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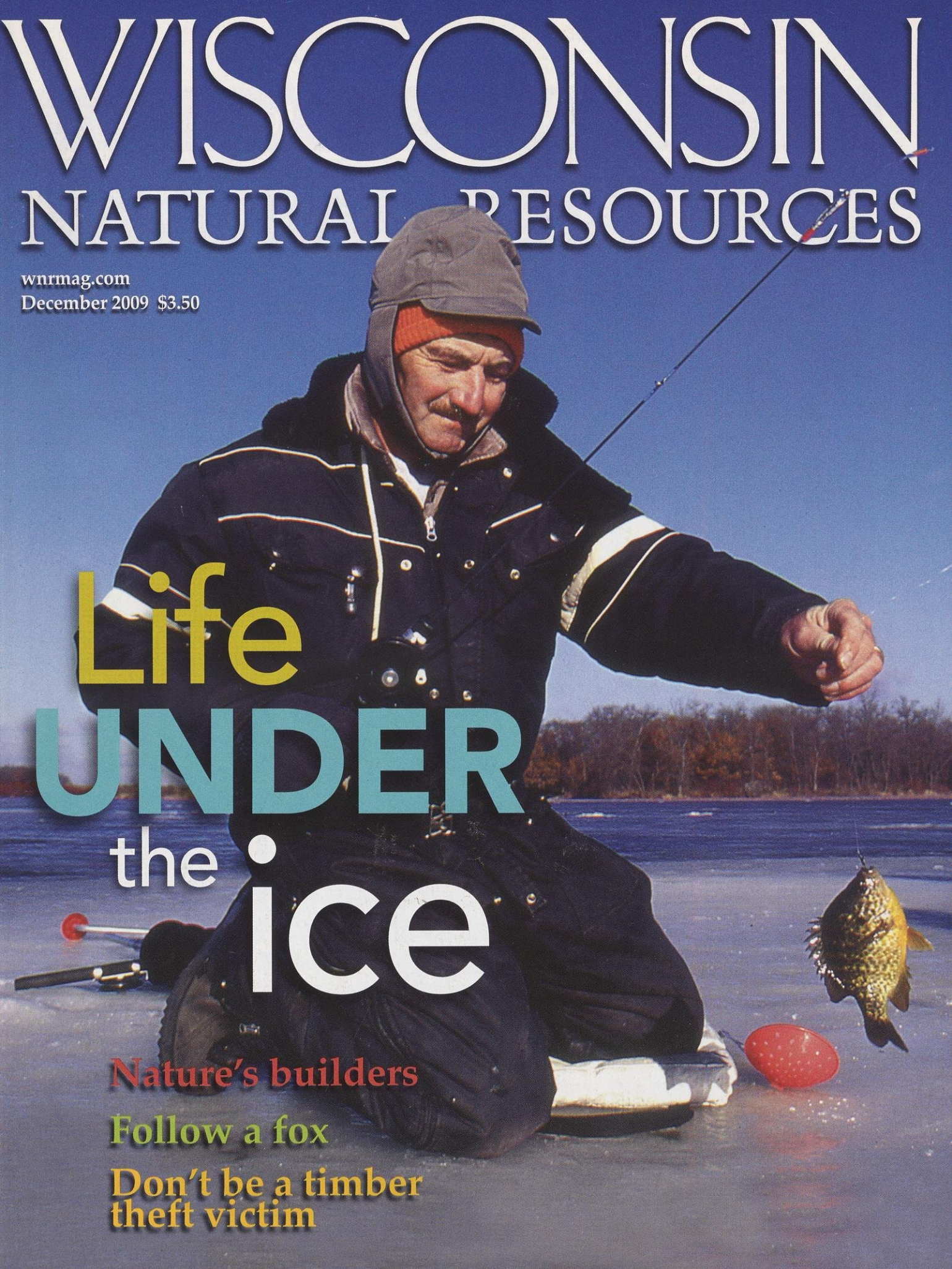
December 2009 \$3.50

Life UNDER the ice

Nature's builders

Follow a fox

**Don't be a timber
theft victim**



The season's tiny tot



Eastern dwarf mistletoe is a parasitic shrub that slowly infects and saps strength from northern Wisconsin swamp conifers. Note early signs of damage on a black spruce branch. This native mistletoe can take decades to spread. Its sticky seed attaches to a twig of the host species and bores into the woody stem.

Our native mistletoe is a teensy shrub whose seeds are launched with a powerful punch.

Matthew Wagner

As we gear up for the upcoming holiday season, some will hang mistletoe near gathering areas in hopes of getting a quick smooch. The traditional mistletoe produces large leaves and big berries, but this leafy type of “kissing mistletoe” is not native to Wisconsin. Our only native mistletoe species is not showy at all; in fact eastern dwarf mistletoe (*Arceuthobium pusillum*) only grows to heights of a couple of centimeters, easily making it Wisconsin’s tiniest shrub.

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MATTHEW WAGNER

WISCONSIN NATURAL RESOURCES

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DNR DIVISION OF FORESTRY



JACK R. BARTHOLOMAI

FRONT COVER: Fish adapt in a variety of ways to life under the ice. Read about their different strategies in our story starting on page 17.

RJ and LINDA MILLER, La Crosse

BACK COVER: Stately hemlocks and white pines grace the snow-bound Patterson Hemlocks State Natural Area in Oneida and Vilas counties.

© THOMAS A. MEYER, Wisconsin Department of Natural Resources

Inset photo of pileated woodpecker (*Dryocopus pileatus*)
SCOTT NIELSEN, Superior

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Nature's architects and engineers

Natural construction by spiders, birds and beavers is equally impressive as any manmade marvel.



DON BLEGEN

Paper wasps (*Polistes* species) chew plant and wood fiber to form hexagonal-celled nurseries for egg chambers. The connected cells taper underneath in a wedge or funnel shape anchored to a stem. The nest can be attached upside down or right side up in a protected overhang, eaves, bridge or in dense vegetation. The light structure is strong enough to withstand the forces of strong wind gusts. Interconnected hexagons are mimicked in human construction to form sturdy weight-bearing foundations out of light materials.



GREG VANDELEEST

Black and yellow garden spiderlings (*Argiope aurantia*) on a web. The egg sacs containing up to a thousand eggs are laid in the fall and spiderlings emerge in spring. Some stay nearby. Others climb up high on the web and shoot out silk that is caught on the wind like a parachute, carrying the young spiders several yards or many miles depending on the wind. Ships at sea have reported spiders carried into their sails.



The Argiope spiders are active during the day. They weave a dense white band of silk in a zigzag pattern near the web's center. Researchers speculate it may provide camouflage for the colorful spider or may serve as a warning to birds to avoid the web, whose threads are otherwise difficult to see.



Many wasps and bees nest underground for protection. They develop elaborate tunnels that provide both shelter and relatively stable temperature for their nurseries and storerooms.

GREGORY K. SCOTT

Kathryn A. Kahler

From the time we are youngsters, we have a fascination with construction, building and excavation. We start with our hands and simple tools like sticks. Then we move on to hand tools and machines giving our children toy hammers, drills, screwdrivers, or dump trucks and earth movers. We visit architectural landmarks and gaze with awe at the brilliance of those who built them. We are amazed at the marvels of engineering like roads, rails, bridges and tunnels we travel every day.

But consider for a moment the far more fascinating architects and engineers of nature. They don't work with blueprints, tools or computers, advanced reasoning or hands with opposable thumbs. Yet their construction techniques are no less awesome than ours. In some cases, we even have a hard time duplicating their elegance.

Take spider silk, for example. Scientists have studied it for years and only recently uncovered some of the mysteries of its molecular structure. It

is made up of complex protein molecules that give it tensile strength greater than high-grade steel or fibers like Kevlar, yet it is as light as air — hence, its more fanciful name, gossamer. On top of that, it's as ductile (or stretchable) as modern manmade fibers like nylon.

All spiders possess spinning glands and make silk for different purposes. There are seven or eight kinds of silk, but most species typically use fewer than six types of varying strength and

viscosity. Silk absorbs moisture and, generally, the more water it contains, the more elastic it is. Silk is created as a liquid in special silk glands within the spider's abdomen and released from three pairs of spinnerets before it instantly solidifies.

Spiders use silk to spin webs of varying design, usually to catch prey. Some webs are spiral, some are flat sheets or funnel-shaped, and others have an irregular shape, like the cobwebs in attics and basements. Insects get caught in the sticky silk and are held long enough for the spider to wrap them up for a later meal. Spiders also use silk to make sacs to protect their eggs; to pull together the sides of leaves to form a tunnel to rest or hide in, or to protect their eggs; to lay down a dragline that helps them find their way back home; as a safety line if they fall; or to hang from a leaf when they molt.

GREGORY K. SCOTT

One of the most interesting uses of silk is for dispersal, or ballooning. Young spiderlings climb to the top of a tall plant and throw out a silk strand, almost like releasing a kite or parachute. The wind takes the silk and stretches it until it pulls the tiny spider from its perch. It floats on the wind until it lands, sometimes only inches or other times many miles away.

The burrowing wolf spider doesn't spin a web but uses silk to reinforce its nest and to form an egg sac, which it carries behind high on its abdomen. These spiders, found on dunes and sandy beaches in the upper Great Lakes states, dig neat sand burrows about 3/8-inch across and line the holes with silk to cement the sand grains together and prevent the burrow — which can be three feet deep — from collapsing. At night, the spider patiently sits at the burrow entrance and waits for unsuspecting prey to pass.

The insect world offers many other examples of amazing engineering feats of nature, especially in the Hymenoptera order of wasps, bees and ants. Well known for their construction techniques, these insects were given names like masons, potters, diggers, carpenters and miners.

This order includes insect families that deliberately build nests — some solitary and others part of social communities. They may nest in holes in the ground — either excavated themselves or abandoned by small rodents — or construct nests in hollow trees, on tree branches and around our houses.

The group includes solitary nesters, each having sole responsibility for building a nest to protect its young, and provide it with food during the larval period. Social bees, wasps and ants, on the other hand, live together in a colony with a queen and castes of workers that perform functions such as food gathering, nest enlargement, cleaning, temperature regulation and brood maintenance.

One type of solitary nester is a potter wasp native to Wisconsin, *Eumenes fraternus*. After choosing a nest site in a burrow or hollow twig, the female potter wasp begins mixing mud by bringing bits of dirt or sand alternately with

drops of water in her jaws. She pounds them together to the right consistency, and forms them into a hollow sphere with a flask-like opening. The potter then busies herself collecting spiders, caterpillars or other larvae, stinging them (to paralyze them) and pushing them into the opening. They will serve as the food supply for her larva as it develops and paralyzing them assures they will last longer than if they were dead. Once she decides there is sufficient food supply in the flask, the wasp lays a single egg, suspends it from the roof with a thread-like filament just above the food cache, and seals up the opening with mud. The wasp may add more cells adjacent to the first. When the egg hatches, the larva stays in its hanging egg case, reaches into the pile of caterpillars and begins feeding. After a few days — and once the danger of being squashed by an escaping caterpillar has passed — the larva falls from the thread and eats until it pupates. The new adult wasp chews its way out of the pot.

Paper wasps are social insects that construct nests of a papery material they make by collecting plant and wood fibers, moistening them with saliva and chewing the mix to a pulp. One species common in the Midwest is *Polistes fuscatus*, the native “golden paper wasp.” Its nest is suspended from a single, central stalk, or pedicle, and is shaped like an upside-down umbrella made up of perfectly shaped hexagons. These wasps build nests in protected places, like under eaves of buildings, under bridges or in dense vegetation. Paper production requires water, which the wasps collect in droplets and bring back to the nest in their jaws. They also use these water drops to moisten the nest surface. When the moist paper surface is fanned by their wings it also serves as a very effective cooling system for the nest.

Carpenter bees are solitary bees that build nests by tunneling into wood — often eaves, window trim and decks of our homes. They don't eat the wood, but instead vibrate their bodies to create a kind of power saw effect as their mandibles rasp against the wood.



The sedge wren (*Cistothorus platensis*) builds a well-camouflaged dome-shaped nest in dense, short grasses, wet meadows and marshes.



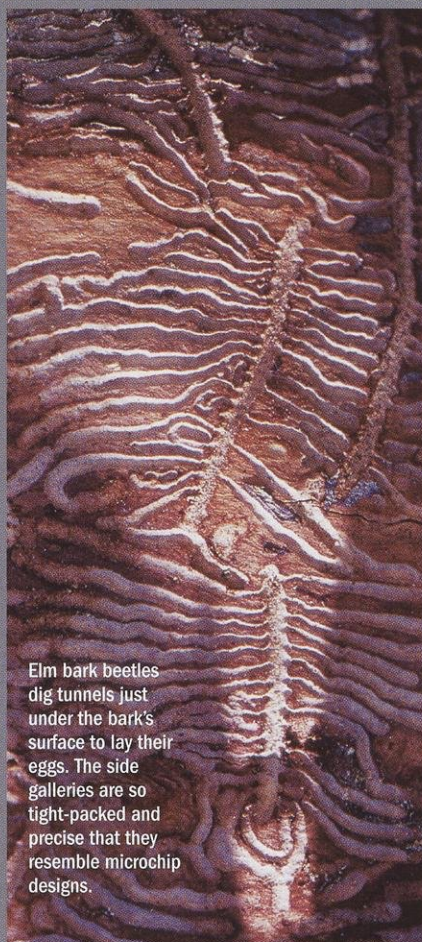
The yellow warbler suspends a cradle-like nest in the forked branches of shrubs. The strong nest shaped in a deep cup is woven of milkweed down, grasses and spider silk.



