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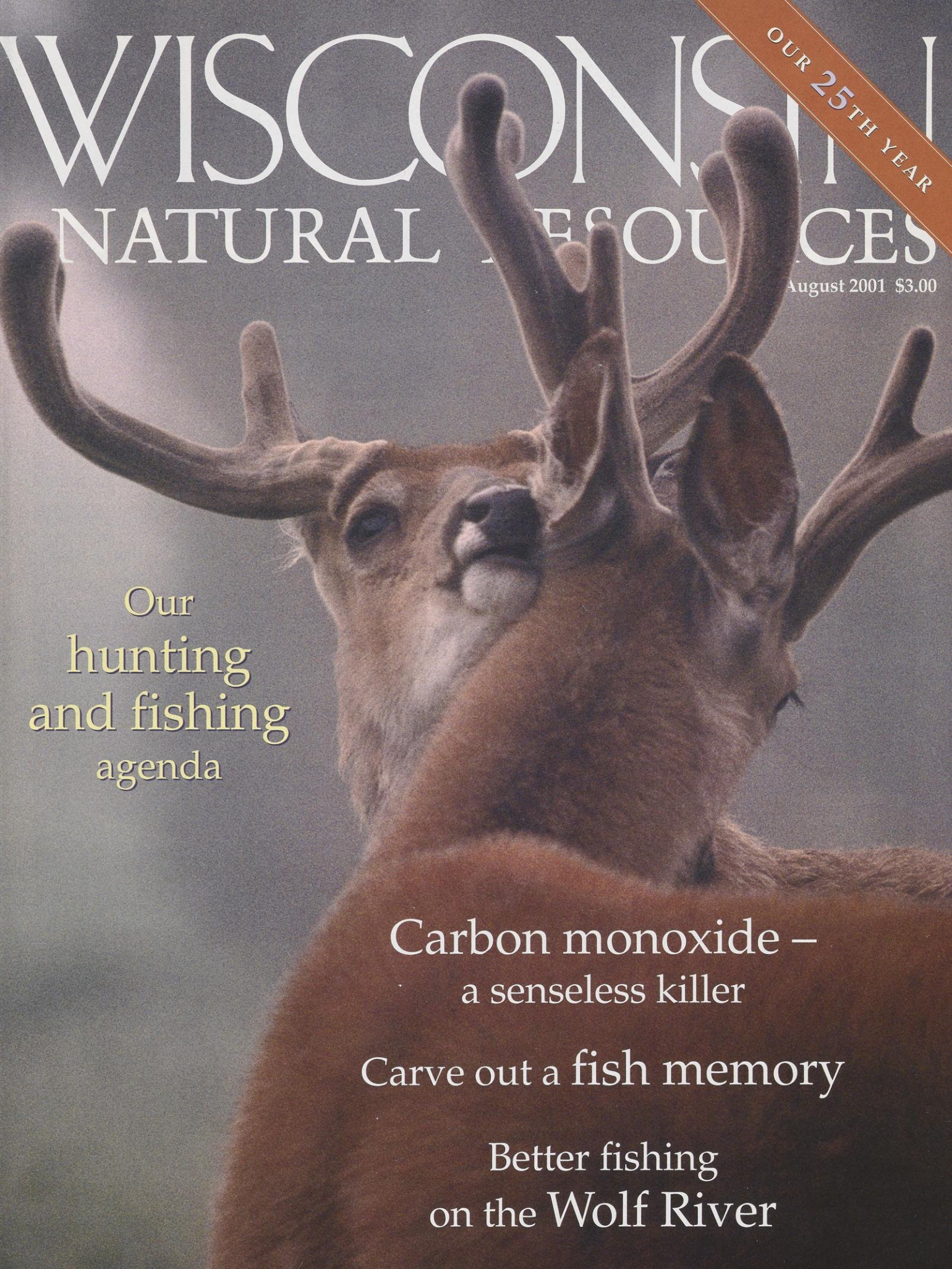
WISCONSIN NATURAL RESOURCES

OUR 25TH YEAR

August 2001 $3.00



Our hunting and fishing agenda

Carbon monoxide – a senseless killer

Carve out a fish memory

Better fishing on the Wolf River

DRINKING PARTIES

When butterflies sip, sip, sip, it's in a puddle!

