportunities like Mercer's Loon Days to talk and listen to concerns about Northwoods economy, education and recreational issues that affect natural resources.

serve customers. Northern Initiatives took the perspective from the beginning that the North really is a unique, regional entity; it's no accident, then, that the DNR's new reorganization plan strongly focuses on northern Wisconsin.

"We will end up with a northern region of 18 counties that better represents the area, and service centers offering customer-friendly "one-stop shopping" where people can get the information and assistance they need," Smith said. "Plus, more decisions will be made at the local level with increased public input."

Sparked by the Northern Initiatives, plans to tackle difficult issues are taking shape. One proposal seeks to open a dialog with people who use and provide motorized recreation equipment — snowmobiles, ATVs, boats, wave runners and the like — to arrive at a mutual consensus that would ease user conflicts on trails and waters.

During the September Natural Resources Board meeting, board members specifically requested that the Department move forward on proposals to protect wild lakes and shorelines in the North. Several members recognized the development pressure on northern shores and asked DNR staff to return to a future board meeting with information on how to address the issue.

Other project proposals on deck include drafting of a Department communication strategy geared to the needs of the rural North, building a regional trails network, finding more ways to cooperate with local zoning commissions and administrators, and opening discussions in the North on sustainable economic issues.

In the end, Northern Initiatives will move the Department of Natural Resources toward becoming more of a resource and technical consultant to the North. The agency's work will not

be conducted in isolation. The Department, together with citizens, landowners, municipalities, businesses and associations, will focus on reaching consensus on the many hard decisions everyone will be called upon to make regarding the North in the years to come.

As we heard often throughout the Northern Initiatives Project: "DNR decisions affect the lives and livelihoods of a great many people who live or visit the North. Therefore, it makes sense to involve those who are affected by DNR's decisions."

That was our commitment going into the Northern Initiatives Project, and it remains our commitment for the future. □

*Dave Daniels is the Northern Initiatives project manager for DNR based in Rhineland, Wis.*

paths every day. Near their dens you'll see distinctive fecal piles and smell the strong scent of concentrated urine.

In spring, abundant food allows the porcupines to roam more freely and they grow fat and healthy while dozing in the dog days of summer. Porkies consume tender shoots, roots, seeds and succulent twigs. Juicy produce is also relished, including apples, melons, carrots and potatoes. Neither are gardener's tools immune to the gouging incisors of porcupines. The animals need to consume sodium to rid their bodies of high levels of potassium found in leaves and bark. So axe handles, hoes, canoe paddles, gloves and anything else touched by salty human hands are porcupine magnets.

When defending themselves, porcupines sit very still, face away from their enemy, raise, bristle and rattle their quill-studded tails, protecting their vital areas from potential predators with up to 30,000 barbed quills.

Although porkies are slow ambling creatures, it is not always easy to keep your distance. A deer-hunting friend of mine still talks about his close encounter. Gary was sitting in his tree stand one day when a young-of-the-year porcupine climbed up the same tree and took a seat directly adjacent to Gary's face. He was kind of cute (the baby porky, that is), as he sat there making little noises with his teeth and watching this newcomer to the tree. Somehow Gary didn't find much to admire. He just kept a real close eye on the porky's tail and slowly, calmly eased out of his stand and made his way down the tree. His heart was pounding pretty hard as he reached the ground and looked up at the porky still perched on a branch.

Only one predator poses a significant threat to porcupines — the fisher. This large weasel will wait for the right moment and inflict quick bites to the porcupine's face and nose: areas that can take little abuse before the injury is fatal.

The porcupine is relatively silent throughout its life, so many people don't recognize the whining squeal that sounds a bit like a cross between a little pig and a crying baby. The sound varies in pitch and is most often heard in areas with rocky knobs and a good mix of conifers and hardwoods — prime porcupine habitat.

Native Americans had both respect and use for the porcupine. Its quills were incorporated in elaborate embroidered pieces, baskets and artwork. Porcupine quills were bartered

Quills were dyed and crafted in this elegant box by Christine Okerlund, an Ojibwa from Eland, Wis.