GREGORY K. SCOTT



GREGORY K. SCOTT



Elm bark beetles dig tunnels just under the bark's surface to lay their eggs. The side galleries are so tight-packed and precise that they resemble microchip designs.

DON BLEGEN



A finger next to this delicate ruby-throated hummingbird nest provides perspective of its tiny size. The birds weave a thimble-sized nest of spider silk, plant down and mosses often covered with a shingled layer of lichens to hide their young. See the two baby hummers inside?

DON BLEGEN

They deposit the bits of sawdust outside the hole and use it later mixed with saliva to partition a tunnel. The bees start a tunnel hole of about one-half inch in diameter, about two inches deep, then turn 90 degrees and tunnel with the grain, sometimes for more than a foot. The female uses the tunnel for a series of brood cells for her six to eight eggs, depositing a mixture of pollen and nectar with each egg and sealing up each cell with a partition of chewed wood.

In terms of architectural diversity, birds get a four-star rating. Some nests are down-to-basics efficiencies with few amenities, others are awesome in their elegant grace. Birds excavate tunnels in trees and stream banks, build floating platforms on marshes, plaster mud under eaves and hang intricately woven cups from tree branches. They use all manner of vegetation — branches, twigs, grasses, cattails, sedges, leaves, plant fibers, moss and lichens — as well as animal materials — feathers, spider silk and hair. Tufted titmice have been known to pluck hair from live woodchucks, dogs and even humans.

The master craftsmen are the woodpeckers, and chief among them is the pileated. Like other woodpeckers, their bills are flattened laterally and make excellent chisels. After choosing an appropriate spot — often in a dead snag, but sometimes in a live tree — both sexes begin excavation. The birds deliberately swing their heads back and forth to achieve the best angle, chipping out pieces of wood. The entrance hole is about 3½ inches in diameter and the cavity can be two feet deep. The birds are Spartan in their interior design and don't line the cavity with anything but wood chips. Pileateds build a new nest each year and their old nests are often used by other birds, flying squirrels or other animals. Pileated woodpeckers' favorite food is carpenter ants, which they pursue with a vengeance, scaling the bark off trees and chipping out large rectangular holes so big they sometimes cause the tree to break in half.

Water birds tend to build large plat-



Beaver dams can be high, long and are incredibly sturdy easily holding the weight of a person and withstanding the force of flowing water. Just talk to a fisheries manager about how much effort it takes to remove a beaver dam from a trout stream!

form nests, often floating or anchored to standing live plants. The Virginia rail builds a platform of cattails, reeds and grasses, usually with living plants forming a canopy over it. King rails will weave a canopy over the nest and add a ramp leading to the entrance. The tiniest of marsh birds — the marsh wren — weaves a football-shaped mass of wet grass, cattails and rushes, lined with fine grass, plant down and feathers. The nest stands above the water, anchored to standing cattails or bulrushes, and has a side entrance.

Birds are masters at eco-friendly design, their homes blending so well into the landscape as to become invisible to protect the nest and young. Ovenbird nests are so well concealed they are seldom seen. The female builds the nest in a depression of dead leaves on the forest floor using grasses, plant fibers, weed stems, leaves, rootlets, mosses or bark. She shapes an arch of dead leaves and surrounding vegetation over the top with an opening at

ground level, making it invisible from above. The nest is lined with fine rootlets, fibers and hair.

Some birds take advantage of the strength and elasticity of spider silk by incorporating it as a building material. Ruby-throated hummingbirds use the silk to tie their nests to the upper surface of a branch or twig. The stickiness and elasticity of the silk helps the ruby-throat mold its perfectly shaped cup and adorn the exterior with lichens.

Another spider silk user is the yellow warbler who crafts a small cradle-like nest in the fork of a shrub. She brings beakfuls of milkweed fibers, hemp, grasses and plant down to the site, using her body to form a deep cup. She uses her beak to weave the pieces together and spider silk to cement them to the supporting branches. The nest is an amazingly strong structure for its delicate appearance. Sometimes, the yellow warbler builds second or third stories on her nest, but not because she needs the space. Un-

fortunately, this species is one of the prime victims of brown-headed cowbird parasitism. If she has only one of her own eggs in the nest or if the cowbird egg is laid first, she will reject the cowbird egg and build a new nest on top of the first. If the parasitism continues, the yellow warbler continues to build layer upon layer, sometimes as many as six times. If she has two or more eggs in the nest before the cowbird egg is laid, she accepts the parasite egg and dooms her own; the cowbird egg hatches before the warblers and grows larger and faster, forcing the smaller warbler chicks out of the nest.

The heavy equipment operators of the natural Wisconsin landscape are the beavers, capable of dramatically altering their landscape in a matter of days. They are best adapted to living in a deep-water environment, and when none exists, they set about to create it using the only tools in their tool belts — their teeth, feet and special physiological adaptations that help them work



SCOTT NIELSEN

The beaver has many adaptations like clear eye membranes, webbed feet and terrific lung capacity that allows it to work for long periods of time under water on its construction projects.

underwater. Their persistent habits are often the bane of farmers, homeowners, road crews and trout managers.

If a pair of beavers looking for a site to build a lodge doesn't find a suitable place, they will often start by damming a stream to create the lake or pond they need. A dam is constructed of logs, sticks, stones and mud, all of which the beavers tow or carry to the dam site with their teeth or front paws. If they don't find logs or sticks lying around, they cut branches and fell trees on their own. Their four chisel-like incisors and strong jaws are perfectly suited for the task.

When felling a tree, the beaver stands with its front paws against the tree, turns its head sideways and bites a 45-degree cut through the wood. It then bites a series of cuts down the tree a distance about equal to the tree diameter, then turns its head the other way and bites an opposing 45-degree cut. To complete the chip, it bites through the chunk between the two

cuts, tears it loose and begins another cut. It continues to work its way around the tree, taking gradually smaller bites as it reaches the center. If the tree is on a steep slope, the beaver will more often cut the tree on the uphill side. Once the tree falls, the beaver uses its incisors to pull the log to the dam or floats it into position.

When constructing their dam, the beavers grasp the butt ends of cut brush in their teeth and front paws and poke them into the stream bed or river bank. They continue to add brush in this fashion until they have a base across the stream, adding rocks, stones and mud to reinforce it. Next, they use their teeth to add smaller diameter sticks to the mass of brush, securing them to the base and chewing them off level with the top of the dam. Once enough wood and brush is piled to raise the dam above the water level, the beavers switch to cementing mode. They dive beneath the surface, bringing loads of mud to the dam site under

their chins and between their front paws, and pushing mud between the spaces in the brush. As the water level in the pond rises, the beavers continue to add material to the top. Beaver dams can be massive, reaching heights of several feet, spanning distances of a quarter mile or more, and so sturdy that a person can walk on top.

Beavers are aided in their underwater work by special adaptations. Between the front incisors and back molars they have a flap of skin that prevents water and wood chips from entering their throats when cutting wood underwater. They also seal off their noses and ears, and have nictitating membranes to cover their eyeballs like goggles. Slightly webbed front paws deftly dig and hold sticks, stones and mud, and large, thickly webbed hind feet propel them through the water. When digging tunnels, beavers start out using their front paws only, but as the tunnel lengthens, they use hind feet to kick the dirt out of the entrance. Beavers use their flat, rudder-like tails for balance when felling trees, and for propulsion as they drag branches through the water.

Beavers have physiological adaptations as well that aid in their aquatic endeavors. They can slow their heartbeat to reduce blood flow to extremities and conserve oxygen for the brain. They have larger than normal lungs to hold more air, and their livers have a greater capacity for oxygenated blood. While a human can only exchange at most 20 percent of his lung capacity, a beaver can exchange 75 percent when it reaches the surface to breathe, allowing it to stay underwater for up to 15 minutes and swim distances of one-half mile.

So as you admire the results of your next do-it-yourself construction project made from step-by-step plans and pre-cut lumber, take a humbling step back and think about nature's architects and engineers that accomplish their building projects with little more than teeth, jaws, beaks and feet, driven only by instinct.

Kathryn A. Kahler designs and constructs feature stories from Madison for Wisconsin Natural Resources.

**Foresters, peers,
DNR investigators
and reputable
loggers can help
vigilant woodland
owners avoid
becoming victims
of timber
theft.**

Timber seized as part of a theft investigation is tagged with ribbon and a notice. Investigators have forensic tools to track wood from the forest through final processing.

When you're missing

Lori Compas

About ten years ago, a stranger knocked on our elderly neighbor's front door and offered to pay him \$1,000 for a tree. It was a tall, straight black walnut that stood in the creek valley just off an old gravel road. Our neighbor, Milton, was tempted by the offer but he turned it down; he had liked the tree ever since he was a boy and he didn't want to sell it. Besides, he knew he might need the money to cover health expenses later on. That tree was precious to him, both as a reminder of his past and an investment in his future.

Milton grew older and walked his land less and less, but he never sold the tree. Then one day my mother, on a hike near the creek, noticed that it was gone: it had been cut off at ground level and the stump had been covered with leaves. She didn't have the heart to tell Milton. House-bound and ill, he never knew the tree was taken; the crime wasn't reported and the thief was never caught.

Milton, like a growing number of landowners across the country, was a victim of timber theft. The crime takes many forms, from dark-of-night operations on public and private lands to failure to pay in full for harvested timber.

"It's really unfortunate, but the elderly are common victims of timber

State foresters give advice on managing timber stands and can provide lists of cooperating private foresters who can help woodlot owners determine when portions of the stand are ready for harvest. Private foresters can also approximate the timber value, help negotiate logging contracts and oversee timber sales. Here, a DNR forester in training marks a stand that will be thinned and selectively harvested.

DNR DIVISION OF FORESTRY

I can't see trees from the forest

theft," said Gary Bibow, the DNR's Private Lands Forestry Law Enforcement Specialist. "Other common victims include absentee landowners and landowners who simply have no idea how much timber they have or what it's worth."

Exact numbers of timber theft cases across the state are difficult to determine. Some complaints are registered through local law enforcement agencies, while others go directly to the Department of Natural Resources. Many times timber theft complaints aren't reported because the landowner isn't immediately aware of the theft, doesn't understand the law, or is embarrassed by the situation. Bibow is currently working on a system to track timber theft complaints throughout the state, and he is certain that not a single Wisconsin county is immune to it. "I've been involved in timber theft investigations from Rock County to Ashland County," he said.

Bibow stressed that reputable loggers play a vitally important role in sustainable forest management, since they harvest trees so the forest can regenerate. "There are a lot of good loggers out there, and they're doing good work," Bibow said. "But it's like a three-legged stool. You need three things to have a successful timber harvest: the landowner, the forester and the logger."

One of the most common timber theft-related issues isn't really theft at all. It happens when landowners are pressured into signing a contract that's written by and for the logger. "Many times we see problems when a timber buyer approaches the landowners on the doorstep and convinces them to sign a contract," Bibow said. "The landowners are told if they don't sell now, while the logging equipment is there, they won't have another opportunity and the timber will lose value."

Landowners can help protect

FINDING PROFESSIONAL HELP

TO FIND A FORESTER

Every county has a professional DNR forester available to:

- Give free advice about managing, protecting and harvesting your woodlot
- Explain how you can sustainably manage your forest and save money by enrolling in a forest tax program (Managed Forest Law)
- Refer you to a list of cooperating foresters if you need services that are not provided by the state

As state government employees, DNR foresters cannot:

- Rate or offer opinions about loggers or cooperating foresters
- Act as your agent or administer sales contracts
- Value timber for you regarding civil matters (though they can value timber at the request of the district attorney)
- Survey private property or settle fence line issues

On the other hand, cooperating foresters are private, professional foresters who meet educational and professional development requirements set forth by the Department of Natural Resources but they are not employed by the state. They are hired by landowners and forest product companies.

Cooperating foresters offer many of the same services offered by DNR foresters. In addition, they can:

- Conduct timber sales (mark trees for cutting, negotiate the sale, prepare a contract and oversee the sale)
- Value your timber
- Arrange to have your land surveyed to establish property boundaries

To find a DNR forester or a cooperating forester, go to dnr.wi.gov/forestry/LP-private.htm. The Association of Consulting Foresters of America at acf-foresters.org can also refer you to a forester in your area.