Anita Carpenter

Drinking parties. The phrase brings to mind groups of friends packed together at corner taverns watching their favorite teams on big-screen televisions, telling jokes and swapping stories.

On a gravel road the morning after a rain, sippers of a different type cluster around mud puddles and damp areas. Tens to hundreds of butterflies gather in an activity known as mud-puddling, puddling, drinking parties or bachelor parties. It is a curious behavior whose function is little understood.

About ten o'clock one early August morning along the Larsen snowmobile trail, I was a bystander watching hundreds of sulphur butterflies puddling. Once a butterfly selected a damp area, others quickly joined it. All faced the same direction with wings closed and tilted perpendicular to the sun's rays. Each butterfly was positioned to stay out of its neighbor's shadow. Some of the sulphurs seemed to be resting and soaking up the warmth, while others extended their proboscises and actively engaged in drinking. For such an unusually frenetic species, the pace of activity seemed relaxed.

Why does puddling occur? No one knows for certain. Many butterfly species feed on flower nectar that provides ample sugar and energy, but is very limited in necessary minerals and ions. Research suggests that the moisture or urine on gravel roads contains dissolved minerals and salt ions, in particular sodium, which may stimulate reproductive development or activate a temperature regulating system to help the young butterflies heat up and keep their cool.

Only newly hatched males puddle, hence the name "bachelor parties." Older males and females do not participate. And only species like sulphurs and swallowtails, whose males patrol territories, engage in puddling. Species like hairstreaks and coppers, whose males perch waiting for females to approach, do not puddle.

The largest drinking party I saw that morning contained about 50 individuals crowded into a square-foot area. Although I carefully avoided disturbing them, the cluster took flight as I approached. What a feeling to have 50 buttery-yellow sulphurs flitting about my face. If only other butterfly species could be as plentiful as these are!

I returned to the trail one week later. The puddling was over, but the "party" was still in full swing. Males were actively chasing females. If all went well, there will be more young males bellying-up to the mineral bar for another round of drinking parties next year.

Anita Carpenter revels in nature's gatherings in every season. She writes from Oshkosh.

Researchers think some male butterflies, like these swallowtails, "puddle" to extract dissolved mineral salts that are important for reproduction or temperature regulation.

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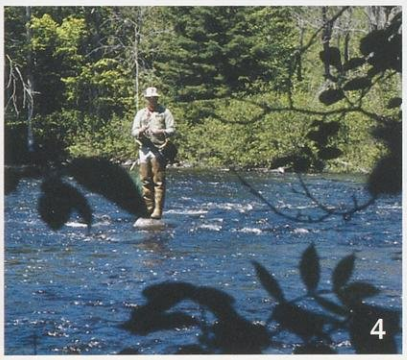
PETER SEGERSON


KARL SCHEIDEGGER


ROBERT QUEEN

FRONT COVER: **Preening bucks.**
R.J. & LINDA MILLER, La Crosse, Wis.

BACK COVER: **Swenson Wet Prairie State Natural Area, Rock County.** *(inset)* **Ohio spiderwort *(Tradecantia ohiensis)* grows here. For a map or more information, contact the State Natural Areas Program, Bureau of Endangered Resources, DNR, P.O. Box 7921, Madison, WI 53707.**
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GREGORY K. SCOTT

Peter Segerson

A fishery with a future

Habitat work in the upper Wolf River turns back damage from Wisconsin's logging era, while limiting environmental consequences and benefitting the trout fishery.