RICHARD MARCH, WISCONSIN ARTS BOARD

and traded with plains tribes who had less frequent contact with the woodland creature.

So keep an eye out for the barbed quill-pig of the woods on your next winter walk. And if one finds you, show some respect. □

*Alan D. Martin writes from Caledonia, Wis.*

## Readers Write

### GOING FOR NATIVES

Please send the listing of native trees and shrubs mentioned in your October 1995 story, "Growing Native." I am on the Board of Directors of the Navarino Nature Center where we are developing a Backyard Habitat (native landscaping program with directions from the National Wildlife Federation). I am also on the City of Shawano's Tree Advisory Committee and the information would be most valuable for our educational brochures.

*Geraldine V.L. Stephens  
Shawano, Wis.*

I would like the free listing of 84 suggested native tree and shrub species. I hope the listing is specific to species as local nurseries carry two different elderberries, two amelanchiers and two chokecherries. I'd be disappointed to purchase the non-native variety if purchasing the native variety was my intent.

*Betty Borucki  
Manitowoc, Wis.*

Thanks for your timely offer of native tree and shrub listings. We are presently digging up honeysuckle bushes. We hope to identify and remove other non-native vegetation and replace it with native plantings.

*Mr. and Mrs. D. Kostush  
Neshkoro, Wis.*

I especially enjoyed the "Growing Native" story. I am working on the design and specifications for a prairie at Kiswaukee College in Malta, Illinois. Approximately one third of the prairie will be started in spring. I find your magazine a great resource for projects like this. Thank you very much.

*David G. Klick  
Batavia, Ill.*

We wish to develop our 25-acre parcel with native landscaping to

benefit wildlife and would love to have the complete listing of trees and shrubs you offered.

*Daniel H. Antolec  
Brooklyn, Wis.*

My husband and I were quite excited to read the article "Growing Native," especially since we recently purchased 25 acres of land and are hoping to plant some native species to enhance its southern oak forest and prairie habitat. Our "prairie" already hosts some pasqueflower, side oats gramma and prickly pear cactus.

Thanks so much for this article!

*Calico Schmidt  
Monticello, Wis.*

*We asked and, boy did you respond! More than 200 readers took the time to write us, talk about their interest in planting native vegetation and request our listing of native plant species for the upper Midwest. Whether they are planting their back yards, revamping a few acres, working with community parks programs or managing larger parcels, many readers are hooked on the merits of bringing back native plants to their property. Many of you also expressed interest in forming a wildlife plan for your property. We will certainly cover that topic in a future issue and introduce you to good books and knowledgeable people who can help you.*

*An excellent starting point for your projects is "Landscaping for Wildlife" by Carrol L. Henderson (Minnesota Department of Natural Resources, 500 Lafayette Road, St. Paul, MN 55155-4046). It's a practical how-to manual for backyard and Back 40 landscapers. Also visit, call or write your nearest University of Wisconsin-Extension office for brochures and recommended varieties of native vegetation. Once you've done a little*

# Readers Write

homework, start visiting local nurseries or contact some of the groups we mentioned in our story to find seed and stock that will thrive in your growing conditions.

## WHICH HONEYSUCKLE?

There was an error in the information we provided about native plants and exotic, invasive species in the October issue. The troublesome species of honeysuckle is *Lonicera x bella* which results from a cross between *L. tatarica* and *L. morrowii*, natives of Eurasia and Japan, respectively. All three species will naturalize, but *bella* is particularly aggressive and it is the hybrid that has taken over large areas at the Arboretum. The species referred to on p.13 of the article (*Lonicera canadensis*) is actually a native honeysuckle that is found in northern Wisconsin. It is not aggressive.

Donna Scott Thomas  
UW-Madison Arboretum  
Madison, Wis.

The alien honeysuckles invading our native woodlands are Tatarian honeysuckle (*Lonicera tatarica*) and Amur honeysuckle (*L. maackii*), not *L. canadensis*, which is among a half dozen native species occurring in the state.