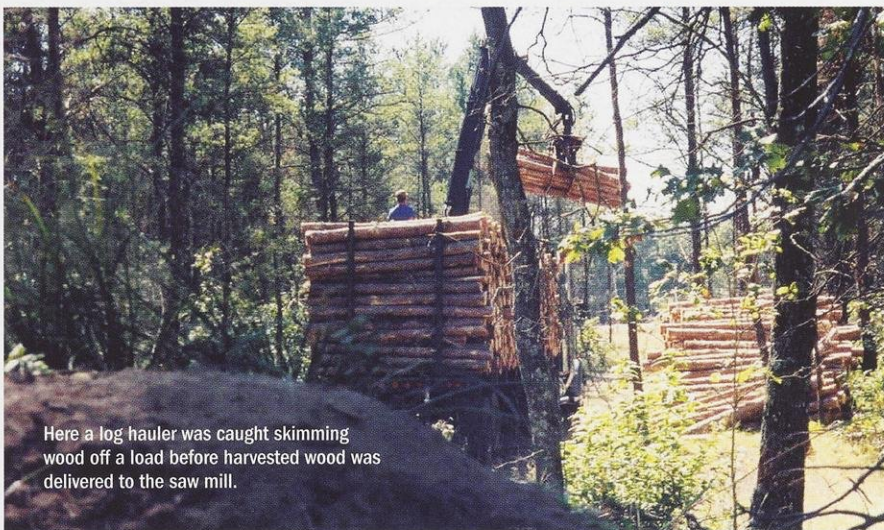
TO FIND A LOGGER

- Refer to the members list of the Master Loggers certified by the Great Lakes Timber Professionals Association at www.wimlc.com. For more information on the Wisconsin Master Logger program, see timberpa.com.
- Contact your county forest administrator for a list of loggers who have conducted timber sales on county forests in your area. Find the administrator for your county at wisconsincountyforests.com/wcfa adm.htm.
- If you're unsure of a logging company's reputation, investigate it through the Wisconsin Circuit Court Access Program (wcca.wicourts.gov). The website allows you to access the public records of court cases filed throughout the state, so you can see if an individual or company has been cited for timber theft or other forestry violations, or if they have been involved in a Wisconsin lawsuit.
- The Department of Agriculture, Trade and Consumer Protection (DATCP) maintains a database of consumer complaints about businesses in Wisconsin. If you want to investigate a particular individual or company, contact DATCP Consumer Protection at 1-800-422-7128.



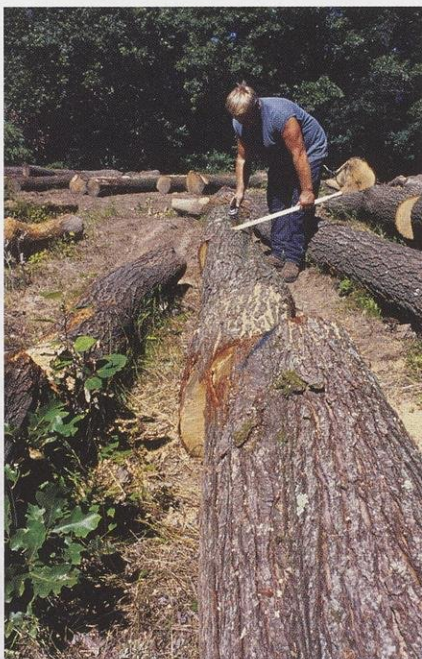
DNR conservation wardens and foresters solved this case where wood legally harvested from state land was stolen from a storage area, split into firewood and sold at a nearby campground.

GREGORY MATTHEWS



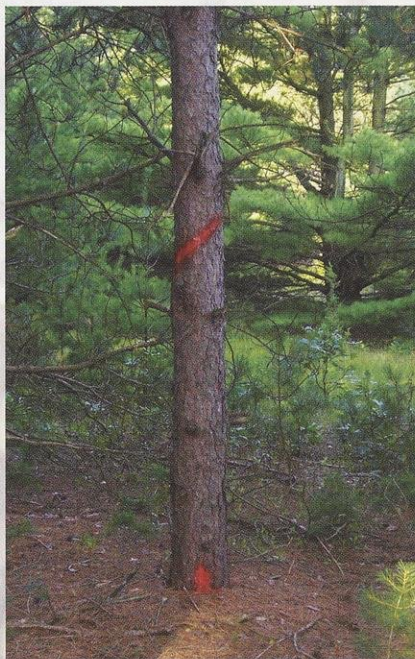
Here a log hauler was caught skimming wood off a load before harvested wood was delivered to the saw mill.

GARY BIBOW



DNR DIVISION OF FORESTRY

A forester measures the length and diameter of cut logs to provide the landowner with a reasonable estimate of how many board feet of lumber to expect once the load is milled.



GARY BIBOW

In this red pine plantation, the forester marked a tree designated for harvest with an orange stripe high enough for the logger to see while seated on harvesting equipment. The stump mark near the base is basically a "receipt" showing that this tree was supposed to be harvested.

themselves — and their woodlands — from the consequences of a hasty sale or outright theft by consulting with a forester ahead of time. Professional foresters can provide essential guidance to landowners about managing and harvesting their timber.

Professional cooperating foresters can help woodland owners estimate timber volume, value and whether that timber is ready for harvest. "You wouldn't sell your car or your house without finding out what it's worth," Bibow said. "Your timber is no different — except it might be worth more than your car, or even more than your house."

A cooperating forester can also help landowners read and understand a contract to make sure the terms are fair. "Without realizing it you can have a contract that says the logger has the right to cut down all merchantable tim-

PROTECT YOURSELF

If a neighbor is planning a timber harvest — ask them to keep you informed about when and where the harvest will occur. Be sure your property boundaries are clearly marked.

If you're planning a timber harvest

1. Talk with a forester to determine if your timber is ready to be harvested. If it isn't ready, he or she can recommend management options to maximize your profits later on.
2. Hire a cooperating forester so he or she can set up and administer the sale for you.
3. If you'll be conducting the sale yourself, find a reputable logger, clearly mark your property boundaries and mark the trees to be cut. Estimate how much timber you have and its worth. It could also be helpful to photograph your property before, during and after the sale.

During the sale

1. Be visible, but stay out of harm's way.
2. Record every load that leaves your property. Photograph every load, if possible.
3. Ask questions: Where is the timber being taken? Who is hauling the logs? Save your contract and copies of mill receipts for later reference.

ber on the property,” Bibow said. “That means every tree. People just sign these contracts without understanding what they mean, and by the time they realize what’s going on, it’s too late.”

Professional foresters can also help set up and administer the timber sale. That means they can advise landowners when a timber sale would be most beneficial for regenerating the forest, can mark trees for cutting, can negotiate a contract, and could monitor the logging operation.

But sometimes landowners are victims of timber theft even when they aren’t participating in a sale at all. This can happen when a logger cuts timber from neighboring land.

“Many of the complaints we get involve adjacent landowners,” Bibow said. “One of the landowners conducts a timber sale and the logger — unintentionally or intentionally — cuts

across a property line.”

The risks of this type of theft can be decreased by ensuring that property boundaries are clearly marked and agreed upon by all adjacent landowners. Since most foresters are not surveyors, neighbors usually need to split the cost of a survey, fencing or other boundary-line markings.

When a case of timber theft is reported — to the county sheriff’s office, directly to a DNR office, or to the DNR violation hotline at 1-800-TIP-WDNR — DNR staff work with other state, local, and sometimes federal law enforcement authorities to determine if, and how, timber theft is occurring. While there are many types of timber theft, DNR foresters and forester-rangers have a variety of investigative tools at their disposal. “We’ve used cameras, night vision and officers in the air and on the ground,” Bibow said, adding

that investigators also have the ability to track harvested timber itself.

If a landowner suspects that timber theft has occurred, he or she should report it immediately. “The sooner that suspicion is reported,” Bibow said, “the sooner someone will be able to react to it, and the easier the case will be to investigate.”

Loggers do exceptional work in Wisconsin, and they are critical to managing our forests sustainably. It’s important, though, for landowners to do their homework before signing a timber sale contract.

“Don’t feel pressured into signing a contract with the first logger who knocks on your door,” Bibow said. “Ask a forester to help you determine whether your timber is ready for harvest and what type of harvest is required. If you think you’re a victim of timber theft, report it right away so we can help you out.”



Writer and photographer Lori Compas is also a website designer and editor for DNR’s Division of Forestry.

HOW THEFT HAPPENS

TYPE OF THEFT	CHARACTERISTICS
Harvesting across the property line Skimming off the top	Timber is cut from a neighbor’s property. A fraction of the cut logs are unloaded at a different location and the remaining logs are taken to the mill. The landowner is paid only for the logs that reach the mill.
Under-reporting timber volume and weight conversion	For example, a load of red pine is hauled to a mill. The mill weighs the load and pays by weight. The logger converts the weight to cords, but instead of using the industry standard conversion rate, which is approximately 4,500 pounds per cord, he uses something like 5,500 pounds per cord. The landowner is paid by the cord and the logger keeps the difference.
False reporting of a species	The logger reports that a less valuable species, like oak, was delivered to the mill — even though the timber was actually a higher value species, like walnut.
Failure to accurately report volume	Logger only pays for a portion of loads that leave the property, for example 15 out of 20.
Failure to report all deliveries	Logger hauls to two mills, but only reports to the landowner what was hauled to one mill.
Falsifying mill slips	Logger creates his own mill slips reporting less volume than the true mill slips state.
Cutting unmarked timber	Even though the landowner or a forester has marked trees to be cut, the logger also cuts trees that were unmarked.
Stealing from log decks	A pile of timber awaiting transport along the road is taken by an unauthorized individual.

Chart from DNR Private Lands Forestry Law Enforcement Specialist Gary Bibow

EDUCATE YOURSELF

Learn more about forest management issues and interact with other woodland owners at:

Wisconsin Woodland Owners Association (wisconsinwoodlands.org) offers education and networking opportunities to woodland owners. The site links to a variety of resources, including information about tax assistance, wildlife, and government agencies and programs.

Wisconsin Woodland Assistance from the University of Wisconsin-Extension (basineducation.uwex.edu/woodland/) offers a great deal of information about managing woodlands, including a sample timber sale contract and in-depth information about how to conduct a timber sale. The site also provides links to conferences and workshops for woodland owners.

The Woodland Advocate Program of Wisconsin Family Forests (wisconsinfamilyforests.org) is an alliance of local forest landowners who share their experiences and pool their needs for professional assistance and educational information.





Following a fox track



Story by Justin Isherwood • Illustrations by Cicely Combs

It was innocent enough in the beginning. I find it embarrassing to find the number of things that start this way, common projects that for some reason evolve from simple enthusiasm into some other kind of project. How it was that reroofing turned into a steeple; a muffler repair evolved into a valve job with new seat covers; and how a used couch became an addition to the house.

I had put on my skis — a pair of cheap cross-country laths, the kind you can buy at second-chance stores — plastic skis, plastic shoes, plastic fish-scale. So equipped, I set off on the trail that led around the east end of the house, followed last year's corn field with the outside few rows left standing. Halfway across the forty, I came on a fox track that wound among the corn,

working that realm of succulence that corn is known to attract in winter — deer, mice, rabbits, squirrels, turkeys, crows, grouse, blue jays, woodpeckers, chickadees. This is the very reason I leave rows of corn uncombined at the field edges in the first place, the same reason God left his apple tree unattended in the garden — to provoke compli-

The corn would have been another hundred bushels in the bin, worth \$250 if we're lucky, which the price of corn generally isn't. After property taxes and other expenses, maybe it was worth a day at Busch Gardens where I could be treated to watching a porpoise or an economically-sized whale jump out of an oversized pool for an audience that thinks it's terrific to see a porpoise jump in close proximity to corn dogs and souvenir shirts. My field does not offer T-shirts, but wild things jump out pretty much the same as at Sea World if a little corn is left standing in the middle of Section 12 Township 22 Range 8E.

I really ought to have minded my business instead of getting involved with the fox. Dark was near, supper not long away. I had a book to tend to on a long winter evening, but the fox track intervened.

It went northwest, kitty-corner of the field in the quick stride of a red

fox, the tracks so singularly placed as to constitute a straight drawn line. I followed.

The fox made for the highway but, before reaching it, veered north and took the trail through the pine plantation that links the south field with the next. From there it went due north. Me too.

It stopped to sniff at a hollow chokecherry. I hadn't known that it was hollow but saw now where a sucker had broken off exposing inner wood that rotted. A well-used mouse trail was evident though apparently no-body was home.

The north field is called Bessie's for she who owned it last. It is a farm tradition to name the fields after those who came before. So long as you own the field, it is called by the name of someone who doesn't, and as soon as you don't own it, your name is on it — a strange backhanded justice in this farm kingdom. The fox turned west.

Following the edge of a pine plantation it detoured into a thicket of elderberry whose position I promised to try and remember. Not that I favor elderberry wine, that too-famous embellishment of widows. I have told my wife, who is a wine maker, that she may make elderberry when I am safely dead, but not before lest this be seen by our neighbors as haste for my waste. A rabbit had barked the new elderberry canes but gave up, finding better company at the hazel bush.

The fox must have found some new thing distracting for it went off on a most excited path zigzagging like a PT boat laying depth charges. The tracks were no longer easy to follow. Instead, they ricocheted from a smell of something here to a smell of something there. The path volleyed back and forth like a hard-played tennis ball. The earth under a nearby pine was torn open to bare ground exposing some sumac leaves and oak. There was no forensic evidence of the victim — no blood, no fur. My guess is it was newborn mice.

The fox continued west. At the center pivot it turned north again, crossing last year's cornfield to the hedgerow

that Willie planted 40 years ago. West again, the fox followed a hedge, dodging here to inspect a stump, there a dead-fall. To follow a fox is to realize the vivid role of decesement in the woodlot, even if it is the lingering kind. You note what lightning struck, what the wind broke, what diseased spot soon became an oasis and accommodation for new life.