A large stream with whitewater, big trout, room to cast, and relative solitude: That's the Wolf River, one of Wisconsin's favorite wild gems for fishing and water recreation. The upper Wolf in particular offers thrills for anglers ready to challenge wily brown trout.

The idea of creating a fishery area on the upper Wolf — a river that has begun to naturally recover, but still bears scars from intensive logging that cleared Wisconsin's northern forests in the late 1800s — was first considered by the Wisconsin Conservation Commission in the 1950s and '60s. In June 1966, the Upper Wolf River Fishery Area (UWRFA) was established to provide fishing and other recreational opportunities on a large trout river with long, undeveloped stretches. Management aims to maintain and restore the waterway's scenic and aesthetic qualities.

To date, the Department of Natural Resources has purchased 9,173 acres from willing sellers within the area's boundaries at a cost of $6,619,101. More than 50 buildings have been sold for salvage or removed, and the sites were restored with native vegetation. When it is complete, the UWRFA will encompass 14,178 acres, including river frontage on 93 miles of stream.

History written on its banks

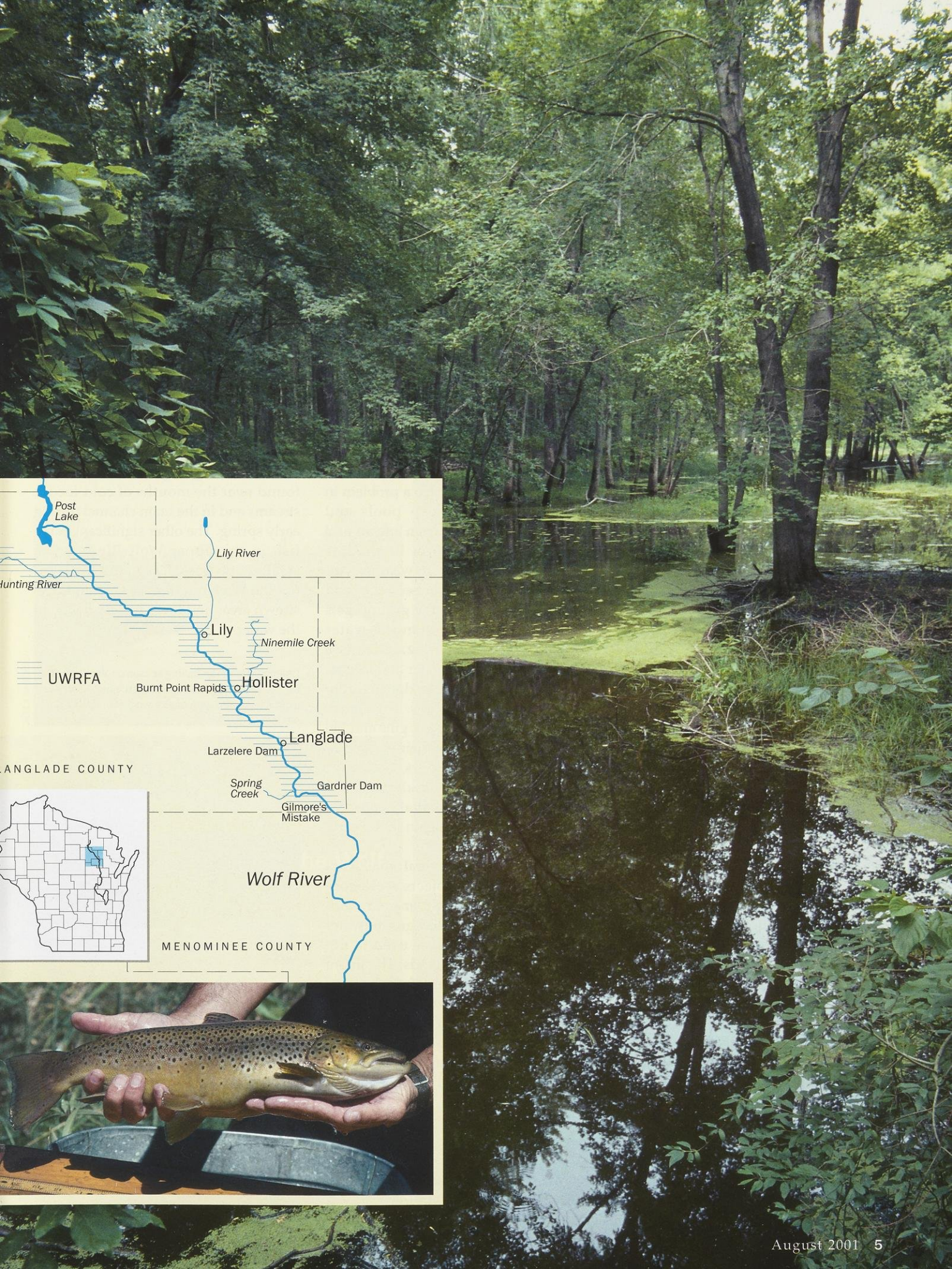
No mention of the Wolf would be complete without recognizing the people who first lived from it and on its banks. The Menominee consider the main stem of the Wolf River sacred and their stewardship of the river continues today. The tribe manages the Wolf River in Menominee County, and the river there has Federal Wild and Scenic River status.