Arrowwood viburnum (*Viburnum dentatum*) though naturalized to some extent, is not native to the Southern Oak Forests of Wisconsin. The similar Rafinesque viburnum (*V. rafinesquianum*) is a native.

I think a photo and brief description of another invasive plant pest, garlic mustard, would have added educational value to this nice article.

Dave Grant  
West Bend, Wis.



A five-petaled, five-leaved trillium.

## TRILLIUM PLUS TWO

We were interested in your August letter from David A. Lee with a picture of a four-petaled trillium. We came upon a five-petaled trillium while hiking in a state park in Door County. We will look for it again next spring.

Even if this condition is caused by a fungal disease, as your response suggests, it was exciting to see.

Kay Shrader  
Big Bend, Wis.

## EXOTIC FISH, TOO

As a former Madison resident, I remember all too well the problems introduced species caused us when we restored our old Cape Cod home inside and out. We spent over a year clearing, digging, pulling and burning (when you could do that) endless clumps of honeysuckle.

I wonder if you could further elaborate on some of the introduced fish that similarly cause problems in Wisconsin. I remember a conversation I had with George Becker (author of *Fishes of Wisconsin*) some years back. He expressed concern about the carp and the eradication program enacted to control

it. I think readers would be interested to learn about the number of introduced species and whence they came from.

Robert Rice  
North American Native Fish  
Association  
Navarre, Fla.

## REMEMBERING GOOD STICKS

I enjoyed "The stick" by Justin Isherwood tremendously! It took me back to when I was a skinny tow-headed 7-8-year-old gal on a big sheep farm in northern Wisconsin.

My stick gave me status and power on the male-dominated acreage. When told to fetch the ewes in the "lower 60," my stick got me across the endless bumpy pastures into the woods where we prodded and coaxed the reluctant sheep back onto the trail toward the barn. "We" ruled the Chicken Yard and my stick protected me from the huge gander who never liked me and from the big rams when they took after me.

On my Indian pony, I often wielded a spear against bad knights in imaginary conflict.

Now, some 60 years later, outside the door of our log cabin

home on the Wisconsin River are 6-8 sticks made of various woods in varying lengths and widths. All are sized for grandparents, parents, college kids on down to grade-school size. All are waiting patiently for a hike along the river shore, across the floodplain, through the woods or just up to the mailbox.

Thanks Mr. Isherwood!

Ann S. Hanson  
Wisconsin Dells, Wis.

## NEW SCHOLARSHIP

We want to make your readers and their families aware of a scholarship open to juniors and seniors working toward an environmental degree at UW-Madison's College of Agriculture and Life Sciences, School of Natural Resources.

The scholarship honors Carroll D. "Buzz" Besadny, former DNR Secretary from 1980-92. Applicants must maintain a 3.0 average (on a 4.0 scale) and submit a one- to two-page essay describing how the scholarship funds would be used and the applicant's previous community involvement in environmental activities.

The scholarship is funded by the Wisconsin Environmental Working Group, an affiliate of Wisconsin Manufacturers & Commerce with assistance from the University of Wisconsin Foundation and the UW School of Natural Resources. Contact the School of Natural Resources for an application.

Patrick Stevens  
Wisconsin Environmental  
Working Group  
Madison, Wis.