At the base of a white pine a hundred yards further on, the fox stopped. From the castings littered round on the ground, this must be an owl tree. Sure enough, overhead was the crude twill nest of a horned owl. The fox, I suspect, took the scat pellet if nothing better was at hand, same as I had borrowed my father-in-law's 10-year-old station wagon for a honeymoon trip to Ely — good enough for my purpose.

West again, circling behind the neighbor's house, it then moved obliquely back to the old woods where there is soft maple and scattered pine. When installing a center pivot there, I left the edge of the field out of line for the sake of a dozen nice specimens. A decent farmer wouldn't do that. Neither would he follow a fox in the dark.

Author, essayist and farmer Justin Isherwood writes from Plover.



A cold world with an icy ceiling

Ice covers the fishes' world for more than four months a year. How do they adapt?

Alisa Santiesteban

We all have our comfort zones when it comes to temperature. Especially during Wisconsin's long winters, we really have no choice: You have to figure out how to wrap up and stay comfortable. You can fight the mental game and just bear it, or embrace the weather as the season brings on the cold stuff.

We've adapted to spending time outdoors when the daylight is short, the temps drop and the winds are stiff. Skiing, sledding, ice fishing and a host of other cold-friendly activities are fun on a bright day. Yet, just as we enjoy our time outdoors, we take solace in the fact that we can always head inside and warm up somewhere. Not everything is so lucky.

Judge whether you are going to keep a fish before removing it from the water in winter. Minimizing handling and limiting its exposure to cold air increases its chance of survival when released.

TERRY MARGEVAV

Once lakes freeze over, fish have to make due with colder temperatures. Though it sounds like a horrible fate, remember that the piscine world generally stays within a 40 degree temperature range year-round. Unless they freeze-out, lakes don't drop below freezing and they are rarely warmer than the mid-seventies. Wisconsin's waters are wonderful habitats, and fish have strategies to survive even some of the harshest conditions.

So where do the fish go when the temperature plummets and ice blankets the water? Most don't go anywhere...they just adapt. Nature has guided them through this annual cycle for thousands of years, and they are prepared to spend a long winter in lower light at lower temperatures.

The frigid wonderland beneath the ice is not well explored, but biologists do understand the importance of metabolism, food and oxygen: key components in underwater winter survival.

Activity and food go hand in hand

During early winter, the lakes have turned over, the water holds plenty of oxygen, food has been stirred up and fish are active. Even though the water doesn't drop below freezing, as winter progresses food becomes more scarce, the waters are still, light penetration drops off and oxygen levels begin to drop too. Fish have learned to adapt to survive.

Fish are *poikilotherms*, that is, "cold-blooded," and can modify their metabolism to the environment.

"To conserve their energy and lower their needs for food and oxygen, most fish decrease their activity during the winter months," says DNR Fisheries Supervisor Terry Margenau.

During winter, anglers can see some of those changes. For instance, anglers are more likely to find food in the stomachs of the fish they catch compared to other times of the year, Margenau observes.

"When water temperatures are around 75 degrees F in the summer, it may only take a fish 24 hours to digest its prey," he says. "But in winter, the same food item may take an entire

week to digest."

Fish are often divided into three groups: coldwater, coolwater and warmwater species that thrive in different temperature ranges.

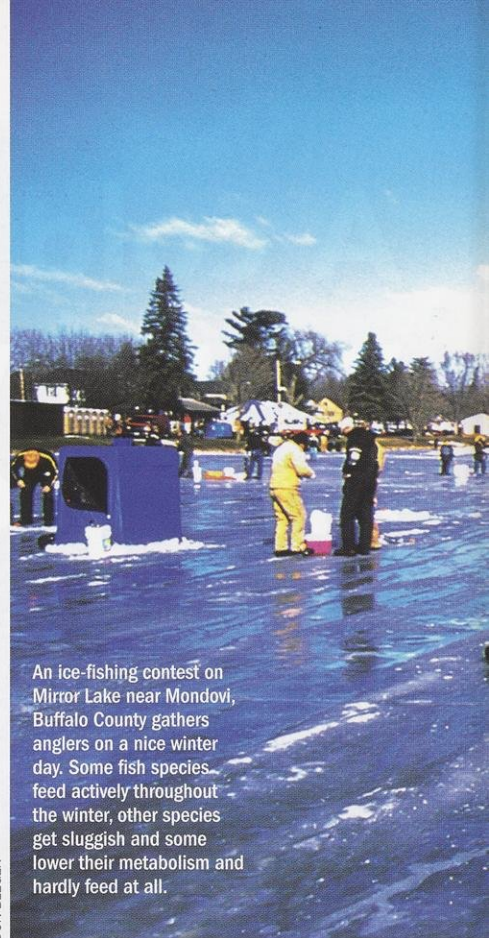
"When it comes to the winter, different fish choose different activity levels, just like people," laughs Margenau. "Some stay somewhat active, some get more sluggish, and others just hunker down."

Fish such as lake trout, whitefish and brown trout are coldwater fish at heart that remain fairly active throughout the winter months. The onset of winter brings few changes for them. In fact, the cooling water during winter months allows such species to expand their range, venturing into habitats that are normally off-limits during summer months when water temperatures rise and oxygen levels may drop off.

Walleye, northern pike and panfish also adapt well to cooler water and keep feeding at the onset of winter. In fact, they feed heartily during first ice as protective weed cover for their prey dies back and small prey fish head for the shallower, relatively warmer waters. Other species, like bass and muskies become more sluggish and only feed to meet base maintenance needs in winter.

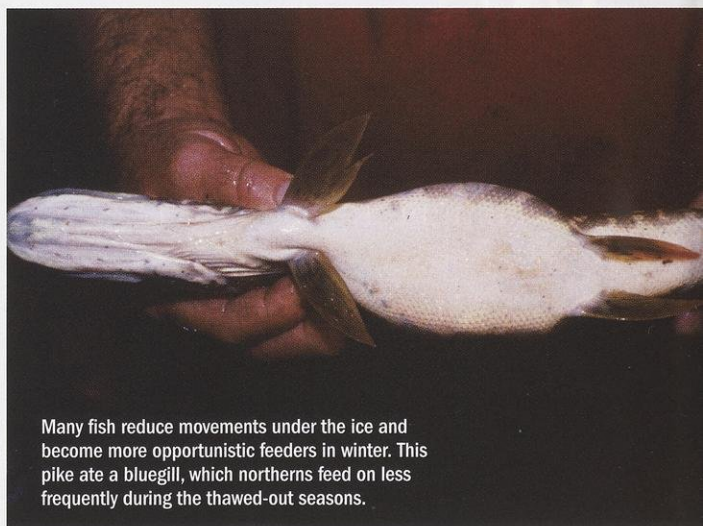
Some fish need even less food energy to get by and really restrict their movements in winter. Bullheads tend to pass the winter buried in the sand. Carp become dormant and some catfish take on a state of near hibernation barely moving, slowing their respiration rate and rarely feeding.

"We've tracked seasonal flathead catfish movements with sonic tags and radio tags, says DNR fisheries biologist Al Niebur. "Both techniques show that once flatheads settle into their winter habitats, they move very



An ice-fishing contest on Mirror Lake near Mondovi, Buffalo County gathers anglers on a nice winter day. Some fish species feed actively throughout the winter, other species get sluggish and some lower their metabolism and hardly feed at all.

DON BLEGEN



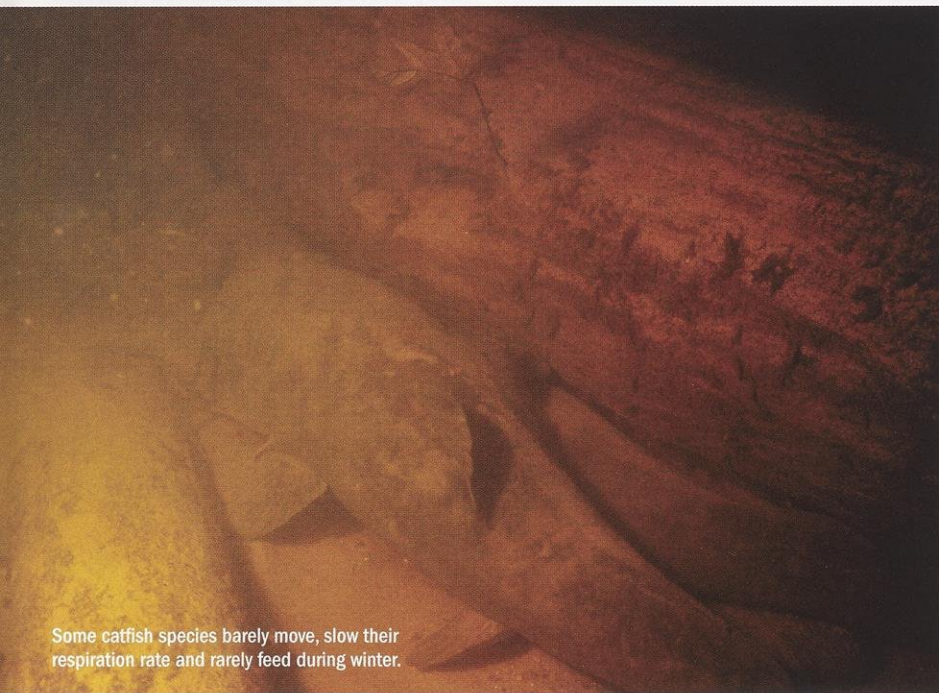
Many fish reduce movements under the ice and become more opportunistic feeders in winter. This pike ate a bluegill, which northerns feed on less frequently during the thawed-out seasons.

TERRY MARGENAU

little. "I would definitely characterize their behavior during the winter as a type of hibernation," Niebur says.

When DNR fish researchers first started sampling flatheads by SCUBA diving, the researchers thought they could release tagged fish at the surface and the big cats would be active enough to swim the short distance back to the safety of their winter group, but the researchers soon found the fish were so sluggish that surface releases would not work.

"We quickly found out from our



Some catfish species barely move, slow their respiration rate and rarely feed during winter.

DNR FISHERIES AND HABITAT MANAGEMENT

tagging studies that these fish could not swim back down to the bottom against the current. They usually ended up in areas significantly downstream of their original wintering site," says Niebur. "We now have divers take all the fish we tag down to the bottom of the river pool before releasing them."

It is interesting to note that the

closely related channel catfish are more active in winter, keep feeding and are often caught by anglers through the ice. Go figure.

When it comes to food in winter, most fish are fairly opportunistic according to Margenau.

"Take northern pike. Panfish are not a preferred prey food for pike dur-

ing most of the year because they are tough to swallow, are a big size, and are very effective at using weed beds for cover. Yet, when you're cleaning pike that are caught in the winter, you will often find they have eaten bluegill as a mainstay of their diet," Margenau says. Consider that during summer months when aquatic plant growth is at its maximum, panfish have lots of places to hide. When the seasonal vegetation dies back in late fall, this hiding cover is greatly reduced. It's a perfect advantage for a coolwater predator like a pike. They're not picky during the cold months."

Most fish won't expend too much energy to find food in winter. They can't afford to spend much time or effort chasing down other fish to fill their bellies. The trade-off is that since food resources are limited, growth rates during the cold months slow way down. If food supplies are really low, this poor diet can result in stunting where the fishes' normal growth rates are retarded.

Layin' low

So what habitat do fish look for to protect them during more sedentary periods over winter? Places that can best meet their needs — as warm as practical, as much oxygen and food as possible, protected from predators and as much light as is plausible.

First, a short chemistry lesson. During summer, on my many swimming trips to our local lakes, I know that generally the deeper I dive, the colder the water gets. During winter there's a bizarre phenomenon that the frigid water actually gets relatively warmer the deeper you descend in a lake. The reason has to do with how water molecules arrange. As water cools, the molecules sink and pack tighter and tighter together (increasing density) until the temperature drops to 39 degrees F. At that point, the water molecules are heavier than the water at the surface (around 32 degrees F), causing a topsy-turvy effect where warmer water is at the bottom.

This oddity is important to our finned friends beneath the ice. Once shallow waters nearshore freeze, many

fish will stay together and high-tail it to deeper, warmer areas of the lake unless they are top-of-the-food chain predators. Some fish, like bullheads, even take it a little bit further and burrow in the mud or gravel for a little extra warmth.

For instance, hibernating flathead catfish congregate in close proximity to each other and to large riprap or wood structures for protection, according to Niebur. However, in waters with big open areas and little cover, fish just hunker down in the deeper areas of the lake or deeper channels in rivers.

If you know where fish cribs or areas of vegetation are located in a lake, there's a good chance you'll find fish there in the winter. If you're unsure of these areas, look for a cluster of tip-ups, bored ice holes and ice shanties. Avid ice anglers often know best and they leave clues where they are finding fish.

"Several fish species will hang around fish cribs and any remaining green vegetation for good reasons," says Margenau — to eat and not be eaten.

"Bluegills for example, use cribs for protection from predators like northern pike. The pike use these areas to find food like bluegill. And anglers," adds Margenau, "use these areas to find both!"