European settlement of eastern Langlade County and southern Forest County began in the mid-1800s, the start of Wisconsin's logging and lumber boom. One J. Gilmore was sent upriver to look into the feasibility of improving the Wolf for log drives and to estimate the cost. At the point where the Langlade and Menominee county lines join, Gilmore found the river full of large boulders and overgrown with cedar trees. Thinking the river ran un-

DNR FOREST TRAINING OFFICE

1870s — Logs clog the Wolf waiting for rising water to carry them to market.
***(right)* Fisheries projects along the upper Wolf River corridor aim to deflect water to the shady bank to restore deeper, swifter, cooler water, create brook trout habitat, and enhance brown trout fishing *(right inset)*.**

(BOTH PHOTOS) PETER SEGERSON, (MAP) MOONLIT INK


Post Lake
Lily River
Hunting River
Lily
Ninemile Creek
UWRFA
Burnt Point Rapids
Hollister
Langlade
Larzelere Dam
LANGLADE COUNTY
Spring Creek
Gardner Dam
Gilmore's Mistake
Wolf River
MENOMINEE COUNTY

DNR FORESTRY TRAINING OFFICE

From the 1870s onward, 15 dams were built to float logs cut from the riverbanks. Given time, the Wolf River has naturally recovered from floods, erosion and sedimentation. Bypassing or breaching dams and the channel restoration will take human intervention.

derground, he reported back in Shawano that logs could never be floated down the Wolf River. The spot is still known as "Gilmore's Mistake" to this day.

The Wolf River Improvement Company was formed in 1870 and a series of 15 dams was built to float logs downstream through the rocky rapids to sawmills on the lower Wolf. Major dams were built at Post Lake, Lily, the Larzelere Dam at Langlade, and the Gardner Dam above Garfield Rapids in Langlade County. Fallen trees were cut from the banks and large boulders four to eight feet in diameter were dynamited to open a channel for driving logs.

Twenty years of log drives down the Wolf River changed the physical dimensions of the stream channel. The loggers first cut tracts of timber nearest the stream. Logs were rolled on traverses and sleighs, and dragged to the river by horses and oxen. This was the era of cutover and get out. As a consequence, the Wolf became flatter, wider, shallower and warmer. The thousands of acres in the watershed cleared of virgin forest could no longer hold water and soil, causing larger floods, erosion and sedimentation in the channel. Gone were the cool shaded banks, fallen trees and overhead cover, boulder hiding spots and many of the fish native to the Wolf River and its tributaries.