ALL PHOTOS THIS PAGE JEAN B. MEYER

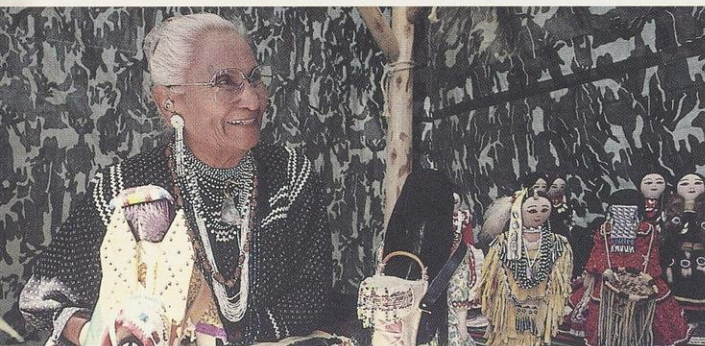
# WISCONSIN TRAVELER

## The city's nature

After the powwow, plan a side trip to see some of the natural splendor that inspires the dancers. Even in urban Milwaukee, you won't have far to go. Bound by Silver Spring Drive and Sherman Boulevard, **Havenwoods State Forest Preserve** stretches across 237 acres on the city's north side. Havenwoods is an oasis of quiet beauty for city residents and visitors alike — and a piece of land with a fascinating history. If soil could speak, what a story it would tell here! Entrance at 6141 N. Hopkins one block west of Sherman Boulevard on Douglas Avenue, Milwaukee. Open 6 a.m.–8 p.m. daily. (414) 527-0232.

North of suburban Fox Point, the **Schlitz Audubon Center** overlooks 225 acres of Lake Michigan habitat. Bring your binoculars: The bluffs and meadows rimmed by a shoreline sky attract wildlife and birds, birds, birds. The center also has a well-stocked natural history bookstore. 1111 Brown Deer Road, Milwaukee. Open from 9 a.m.–5 p.m. Tues.–Sundays. (414) 352-2880.

At the **Wehr Nature Center** just southwest of the city, 200 acres of prairie, oak savanna and woodlands are yours to explore. Start at the new visitor's center and follow the trail to 20-acre Mallard Lake, where early migrating birds may be stopping for a rest. The center, located at 9701 W. College Avenue in Franklin, is open from 8 a.m.–4:30 p.m. daily. (414) 425-8550.



Enjoy expressive dances, beautiful attire and music at Native American powwows. Shop for native crafts, festive ribbons, beads and jingles.

## Pow WOW!

**W**hen the drumming starts and the dancers take the floor, the swirl of motion, color and sound will command your full attention. Follow the call of the drums to Indian Summer Festival's Winter Powwow, Saturday and Sunday March 2–3 at Wisconsin State Fair Park in West Allis.

A powwow is a time for Native American families to reunite and celebrate a cherished rite: dancing. From across the country, dancers of all ages from different tribes come to the powwow to perform and compete to the accompaniment of ancient rhythms and chants. Some dances are performed by individuals, others are done in

groups. There are dances with traditional steps mimicking a particular animal, like the Eagle Dance, or even a plant, like the Grass Dance. "Fancy dancers" follow their own spirits in free-form performances. Jingle dancers take small steps but make a big sound, thanks to the many "jingles" attached to their brightly colored outfits.

At the powwow you'll see children who have only recently learned how to walk working on their dance steps next to elderly practitioners of the art, who step into another world when the drumming begins.

It's certain you'll work up an appetite after watching the dancers in action. At the pow-

wow you can sample Native American foods, including crispy-on-the-outside, chewy-on-the-inside fry bread, savory wild rice dishes and maple sugar sweets. (Dieters be forewarned: One slice of fry bread, and it's back to carrot sticks for the rest of the week.)

Native crafts will be on sale, too. Look for leatherwork, jewelry, and beaded belts and hair ornaments. Most of the trappings to outfit a dancer are sold at powwows, from cloth, ribbon and feathers to beads and jingles — which are made from the thin metal tops of snuff cans. The flat metal disc is rolled into a cone shape and stitched to the dress. Sew on a few hundred jingles and you'll be ready to dance!

Wisconsin State Fair Park is at 84th & Greenfield Avenue, West Allis. The Winter Pow-

wow is open 11 a.m.–11 p.m. on Saturday, March 2 and 11 a.m.–6 p.m. on Sunday, March 3. Call (414) 774-7119 for Indian Summer Festivals information, 1-800-884-FAIR for admission fees and events at State Fair Park.

Young dancers may inspire the native dancers in your family!