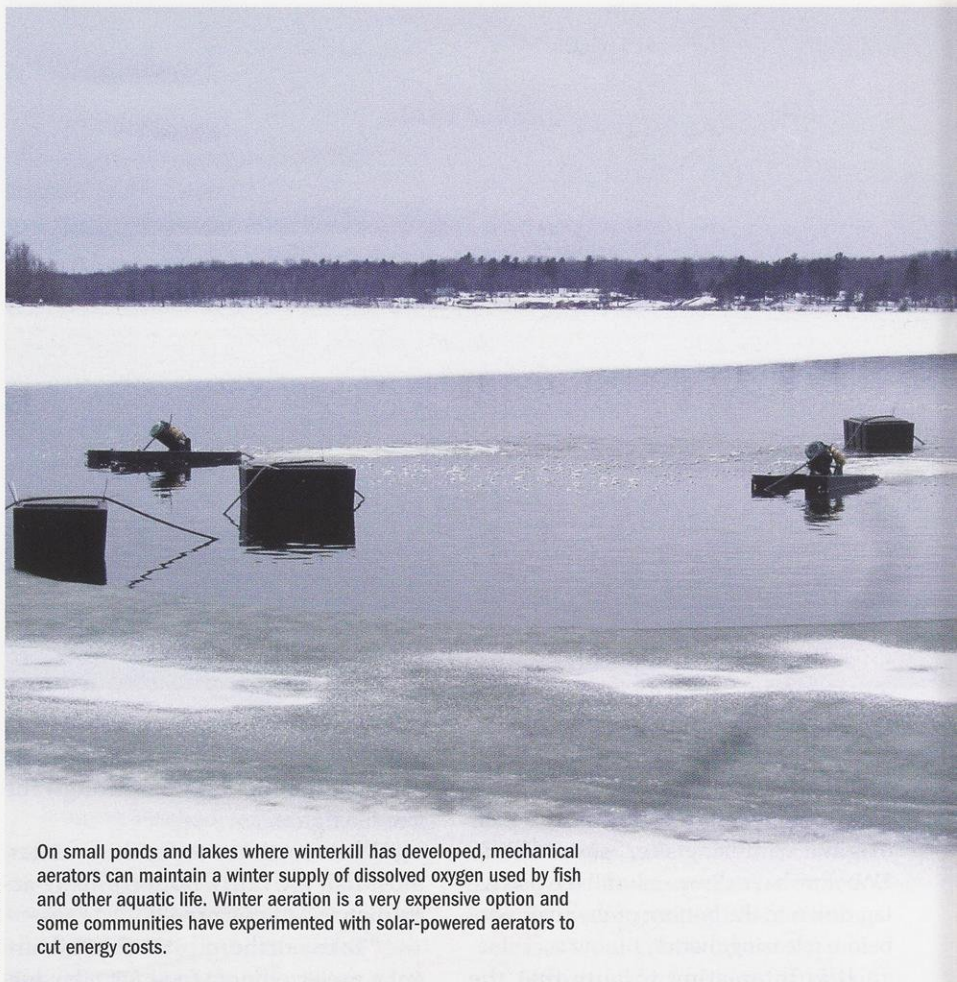
Fish wintering in rivers face the additional challenge of unrelenting currents. Trout will often give up the fast-flowing riffles and runs they inhabit in the summer and move downstream seeking out deeper, quieter pool habitat in the lower reaches of streams.

In the Mississippi River, bluegill will move into the backwaters where they find the quieter waters more suitable. Walleye, sauger and pike prefer to stay in the same places they occupy in fall and spring, but they move to the deeper rock areas that provide cover, escape and the chance to find congregating forage fish. Smallmouth bass may be found in the main channel or in backwaters but also take refuge behind warmer wing dams or closer to shore. Each fish has slightly different preferences but knows what's best for it.



A northern cruises past a fish crib looking for an easy meal.

TERRY MARGENAU



On small ponds and lakes where winterkill has developed, mechanical aerators can maintain a winter supply of dissolved oxygen used by fish and other aquatic life. Winter aeration is a very expensive option and some communities have experimented with solar-powered aerators to cut energy costs.

TERRY MARGENAU

In search of oxygen

As winter presses on, ice thickens, snow builds up, and diminishing supplies of oxygen are continually consumed below the ice. Low oxygen levels test fish and can leave them vulnerable. Shallow lakes with abundant vegetation are at especially high risk for dropping dissolved oxygen levels.

"Some fish are more sensitive to low oxygen than others, though the reasons for that aren't well known," says DNR fish ecologist Paul Cunningham. "Low oxygen is most unforgiving for fish like bass, trout and bluegill. Northern pike, walleye, crappie and yellow perch have added tolerance, and fish like fathead minnows and bullheads come out on top in their ability to handle the lowest amounts of oxygen."

One of the most successful species in low-oxygen conditions is the mudminnow because it can take in air through its gills and also breathe air directly as needed to survive. John Magnuson, director emeritus of the Center for Limnology at the University of Wisconsin-Madison, observed that mud minnows breathe oxygen trapped in bubbles just beneath the ice.

Fish under low-oxygen conditions move upward in the water column searching for more oxygen-rich water, or they migrate to oxygenated inlets to get through the harshest months, he explained. When fish become stressed from low oxygen, their activity levels really drop off and feeding basically shuts down until conditions improve.

If these low-oxygen conditions persist for a period of time, winterkill or "freeze-out" may occur, killing some or all of the fish, says Cunningham. "Partial winterkills are expected every year, but we haven't seen severe winterkills for more than 20 years," he notes. "In some waters, partial winterkill is just a natural and beneficial process that results in faster growth rates for the survivors."

Hundreds of Wisconsin's lakes that are more prone to severe winterkill are equipped with aeration systems that sustain open water during winter allowing oxygen exchange and uptake. Artificial aeration is an expen-

sive, energy-intensive option.

Limit how long your catch is out of the water

You would want to be in the frigid waters in winter about as much as a fish wants to be exposed to the air. So it's best to try to keep the fish in the water as much as you can if you intend to return your ice-fishing catch to the water.

"At any temperature colder than freezing, a fish's gills are very susceptible to freezing when exposed to air," says Sue Marcquenski, DNR fish health specialist. "It is best to keep the fish in the water as much as possible while removing the hook."

When temperatures start running below 10 degrees F, a fish's eyes are also at risk of being damaged.


"When it's really cold, you might notice the fish's eyes become opaque when they're out of the water," says Marcquenski. "It's possible that the cornea has frozen and although the eyes clear up when the fish is put back in the water, the cornea or lens might have been damaged. Fungus or bacteria in the water can also infect the damaged cornea, perhaps leading to blindness."

Along the same lines, it's a common misperception that cold water reduces the likelihood of infections in fish, so it's important to be careful when handling fish.

"Cold temperatures don't prevent infections, they simply slow the infection down because the fish's metabolism is so much slower," says Mergenau. "If a fish gets an internal or external injury, it may subsist throughout the winter, but when spring weather comes and the waters warm up, the infection gets worse and can be lethal."

Additionally, ice anglers fishing in water deeper than 25 feet should take care to pull hooked fish up slowly, to lower the risk of enlarging gas (swim) bladders. The gas bladder contributes to a fish's buoyancy control that allows it to suspend at a favorable water depth without having to swim too hard. If a fish is brought up too quickly,

the bladder can rapidly expand causing the stomach to be pushed into the fish's throat. It can be difficult for these fish to survive if released, though unhooking the fish quickly and helping it upright itself in the water will increase its chances of adjusting the bladder on its own.

In summary, fish are hardy and adopt many different strategies for making it through the cold months. Those species that can't make it through the winter weather disappeared here long ago. Just like their human counterparts, the hardy survivors below the water adapted to the broad range of temperatures they are sure to experience in the upper Midwest. 

Alisa Santiesteban writes for DNR's Fisheries Management and Habitat program.

WINTER FISH PHENOMENA

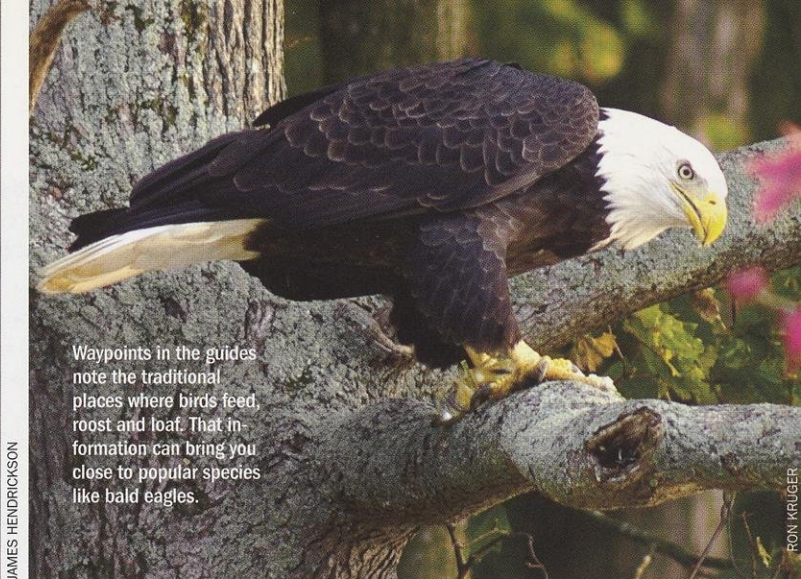
■ **DRUNKEN FISH** — After first-ice and before snow cover has had a chance to block out the sun, a maximum amount of light reaches the green plants below that photosynthesize and trap oxygen below the surface. Just below the ice, you may see fish swimming on their sides appearing to be lightheaded because of too much oxygen. Anglers often report seeing these "drunken fish."

■ **EARLY SPAWNERS** — Most Wisconsin fish spawn in spring, summer or fall, but the burbot prefers the middle of winter, under the ice. It is Wisconsin's earliest spawner. Spawning usually takes place at night and by daytime the spawning grounds are deserted. Surface water temperatures are close to freezing, there is no nest, and the burbot provide no care to the eggs. Burbot (also called lawyer, eelpout and lingcod) are members of the freshwater cod family.

■ **ANCHOR ICE** — Occasionally when it is extremely cold, fast-flowing rivers can form ice on the bottom, called anchor ice. Sometimes when a stream is on the verge of freezing, ice starts to form on the stream bed. This can be very damaging, freezing to death trout eggs, developing trout buried in the gravel for a long winter's rest, and invertebrates that live in the stream beds and in the small spaces between gravel and rocks.



Experienced watchers know when birds like cedar waxwings move through an area. They recommended where to go and when to visit as stops on the birding trails were compiled.



Waypoints in the guides note the traditional places where birds feed, roost and loaf. That information can bring you close to popular species like bald eagles.

JAMES HENDRICKSON

RON KRUGER

Road map to the right place at the right time



Birders enjoy a trip to Pheasant Branch Conservancy in Middleton, one of the trail stops in the Southern Savanna Region. Bird watching has become the fastest growing outdoor activity since the early 1980s according to trends noted in a May 2009 study of outdoor recreation.



Then there are those odd years when irruptions bring birds into an area. They often congregate near the birding hot spots identified. The fall of 2004-winter of 2005 brought lots of the boreal great gray owls to Wisconsin.

STEVE MARFLIUS

Susan Foote-Martin

Nothing builds an appreciation for nature like seeing, hearing and watching it for yourself. Though wild animals don't suddenly appear on cue, experienced bird watchers have tried to tip the odds in your favor by forming lists of "best bets" to see birds in key places at key times of the year. The birders shared their favorite spots so we might bring flocks of new bird watchers and wildlife viewers closer to the natural world when natural cycles hit their peaks.

That was the concept in compiling the Great Wisconsin Birding and Nature Trail — a series of regional auto routes that could get you to the right place at the right time to find the places where birds congregate during their courtships, breeding seasons, migrations, resting times and feeding periods. Moreover, the concept was to form routes that you could easily travel by car to visit locations for a day, a weekend or longer as your schedule allows.

Our goal was to help people connect to nature on their own terms and to put everyone in Wisconsin within arm's reach of outstanding places to experience wild birds throughout the year.

To provide great statewide viewing, the biologists, amateur birders and tourism interests who developed the trail system first divided the state into five ecological regions. Each has its own identity and character. And each area was named for prominent landscape characteristics. From the Lake Superior Northwoods region in the northern tier of 18 counties, to the Mississippi and Chippewa Rivers out west, the Lake Michigan region to the

east, and Central Sands Prairies to the Southern Savanna region in the south, each trail had its own unique niche.

Next, we recruited bird watchers from throughout the state to nominate their favorite sites that might appear in the guide books. Each location was ranked based on the richness of bird species that frequent the area, nearness of major roads, overall access for people of all ages and walking abilities, and customer friendliness. Descriptions particularly noted if there were amenities like adequate parking, signs, established paths, sitting areas, water or restrooms. Properties that ranked the highest were included in the listings. Careful consideration was given to sites that had staff on hand to answer questions or employed naturalists to give programs and lead tours. With each property description we listed the species that were main attractions and any rare species of plants or animals found on each property. Each listing also provided written driving directions and detailed maps.

We also added contact information and website addresses as a tool to help visitors plan a trip. The contact infor-

Five auto trails provide routes and waypoints to explore birding hotspots and community highlights throughout Wisconsin all year.



Some of the waypoints noted in the Lake Michigan Region trail guide.