The fishery after logging

In 1894, angler Dr. Alfred Hinde of Chicago described a fishing trip on the West Branch of the Wolf River: "Found fishing rough, fighting brush, mosquitoes, etc. Stream hard to wade, too deep at some places. Had to use worms; fly-fishing impractical. First day 95 trout...334 trout in 3½ days for 3 men, largest 1½ pounds."

The good doctor was fortunate to have fished the Wolf at the time he did. The river's once-abundant trout populations declined in the decades following the logging rush. Water in the river's wide, shallow flat stretches warmed above the tolerance level of cold-water species, and few places offered secure overhead cover for fish to set up housekeeping.

The shallows were also a problem in winter. Fish need deep pools and springs to take refuge from anchor and frazzle ice, which form in shallow stretches during sub-zero weather. Anchor ice forms on streambed rocks and other materials when the ground gets substantially colder than the water flowing over them. Frazzle ice is a milky-looking mix of water and ice that forms in rapids and riffles due to turbulence on really cold days. The sharp, needle-like crystals can cut gills and kill fish that can't get out of their way. Without deep-water hideouts, fish can't avoid the huge, slushy underwater ice clouds or the ice jams that can occur during freeze-up and again in the early spring.

During the 1950s several small habitat enhancement projects were constructed in the Wolf River near cold-water feeder streams and groundwater sources. A dragline was used to dig pools and construct islands. The intent was to provide thermal refuge for trout and other cold-water species during temperature extremes. The pools have maintained their depth and the constructed islands and current deflectors are covered with a mixture of grasses and woody vegetation.

The fishery today

The Wolf has major cold-water tributaries with good populations of trout today. The Hunting River, Ninemile Creek, Spring Creek and the Lily River are the major feeder streams in Langlade County. Within the UWRFA, there are 135 seeps, springs and unnamed feeder streams that come from the west side of the Wolf River and another 65 that feed from the east side. These small feeders range from tiny trickles to streams with significant flows of 2–3 cubic feet per second of cold, alkaline spring water. Many contain brook trout fingerlings.

Fishermen today find mostly brown trout in the main channel of the Wolf in Langlade County, which is considered a cool-water fishery that provides good fishing as a result of a long-term stocking program by the department and conservation groups. Brook trout are found near the mouths of cold feeder streams and in the main channel during early spring. The other significant game fish in the upper Wolf River is the smallmouth bass. It is found throughout the Wolf, but does best in boulder-strewn areas and loves woody debris in the water.

Opening Day of the fishing season on the Wolf. For decades, scenery, solitude and excellent fishing for trout and smallmouth bass have drawn lots of anglers here.

MAX JOHNSON

The upper Wolf River has a wonderfully diverse and abundant insect population, with 91 species of aquatic insects. Hungry fish munch on major hatches of mayflies, stoneflies and caddis flies; anglers who follow the hatches will enjoy some of the best fly-fishing in the state.

In-stream habitat restoration bolsters fish populations

Wisconsin's trout management program has long focused on habitat improvement and protection. Deepening the channel, restoring pool-riffle sequences, narrowing the channel without removing the floodplain, increasing the meander pattern of streams, restoring streambank cover and in-stream cover are recognized methods of improving habitat for fish.