AUDUBON SOCIETY CHRISTMAS BIRD COUNT

The guides note where birds are drawn in for close viewing at different times of the year. White-breasted nuthatches are easy to see pulling seed and suet from a winter feeder.

mation aims to help travelers expand their horizons. Most people who are curious enough to travel will make some time to explore an area and likely have several interests. Some enjoy other forms of outdoor recreation like golfing, fishing, swimming, skiing or biking in season. Those who are more than day-trippers will be seeking lodging at accommodations that range from campsites to RV stations, motels, B&Bs or resorts. Some want to explore cultural interests like regional theater or historic sites. Some would enjoy adding community festivals and special events in the mix of their sightseeing. Others want to know about nearby towns where they can shop, visit a specialty business and find good meals. To help meet those needs, the guide includes contacts for visitors bureaus and tourism offices.

To build this diverse approach to blend outdoor experiences with other good reasons to travel, we started with the scientific community of resource managers then talked with other potential partners. The Wisconsin Bird Conservation Initiative provided start-up funds to move ahead on building the bird trails and routes. Long-term financial support came from the U.S.



HERBERT LANGE

Look for eastern meadowlarks perched on fence posts and taller shrubs that give them an overview of the moist grasslands, prairies and pastures where they gather food and nesting materials.

Fish & Wildlife Service, Wisconsin Coastal Management Program, Natural Resources Foundation of Wisconsin, Department of Natural Resources and Wisconsin Department of Tourism. The guides were enhanced by the beautiful photos of birds donated by Mike McDowell, Rich Armstrong and Alan Orr. The classy layout and attractive design came from publication designers at the Department of Tourism.

This impressive group of partners all saw great potential for current and future business in promoting a combination of ecotourism and hospitality. There's particular interest in the waves of baby boomers who are retiring, healthy, active and eager to find interesting experiences they can explore here in Wisconsin. This large group of travelers has both the time and resources to travel in search of nature. In fact, a national survey published in 2001 showed that Wisconsin ranked third among all states as a destination for bird and wildlife viewing, just behind Virginia and Alaska. Now eight years later, a paper from May 2009 titled *Long-Term National Trends in Outdoor Recreation Activity Participation — 1980 to Now* (Cordell, Green & Betz) shows that "viewing and photograph-

ing birds has become the fastest long-term growing activity, growing 287 percent since 1982-83."

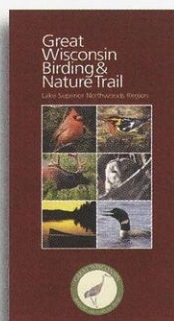
The trends show nature travelers living the green life at home want to carry out that lifestyle as they travel to parks, nature centers and wild places. They recycle, buy compact fluorescent bulbs and are conscious of their energy use. A green travel industry was born to match a greener public with tourism businesses that share a commitment to keep Wisconsin's natural resources healthy and unharmed. Today, *Travel Green Wisconsin* certifications hang proudly in private businesses across the state and those places are also destinations for the bird and wildlife viewing public who do not want to leave a large travel footprint.

Gaining national attention

In a spring 2009 article in *Audubon* magazine, author Kenn Kaufman named the Great Wisconsin Birding and Nature Trail among the top 10 bird trails in the Midwest. The trail is described in five regional full-color guide books and an accompanying website (wisconsinbirds.org/trail). A companion pocket guide contains a *Checklist of Wisconsin Birds*. These trail guides, designed to fit in a car's glove box, lead travelers to extraordinary places to see birds in season. A total of 368 of these "waypoints" or stops are detailed in the five guides. Each stop is located in a public park, forest, natural area or a nature center where public visits are welcome. Here's a closer look at each of the regional guides.

Lake Superior/Northwoods Birding and Nature Trail

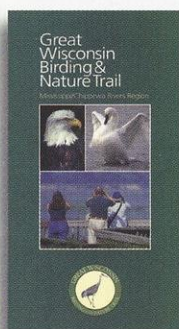
This first guide published in 2004 describes birding hotspots in a mosaic of lake country and old-growth forest in Wisconsin's 18 northern counties. It includes 88 destination waypoints from the 21 Apostle Islands to more than a million acres in the Chequa-



megon-Nicolet National Forest. Suggested stops in state and county parks, state natural areas, Nature Conservancy properties, and private nature centers encourage visits throughout the four seasons.

"To explore the spruce and pine forest in the trail's northern section is to evoke an ineffable sense of the great Northwoods and you might find nesting pine siskins, boreal chickadees or northern saw-whet owls. A full complement of eastern North America's woodland birds may be found in Wisconsin's hardwood forests, with everything from ruffed grouse to tiny blue-gray gnatcatchers."

— Kenn Kaufman, *Audubon's Field Guide to Birding Trails*



Mississippi & Chippewa Rivers Birding and Nature Trail

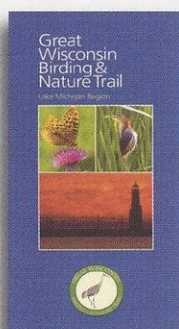
The second guide published in 2005 describes 67 waypoints in 13 Wisconsin counties in western Wisconsin within the Mississippi River and Chippewa River area. Potential stops here include sandbar sloughs and backwaters of the Mississippi River, and trout streams in the coulees, valleys and undulating hillsides of southwestern Wisconsin. The area contains some of our best bike trails, the Upper Mississippi River National Wildlife & Fish Refuge, Tiffany Bottoms State Wildlife Area and Norskedalen Nature & Heritage Center in Coon Valley.

"America's greatest river is the centerpiece of this birding trail that highlights wading birds, American white pelicans, rafts of ducks and great concentrations of bald eagles on their wintering sites along locks and dams."

— Kenn Kaufman

Lake Michigan Birding and Nature Trail

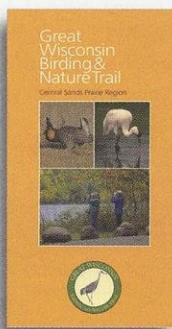
The third guide made available in 2006 takes visitors through 11 counties that border Lake Michigan. Sixty-four waypoints mark birding hotspots from the



tip of Door County on the shores of Rock Island State Park all the way south to the state line near Chippewa County. Coastal travelers will enjoy visits to public properties as well as stops at privately run centers like Bay Beach Wildlife Sanctuary in Green Bay, Woodland Dunes Nature Center in Manitowoc County and Schlitz Audubon Nature Center in Milwaukee County.

"The edge of Lake Michigan produces concentrations of migrating hawks and songbirds plus a chance to see rare water birds and provides vital rest stops for birds during migration."

— Kenn Kaufman

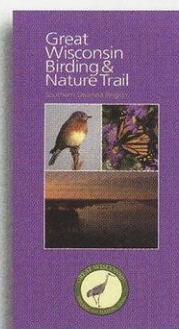


Central Sands Prairies Birding and Nature Trail

The fourth guide provides routes through 17 midstate counties. Published in 2007, it includes 78 waypoints, from the massive 43,000-acre Neecedah National Wildlife refuge in the west to High Cliff State Park in the east. Also included are impressive sites like Quincy Bluff and Wetlands State Natural Area in Adams County, George Mead State Wildlife Area, the Leigh Yawkey Woodson Art Museum in Marathon County and the Buena Vista Grasslands in Portage County.

"The central region's damp meadows are the places to hear the chatter of fidgeting sedge wrens by day and the bubbly aerial flight songs of American woodcocks at dusk. From the outrageous stomping dances of greater prairie-chickens in early spring to the swirling flocks of longspurs in the winter to the haunting whistles of upland sandpipers in summer, this area of wide horizons has the capacity to delight us in every season."

— Kenn Kaufman



Southern Savanna Birding and Nature Trail

The fifth guide published in 2008 highlights places to visit in 13 counties in south-central Wisconsin. It includes 71 waypoints from Horicon International Education Center in Dodge County, west to Yellowstone Lake State Park in Iowa County. The landscape includes historical restorations like Old World Wisconsin in Waukesha County westward to the relic prairies and oak savannas of Lake Mills State Wildlife Area and Zeloski Marsh in Jefferson County, to the Aldo Leopold Legacy Center and International Crane Foundation in Sauk County.

"Great flocks of ducks and geese gather on small lakes providing vital rest stops for weary shorebirds wading in its wetlands and for woodland species retiring where the prairies give way to forests. But the prairies themselves hold some of the richest prizes."

— Kenn Kaufman

What people are saying

The *Birding & Nature Trail* guides have been ordered by people from all 50 states and foreign travelers as well. They are among the most popular guides published by the Department of Natural Resources and the Department of Tourism.

Wing your way through wild Wisconsin!

With guides in hand, all the pieces are in place to visit phenomenal places across Wisconsin at peak times. Get to know your state county-by-county, park-by-park, and business-by-business as you chart your own course across our rich landscape. Order a complimentary copy of any or all of the Great Wisconsin Birding and Nature Trail guides from stacy.rowe@wisconsin.gov or travel.wisconsin.com.

Susan Foote-Martin is a conservation biologist who coordinates the *Great Wisconsin Birding and Nature Trail* for the Wisconsin Department of Natural Resources.

COMMENT ON A STORY?

Send your letters to: Readers Write, WNR magazine, P.O. Box 7921, Madison, WI 53707 or e-mail letters to david.sperling@wisconsin.gov

BULL SNAKE TALES

I read the update on bull snakes in the June issue and will go back in the archives to read the original article ("More bluff than bite," April 2007).

I live in Texas now, although I still own a farm in Wisconsin, near Sparta in Monroe County. It doesn't surprise me that county has one of the highest frequencies of sightings. I grew up on a farm near Sparta in the '40s and '50s and we saw bull snakes quite often. I was bitten by one when mowing a local cemetery in 1955 when I was 13. The cemetery association had added space on the back and cultivated and seeded the new plot. My job was to keep grass trimmed. I accidentally mowed off about 6-7" of the tail of a large bull snake. He was not happy about this and struck me just above my right ankle above the top of my shoe. I had to grab him behind the head to pull him loose and tossed him over the back fence. I put the mower away and rode my bike home about a mile. When I told my mother what happened she called the doctor. Since there were a few rattlers around, he asked me if I had positively identified it as a non-poisonous snake. When I told him it was definitely a bull snake, he just said, "Try to make it bleed a little and wash it with warm soapy water." I washed it well, put on a Band-Aid and went back to mowing. I never saw the snake again, but stuck the little piece of his tail on the side of the shed with a nail. It stayed there for

three or four years. I had a little dimple scar on my leg for many years before it eventually faded.

In the '70s, my brother was operating a farm nearby and caught one of the largest bull snakes I ever saw. It was around six feet long. He kept it for a pet in a big stone jar in the barn for a few weeks. He named it "Bully" and fed it live mice that he would catch in traps in the barn and corn crib. He weighed it on a dairy scale in a bucket. It weighed 23 pounds. When it got lethargic, he decided that it was not happy confined in that jug and he released it in a thick fencerow near the barn. He saw it several times for the next few years. Apparently that snake did not have a very large territory.

This summer I served as an adult leader on our church's youth mission to Raymondville, not far from the Gulf Coast. The town was hit hard last summer by the remnants of Hurricane Dolly. We were repairing homes that suffered water and wind damage. When tearing down damaged ceiling drywall in a bathroom, the kids found a dead snake that I estimated at a bit over three feet long. I am almost positive by the markings and the shape of the head that it was a bull snake. As we carried it out, a few eggs fell out on the concrete floor. These were creamy white and about the size of a large pea. One of the eggs broke open. A little "wiggler" 1/4-1/2 inch long emerged from the broken shell. We found a lot more eggs, possibly 200 or more, as we cleaned out the moldy insulation. I told the kids that these were not poisonous snakes and were very beneficial, that they ate small rodents and insects. We put all of the eggs in

the edge of a large sugar cane field that adjoined the lawn. I always look forward to receiving *Wisconsin Natural Resources*. I enjoy all of the articles and commend you on the information contained in every issue.

John Thurston
Irving, Texas

MUSIC APPRECIATION

"A little night music" (August 2009) was GREAT! I didn't know anything about coon hounds or coon hunters prior to reading this story; however, Kathryn Kahler's writing gives one a sense of being right there in the midst of the whole thing. While reading the story it seemed that I could hear the dogs barking and see the fat coon staring down from the tree branches. It was only after I finished reading the story that it hit me that I wasn't literally there. Excellent!

Rudolph Bentley
Madison

MISTAKEN BEE ID?

In the June 2009 article ("What's the buzz about bees?") I was particularly interested in the reported dramatic reduction of the yellow-banded bumble bees in relation to the total number of bees tallied. The article seemed to imply that the rusty-patched bumble bee had taken over the former's habitat range. My wife and I plus our neighbors see only the yellow-banded type in our area. We are all trained researchers and have been observing bees for

decades, so I don't think it is a case of mistaken identity. We live near the junctions of Waushara, Green Lake and Marquette counties. Am I missing something in this article? Is there any significance to our observations?

W. James Morris
Berlin

Author Eric Mader of the Xerces Society replies: To be clear, the rusty-patched bumble bee (*Bombus affinis*) has not increased its numbers nor expanded its range in response to the decline of the yellow-banded bumble bee (*B. terricola*). Rather both species have declined rapidly and extensively throughout their historic range.

As for the bees you are observing, there is definitely a chance that you are seeing the yellow-banded bumble bee. The few recent records we have of it nationally are limited to specimens collected in 2007-2008 near Two Rivers to the east of you, Manitowish Waters and Mountaintown to the north, and Ozaukee County to your southeast.

All of these reports make conservation efforts in Wisconsin crucial to the survival of these species. The Xerces Society for Invertebrate Conservation is attempting to document sightings of these bees so that we can help state and federal agencies coordinate conservation resources. If you think you are seeing either the yellow-banded or rusty patched bumble bee, we encourage you to photograph it and send the photo to the Xerces Society's Endangered Species Coordinator, Sarina Jepsen at: sarina@xerces.org. Also, several online identification guides to bumble bees are avail-



able on our website, xerces.org/bees.

[NOTE: Subsequent study of photos supplied by Mr. Morris led Eric Mader to conclude the bees in the Waushara area were actually the common eastern bumble bee, *B. impatiens*.]

GIVE US MORE CREHORE STORIES

After a quick scan of my August issue I was disappointed there were no readers' letters! What a bummer. Then I read Dave Crehore's article ("No fair!"). It mirrored my experiences at the Rock County Fair in Janesville 60 years ago in the first part of August. I went every day. I didn't have any entries but blew my hard-earned paper route money trying to win a stuffed animal or a watch. Twenty-five cents here, 50 cents there and I was broke. Loved the cotton candy! Mr. Crehore's writing style and memories were a *superb* treat. Bring us more, and bring back "Readers Write" also.

Jim Cox
Lodi

Our letters column is sometimes a matter of feast or famine, as evidenced by the number of letters we were able to print in our October issue. Like you, we enjoy hearing from readers and encourage everyone to keep the letters coming.

FLYING CARP A HAZARD TO SKIING

Julia Solomon's story ("Containing the threat," August 2009) was an eye-opener! Fifty years ago, I owned a small power boat, and occasionally spent a weekend water skiing along that stretch of the Illinois River. The photograph of Heidi Keuler on page 17 (which is an outstanding bit of photography) would certainly discourage me from doing that now!

M. L. Hoch
Racine

CAMOUFLAGE ARTIST

Can you tell me anything about the toad or frog that has taken up housekeeping under the cover of my gas grill in the back yard? Is it some kind of tree frog? Does it change colors? Do they all have the same marking like a standing man with his arms outstretched on its back, starting at the head? I found it twice under the black cover of my gas grill. The shelf on the left of the grill is grey so the first time I removed the cover I didn't see it until I came back to place items on the grill. The next time it was in the right side, an area more of a black color with grey controls. As I went to get the camera it jumped to the concrete patio surface where I took the shot.

Jim Rusch
Oconomowoc



Jim, your little grill buddy is either the eastern gray treefrog (*Hyla versicolor*) or the Cope's gray treefrog (*H. chrysoscelis*). If it has a white spot under the eye, it is the eastern gray treefrog. We're really taken by these little guys because their camouflage is so elegant ranging from bark brown to green to rocky colored, depending on their surroundings. DNR publishes small field guides to the amphibians, reptiles and snakes of Wisconsin complete with identification keys and nice pictures. The books sell for \$4 each with discounts for larger quantities. Order forms are available on the DNR website at dnr.wi.gov/org/land/er/publications. You can also find more information online at

dnr.wi.gov/org/land/er/biodiversity where you'll find descriptions of hundreds of other plants, animals and natural communities, or at DNR's kid's page (EEK!) at dnr.wi.gov/eeek (click on "Critter Corner").

WHAT'S THAT BIRD?

My wife and I really enjoy Wisconsin Natural Resources magazine. The pictures and maps are well done and the written articles are very informative. Several months ago near Fish Camp Road and near Lake Kegonsa State Park campground, we saw a bird fly over the car and land in a pasture. It was at least the size of a crow, but its wings had black and white feathers. The body and head were black. I have never seen such markings on a bird. Perhaps you can identify the bird for us and send us a picture and better description. Thank you in advance for your help.

Leslie C. Hellemann
Marengo, Ill.

It's often tough to identify birds and other animals based on verbal descriptions. Features that distinguish one bird from another don't always present themselves as the bird flashes past our field of vision. After consulting some of DNR's experts, we think we can narrow your bird down to a few possibilities. You say "at least" as big as a crow, so it could have been an immature bald eagle or a turkey vulture, though both are considerably larger and turkey vultures don't have feathers on their heads. To complicate matters, birds and other wild animals sometimes exhibit color abnormalities, such as melanism (where they have more black pigmentation than normal) or albinism (where they lack black pigmentation and are white). Somewhere in between are piebald or partially leucistic feather patterns such as those shown by this piebald American crow. The fact

that the bird you saw landed in a pasture (typical crow behavior) makes this a possibility as well. [Ed. Note: A subsequent phone conversation with Mr. Hellemann ruled out the turkey vulture and immature bald eagle as possibilities. The bird he saw wasn't nearly that large, making the piebald crow the leading candidate.]



Piebald crow.

WINTER ROOSTING BOX

In an early 2009 issue, there were plans for a wooden house where birds could spend the winter night. Can you refresh me as to which issue that was, or direct me where to get the plans?

Arlene Kollath
Town of Packwaukee
Marquette County

Our February 2009 Creature Comforts column (dnr.wi.gov/wrwmag/2009/02/creature.htm) had a diagram and plan for building winter roosting boxes that can also be converted for spring use. We provided links to sets of plans, one from the Cornell Lab of Ornithology at allaboutbirds.org/NetCommunity/attractingbirds, (Click on "Other Ways.") and a second set of plans from suite101.com (Enter the phrase "how to make a winter roosting box" in the search field.)

GIVE YOUTH A SHOT

We just wanted to commend the Department of Natural Resources for initiating the early hunt/fish programs for youth in Wisconsin.

Our 12 year-old son, Colton was out early this morning for his first youth duck hunt and we could not have wiped the smile off his face! It is a very proud moment to bag a first duck and we were able to capture some proud moments with Dad, photos which will mark this moment in time forever.

At a time when many youth remain sedentary, unmotivated and often are making poor choices out of boredom, we are so grateful for the early youth hunt/fish programs. These create great bonds with family and friends as kids learn about the amazing outdoor activities open to them, and also learn rules, regulations and respect for nature in the "great outdoors." This is a great slogan — "Giving youth a 'shot' at our amazing natural resources!"

Growing up on a farm as one of nine kids, I feel so lucky that my dad and brothers initiated me into this important "club." I've since enjoyed being a part of many outdoor activities. Others do not get the chance soon enough and unfortunately other activities and priorities begin to take precedence.

I just want to thank the DNR for their hard work and the insight to ensure the future rights and opportunities for our next generations of outdoor enthusiasts!

*Eileen and Robert Richter
McFarland*



UPDATES

ASIAN CARP

Asian carp continue to move north and are likely within 10 miles of an electric barrier designed to keep them from invading the Great Lakes, according to reports in the *Milwaukee Journal Sentinel*.

DNA testing shows silver carp had cleared the Brandon Road Lock and Dam, leaving only about 10 river miles and one navigational lock between the fish and the electric barrier, one of the last physical obstacles before fish would reach Lake Michigan.

"The big thing is, they got through a lock," said Phil Moy of University of Wisconsin Sea Grant who was instrumental in getting a new fish barrier installed on the Chicago Sanitary and Ship Canal, the *Journal Sentinel* reports.

Moy said no actual fish have been caught, but water tests determined that the river pool above the Brandon Road lock is positive for silver carp DNA, meaning it is likely that the fish have migrated this far.

RNA MAY BE CLUE TO DISAPPEARING HONEY BEES

Researchers from the University of Illinois at Urbana-Champaign recently found that damage to honey bees' protein factories — ribosomal RNA — may be a contributing factor in colony collapse disorder (CCD). (See our June 2009 story, "What's the buzz about bees.") Ribosomes help link amino acids together to build cell protein.

"If your ribosome is compromised, then you can't respond to pesticides, fungal infections, bacteria or inadequate nutrition because

the ribosome is central to the survival of any organism," said May R. Berenbaum, head of the U of I Entomology Department and study co-author.

The study compared genes in the guts of honey bees from CCD colonies to those from healthy hives and suggests that protein production had been compromised. Such RNA fragments could result from viral infections, possibly carried by the varroa mite which was accidentally introduced to the United States in 1986.

RARE BIRDS NEST THIS YEAR

Four pairs of piping plover nested on Long Island in the south channel of Lake Superior, south of Madeline Island, and produced eight young. This was the only known nest site this year in Wisconsin for this endangered bird. (See "Piping up for plovers," June 2008).

Twelve female Kirtland's warblers in Adams and Marinette counties fledged about 30 young from eight nests this year, reports DNR Endangered Resources Conservation Biologist Kim Grvelles. The Kirtland's warbler, a "Species of Special Concern" in Wisconsin was surveyed, monitored and protected from

predation by brown-headed cowbirds that were trapped near nest sites. Plum Creek Timber Company again allowed use of their lands to conduct this field work.

DEER DONATION PROGRAM

Lee Dudek, volunteer coordinator/founder of Hunt For The Hungry in Green Bay, reports the Green Bay Packers are selling blaze orange ball caps and stocking hats to encourage hunters to take part in the Wisconsin Deer Donation Program and Hunt For The Hungry programs to benefit food pantries. Hunt For The Hungry is in its 15th season this fall and has partnered with DNR's Deer Donation Program for the past 10 years.

NEW CAMPGROUND

On August 26th, staff from Harrington Beach State Park in Belgium, Ozaukee County registered the first campers at the new 73-unit campground that includes sites with electrical hookups, nonelectric sites, a group campground and kayaking sites. It is the first new campground on state parks properties in more than 20 years.

Choose a gift that delivers in all seasons

Set your sights on a bargain and consider holiday gifts to **Wisconsin Natural Resources** magazine. Whether you are thankful for a favor or just want to do something special for a friend who enjoys the outdoors, a subscription to **Wisconsin Natural Resources** makes a thoughtful, affordable, tasteful gift that we wrap up and deliver six times throughout the year. Just call **1-800-678-9472** or subscribe online at wnrmag.com and download a gift card of your choice. Just \$8.97 per year. Call now, mention code U9TEL, and wrap up your holiday shopping before the snow flies.



The season's tiny tot

Eastern dwarf mistletoe is a hemi-parasitic plant, meaning it derives some of its nutrients from photosynthesis, but also robs some nutrients from the host plant. In nature, its hosts are primarily black spruce trees and occasionally white spruce and tamarack. The vast majority of mistletoe populations occur in the swamps of Northern Wisconsin.

Eastern dwarf mistletoe derives its nutrition, especially amino acids and sugars, from the host. The mistletoe seeps a growth-inhibiting hormone into the host tree's branches, upsets the hormonal balance and causes proliferation of twigs in dense clumps called a witches' broom. The deformed tree, weakened by the loss of nutrients, eventually succumbs.

Although this mistletoe will in time kill a tree it infects, it should not be considered a threat to forest health. It is important to realize that eastern dwarf mistletoe is not a disease, but rather a slow-growing shrub. Diseases can easily kill countless plants in a short time and can spread over vast areas like wildfire. This parasitic shrub moves more slowly. One study indicated that a 1.5 acre patch of mistletoe took 60-70 years to form. Moreover, the death of an individual tree from dwarf mistletoe can take several decades and more widespread infestation of a forest stand may take centuries.

Instead of a bane to the forest, many ecologists consider mistletoe beneficial. Witches' brooms provide nesting sites for birds. Plus, the buds of infected spruce trees often open very early in spring when other buds are still closed. This yields sugars for ants and other insects, which in turn serve as food for birds. When infect-

ed trees eventually die and fall to their swampy floor, they open up the forest canopy to sunlight that gives other trees the opportunity to grow. The small trees interspersed with more mature growth creates a more uneven

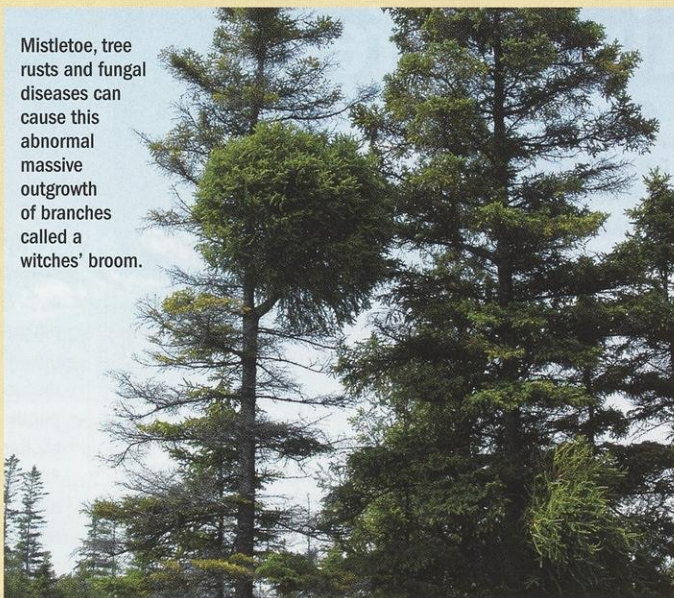
deposited in a very small area near the base of the fallen tree. Since swamps typically have a very thin topsoil layer, this piled soil creates ideal habitats for many of our beautiful native orchid species.