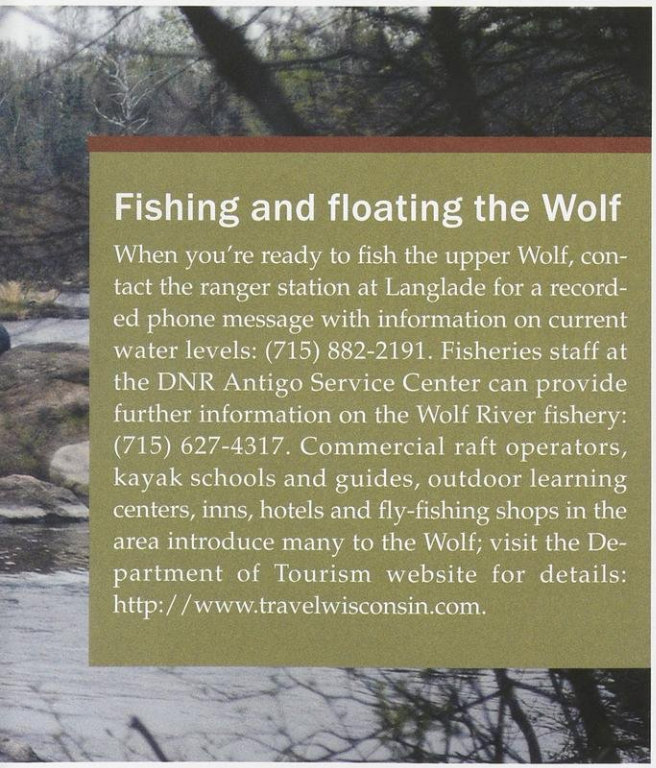
In 1993 the Wolf River Chapter of Trout Unlimited (TU) and the Department of Natural Resources embarked on a large-scale restoration project upstream from Burnt Point Rapids near Hollister. A quarter-mile stretch of the river was deepened and meandered, and boulders and fallen trees were placed in the channel for cover. Today the islands and current deflectors are covered with well-established grasses, alder and ash trees. One goal of the project was to deflect the majority of the flow to the shaded west bank, where several cold-water feeder streams join the river.

DNR personnel carefully monitored the restoration area. Its success prompted two larger projects, which were completed in 1995 and 1996. The sites selected for habitat management have been adjacent to farm fields in old logging flowage basins, or above significant rapids. It was a practical decision. His-

Rocky current deflectors make the river course through meanders keeping the waters swift and oxygenated.

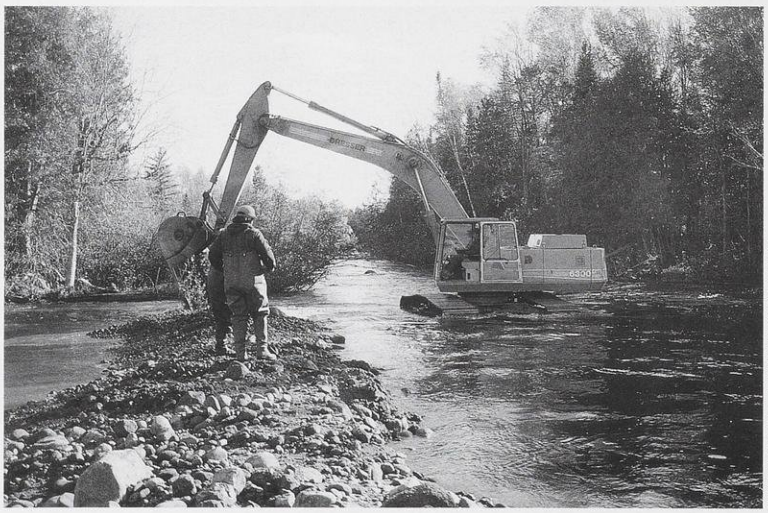
PETER SEGERSON

Trout Unlimited volunteers float fingerlings in rafts to restock the waters after physical digging ends, vegetation grows on the river bed and insect life returns. *(bottom)* In some places the riverbed is covered with rocky rubble and boulders to resist erosion and stabilize the bottom.



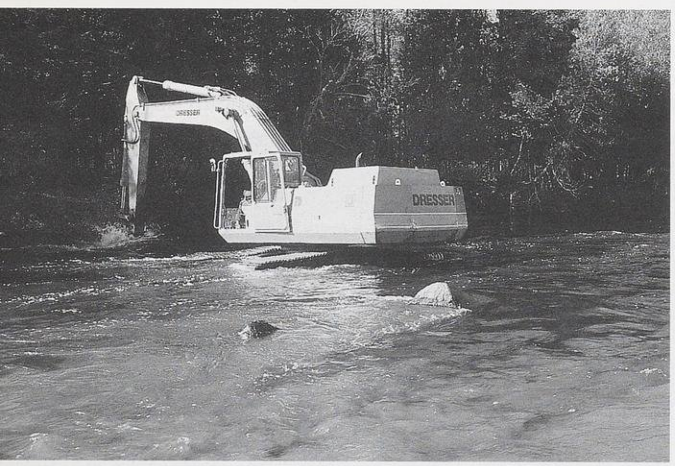
Fishing and floating the Wolf

When you're ready to fish the upper Wolf, contact the ranger station at Langlade for a recorded phone message with information on current water levels: (715) 882-2191. Fisheries staff at the DNR Antigo Service Center can provide further information on the Wolf River fishery: (715) 627-4317. Commercial raft operators, kayak schools and guides, outdoor learning centers, inns, hotels and fly-fishing shops in the area introduce many to the Wolf; visit the Department of Tourism website for details: http://www.travelwisconsin.com.



MAX JOHNSON *(TOP)* PETER SEGERSON

PETER SEGERSON



PETER SEGERSON

All in-stream projects teach lessons.
*(top)*This new artificial island above the former Gardner Dam was seeded with native vegetation right after construction. Otherwise invasive weed seeds from nearby plots could take over.
(below) Downstream sediment traps were a must. Occasionally digging equipment can hit pockets of fine clays that stay suspended and send turbid clouds of silt downstream.

torically, the most degraded areas on the Wolf had been above dams and rapids in the old logging flowages. Logs used to jam upstream of the rapids and dams where sediments piled up. The cleared farm fields provided easy access points to bring in heavy dredging equipment without disturbing the forest by constructing trails and roads.

Another project was completed in 1999. DNR fisheries crews, Endangered Resources staff, Menominee tribal environmental staff and TU were concerned that disturbing sediment in the channel might affect nongame fish species and aquatic insect communities. A state threatened species, the pygmy snake tail dragonfly *(Ophiogomphus howei)*, is found in the upper Wolf River. DNR and tribal environmental teams are monitoring these concerns.

Support for in-stream management work on the Wolf River has come from TU, the Fly Fishermen's Federation, paddle sport enthusiasts and others who recognize that the river's channel was altered by past disturbances. Restoration crews followed best management practices. They were careful to steam-clean excavators used in the water and to regularly check the equipment for oil and fuel leaks. They also built downstream sediment traps where the water slowed. They did the restoration work during late summer after major insect hatches were over and workers promptly seeded and mulched exposed soil areas.

Endangered Resources staff have several concerns about in-stream dredging projects on rivers as large as the Wolf. Most in-stream projects to improve fishing conditions are made on smaller rivers and streams. Northern fisheries crews have done projects on other rivers damaged as a consequence of past logging such as the Oconto, Prairie, Plover, east branch of the Eau Claire, the Bois Brule and the Namekagon. Several DNR programs are collectively examining how shifting river channels change conditions for downstream invertebrates. They are also surveying aquatic populations before and after restoration projects to note changes. These surveys will help assess consequences of creating artificial islands.

Islands provide great angler access to adjacent deeper pools, but other things can happen. In one case, dredging equipment hit a pocket of clay that wasn't adequately contained by downstream sediment traps. In some past dredgings, the new islands vegetated with the invasive plants purple loosestrife and reed canary grass that were well established in the area previously.

It's a learning process. Now islands and current deflectors are quickly seeded with annual rye grasses after they are created. Then the islands are planted with native grasses, sedges and aquatic plants purchased from nurseries within the Wolf River watershed. Wild rice beds have been established in slack water areas.

The constructed islands and deflectors remain stable and intact, even after high water flushes through. The majority of the river flow stays in the shaded west channel. The river is about 3–4° F colder in the deepened channels along the shaded banks.