Dwarf mistletoe plants are dioecious, meaning that male and female flowers bloom on separate plants. Wind and insects carry the pollen in April and May. In the fall, mature fruits fill with so much fluid that they build up enough pressure to burst and cast seeds around 20 feet at about 50 miles per hour. Seeds that land on suitable host twigs will germinate in spring. Another fascinating adaptation of these seeds is that instead of having a hard seed coat, mistletoe seeds are coated with a sticky viscin, which glues them to host surfaces. Unlike most germinating seeds, mistletoe seeds are not sensitive to the pull of gravity or the tug of light. Their dominant growth impulse is to grow away from the light. Thus, a seed attached to the bottom of a twig will grow up into the twig, while one atop a twig grows down. In either case they grow *into* the twig to infect the host tree.

Although eastern dwarf mistletoe may not be the showiest or most elegant plant of the season, its diminutive size and fascinating life cycle more than make up for its unsightly form. Though few Wisconsinites will be scouring the swamps for some eastern dwarf mistletoe to hang over a doorway, we can all raise a glass of eggnog and toast this tiny, most interesting native shrub. ❧

Matthew Wagner is an amateur botanist and writes from Summit Lake.

Mistletoe, tree rusts and fungal diseases can cause this abnormal outgrowth of branches called a witches' broom.



GARY FEWLESS

Female flower of the eastern dwarf mistletoe growing on a spruce branch.



GARY FEWLESS

Male flower of the eastern dwarf mistletoe.



GARY FEWLESS

aged forest stand that enhances the health and ecology of the whole forest. Since a witches' broom can make a tree more top heavy and the roots of most swamp dwelling trees are shallow, the tree is more susceptible to toppling. Wind-felled trees in swampy areas often cause the roots to come out of the ground. When this happens all of the soil that covered the roots is eventually

Comforts

Natasha Kassulke



Road salt can hurt your dog's paws. According to the American Dog Trainers Network, ice-melting chemicals on sidewalks and roads can cause burns on dogs' footpads and the spaces between their toes.

Whenever possible, avoid walking your dog through these sidewalk chemicals, and wash off his footpads when you return home. Consider some pet booties. If you are crafty, you can make your own. Protective balms and waxes such as Musher's Secret can be rubbed into and between your dog's footpads before walks to reduce pain and dry skin caused by road salt and chemicals.

DAVE CREHORE

Get creative about exercise

Winter doldrums are upon us. It may be dark when you leave for work and when you return home. How are you going to exercise your dog when the yard or park is snow covered and cold?

Consider inside games like hide-and-seek, tug-of-war with some old cloth or a game of fetch.

Pet toys like KONGS™ make great gifts for dogs and cats alike. Stuff

them with treats and pets will stay occupied for hours.

Or make time for an obedience class to improve communications and teach your four-legged friend who's boss. Experts say dogs see all people and dogs in a household as a pack, each with their own rank. For more information on being top dog, see dogbreedinfo.com/topdog.htm

Holiday safety reminders

Most pets are curious by nature and want to check out

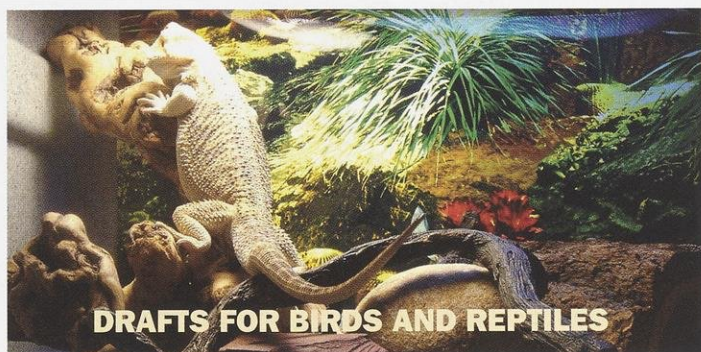
any additions to home for the holidays. Sniffing can lead to chewing or eating foreign objects. Keep electrical cords tucked away and other decorations or holiday plants out of reach. Watch out for dangling objects that can be pulled down.

Naturally curious puppies, kittens and other pets may want to sample plants, some of which are poisonous, especially since dosage is size-dependent. Poinsettia is mildly toxic/irritating, and can cause

nausea or vomiting; mistletoe and holly are moderately to severely toxic. Be aware that plant bulb kits featuring amaryllis, daffodil or others in the lily family can be toxic to pets causing gastrointestinal distress, cardiac arrhythmias, tremors and convulsions.

Don't forget about the holiday tree. Fir tree oils can irritate the mouth and stomach, causing excessive drooling or vomiting. Tree needles are not easily digested and don't let your

dog drink the tree water. To be safe, place plants out of reach and check the plants for any signs of chewing or missing leaves.



PAIGE STEVENS

Sometimes an afghan just won't cut it. Birds or reptiles may need their cages moved away from windows where they are subject to drafts. The cage should also be covered on three sides to prevent over-stimulation.

Though feathers provide tremendous insulating capacity, consider covering bird cages at night to protect against cool drafts and provide privacy. This tends to keep the bird quiet in the early morning too when it would otherwise become active and vocal.

Unlike mammals and birds, reptiles and amphibians do not produce their own body heat. In the wild, a reptile might sit in the sun, or on a sun-heated rock to warm up in the morning, and retreat to a cooler burrow in the afternoon.

In captivity, reptiles often need a supplemental heat source, a "hot spot" where they can raise their body temperature to nearly 100 degrees F, or higher for some tropical or desert species. This allows them to digest food and fend off disease. The animal should have the option to move well away from the heat source and cool off as it chooses.

When keeping reptiles, an important tool is two high-quality thermometers. Place one in the warmest basking spot in the enclosure; the second at the far end of the cage. When designing your reptile's enclosure, keep the concept of the thermal gradient in mind. Aim to have one side of the cage warm, and the other cooler. A variety of heating bulbs, pads, panels, and thermostatic rocks are available to keep your pets warm.

Natasha Kassulke is creative products manager for Wisconsin Natural Resources magazine.

Traveler

Natasha Kassulke



Winter wanders

Traveler challenges you to get kids of all ages to stop Twittering and start talking face-to-face again during these frosty family adventures.

LICIA JOHNSON

Just when you were getting worried about the high costs of the holidays, the **Milwaukee County Zoo** comes to the rescue with a free family day on Saturday, December 5 from 9:30 a.m. to 4:30 p.m. Admission is free but the \$10 parking fee remains in effect. What better time of year to share the cold air with a polar bear or Humboldt penguin and then warm up in the aviary or the reptile center? Visit milwaukeezoo.org or call (414) 256-5466 for more information.

Use the Wright-side of your brain to celebrate the wonders of flight on Saturday, December 12 at Havenwoods State Forest, 6141 N. Hopkins St., on Milwaukee's north side, (414) 527-0232. During **Discovery Saturday: Flight Experiments**, families can make paper airplanes and film canister parachutes then see how well different designs fly. Drop in anytime between 9 a.m. and noon to participate in the aerial antics.

Take a break from the bustle at this busy time of year and join other astronomy aficionados as the sun rises over the Tropic of Capricorn on Monday, December 21 at the Richard Bong State Recreation Area in Kansasville, (262) 878-5600. **Celebrate the winter solstice** and learn how others

have celebrated the slow return to more daylight then hike and do some of your own celebrating. Dress to be outside and meet at the amphitheater at 6:30 p.m. Richard Bong State Recreation Area is located on State Highway 142 about 47 miles from Milwaukee.

Wisconsin averages 45 inches of snow a year, so it's not surprising that the Wisconsin Department of Tourism reports an inflating number of **snow-tubing facilities** in the state.

Tourism's website suggests the following slippery stops. In central Wisconsin, Powers Bluff County Park in Arpin (715) 421-8422 offers the longest tubing runs (1,200 ft.) in the state. For those in the Northwoods, Christie Mountain (715) 868-7800 and Perkinstown Winter Sports Area (715) 785-7722 are great weekend family destinations. In west central Wisconsin, slide into Hudson's Badlands Snow Park Recreation Inc. (715) 381-1541. Snow lovers in northeastern Wisconsin can tackle the Triangle Sports Area (920) 448-3365. The Wisconsin Dells area boasts two great tubing hills. Cascade Mountain in Portage (800) 992-2754 has more than 900 ft. of speed and snow, while Christmas Mountain Village in Wisconsin Dells

(608) 254-3971 offers four snow-tubing chutes. For tubers in southeastern Wisconsin, Sunburst Ski Area in Kewaskum (262) 626-8404 offers the second-longest run (1,000 ft.) and more snowtubing chutes (11) than anywhere else in the state.

Another slippery silent sport, ice skating, takes center stage at several winter festivals. On December 5 and 6, the Pettit National Ice Center in Milwaukee hosts a **holiday classic ice skating event**. The public also is invited to skate daily for fun or fitness. Public skating fees: \$5 - children (12 and under); \$7 - adults; \$5 - seniors (62 and over); \$3 - skate rental. A lesser-known attraction at the facility is **Pettit's indoor 450-meter run/walk track**, which is open daily and is the only track in Wisconsin with a Zamboni Crossing sign! The track is open Monday through Friday from 6 a.m. to 9 p.m., Saturday from 7:30 to 8 p.m. and Sunday from 10 a.m. to 8 p.m. Call (414) 266-0100, ext. 108 for track schedule updates. Admission is \$4 or 10 visits for \$36. The Pettit National Ice Center is located at 500 South 84th Street in Milwaukee (next to State Fair Park). Visit thepettit.com or call (414) 266-0100.



Take on an indoor run at the Pettit Center.

PETTIT NATIONAL ICE CENTER



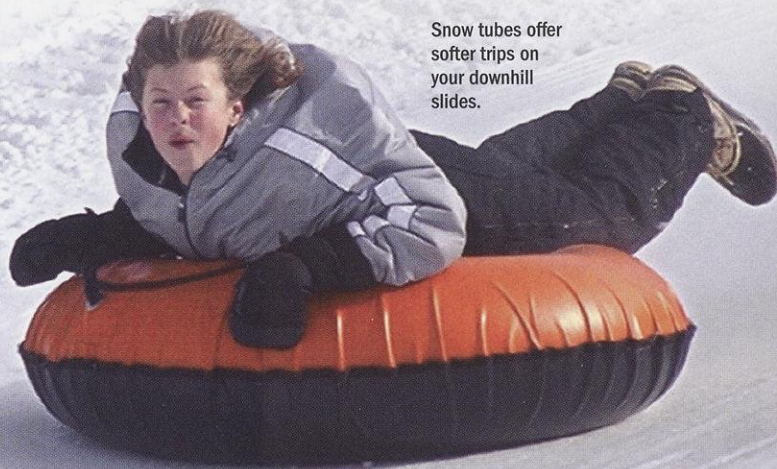
BRIAN MALLOY COURTESY OF WI DEPT. OF TOURISM

On December 19, Pleasant Prairie in Kenosha County hosts holiday music, bright lights and colorful costumes during the **IcePlex Learn to Skate Fest**. Freestyle, synchronized and guest skaters will entertain you. Visit pleasantprairieevents.com. The IcePlex is located at 9900 Terwall Terrace at State Hwy 165 and County Road H in Pleasant Prairie.

From December 26 to 31 Manitowish Waters counts down to the New Year with low/no cost, family-fun activities held regardless of snow conditions. Library story hour and craft projects, dog sledding demos, sleigh rides, snowshoeing, live jazz, wolf program, **Marvel in Manitowish** ice skating, snow sculpting, skiing and more are on the program. Visit manitowishwaters.org or call toll free (888) 626-9877.

Then usher in 2010, the Year of the Tiger, and celebrate the start of National Skating Month on January 2 during **Boulder Junction's Winter Celebration**, which includes a chili dump, bonfire, music, ice-skating, cross country skiing, fireworks and more. Events are located at Boulder Junction Winter Park, Old Hwy K, Boulder Junction. For more information call (715) 385-2400 or visit boulderjct.org.

MARY LANGENFELD COURTESY OF WI DEPT. OF TOURISM



Snow tubes offer softer trips on your downhill slides.



Wisconsin, naturally

PATTERSON HEMLOCKS STATE NATURAL AREA

Notable: A prime example of a mature northern mesic forest dominated by large-diameter hemlock, yellow birch and white pine situated between Clear and Fuller lakes. Standing snags, downed wood, tip-up mounds, ephemeral pools and a thick duff layer accentuate the natural area's old-growth appearance. The understory vegetation of ferns, club mosses and other shade-tolerant species is somewhat sparse due to reduced light at ground level. Resident nesting birds include the pileated woodpecker, Blackburnian warbler and the state-threatened red-shouldered hawk.



How to get there: From the intersection of U.S. Highway 51 and State Highway 70 in Woodruff, go west on Highway 70 just over 13 miles, then south on West Clear Lake Road one mile to the northern boundary of the site. Park along the road. (Do not confuse West Clear Lake Rd. with East Clear Lake Ln., which lies 0.8 mile to the east). See dnr.wi.gov/org/land/er/sna/index.asp?SNA=216 for maps and more information.