The improvements to the fishery were dramatic. In May 1995, before the project began, DNR fisheries personnel used electrofishing gear to survey 4,000 feet of the Wolf River (including the 1996 project area). The crew captured 11 brown trout, one brook trout and no smallmouth bass. Three years later, an angler caught four brown trout, one brook trout and 32 smallmouth bass within the project area in just two hours of fishing. Admittedly, that's not a very scientific sample, but the deepened channels have proven to be too deep and the currents too fast to sample with traditional fisheries electrofishing gear. Similar projects on smaller rivers like the Hunting and Prairie rivers resulted in 300–600 percent increases in the number of trout larger than 14 inches. It will take longer-term surveys to gauge lasting changes on vegetation and insect life on the Wolf River, but clearly, improved habitat means improved fishing.

High quality water, proper land use in the watershed, restrictive harvest regulations and stocking are all important factors in fisheries management — but if in-stream habitat isn't there, the trout won't be there either. By fine-tuning the methods we use to provide or maintain habitat one reach at a time, the Upper Wolf River Fishery Area will continue to offer great fishing, solitude, fine boating, and a place to see nongame species and enjoy other outdoor experiences for years to come.

Peter Segerson, a fisheries technician who works on the Wolf River, is based at DNR's Antigo Service Center.

WHEN MARL MEANT MONEY

Budding businesses gambled and lost, mining a little-remembered marsh mineral.

COURTESY OF MAYNARD MCKILLEN

(above) **The Eagle Lime Products marl plant in its heyday.**
(left) **The factory ruins adjoin the Scuppernong Trail.**

Maynard McKillen

Eleven railroad ties bear a pair of rusty rails that bisect a hiking trail. Shallow ditches parallel the trail as it curves southeastward through the Kettle Moraine State Forest. From this raised vista on the old railroad bed, visitors can see the Scuppernong Marsh through a thin line of trees and listen to trilling sandhill cranes and waterfowl. Here too among dogwoods and birches lies a crumbling jumble of concrete walls, testament to a crumbling enterprise.

Almost a century ago, the Eagle Lime Products Company mined marl here. A handful of entrepreneurs invested heavily in equipment, gambling that demand for this nonmetallic mineral would increase while manufacturing and transportation costs would level off or drop. Their venture is a study of human nature, and a visit to their abandoned mining sites, a study of ecological recovery.

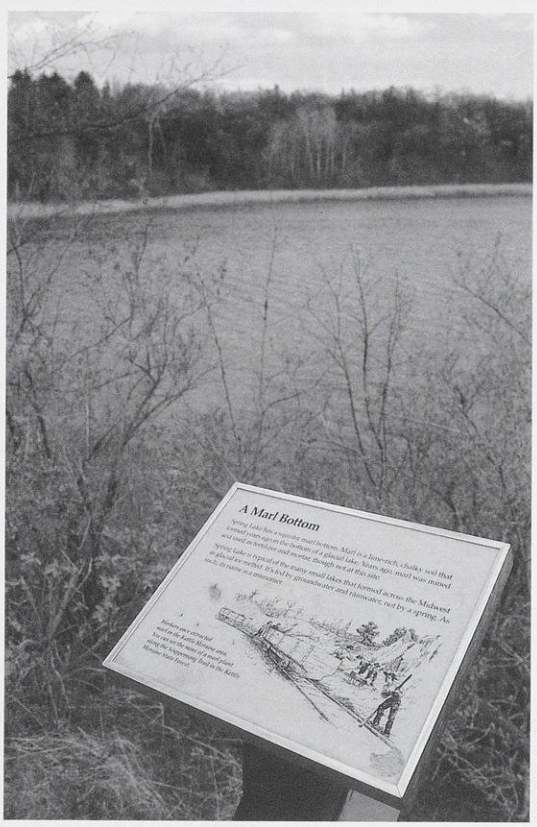
Marl is calcium carbonate and it is certainly one of Wisconsin's lesser-known mineral resources. The squishy, sticky, off-white clay-like mud is often found in marshy areas. It formed thousands of years ago when aquatic plants, particularly chara, extracted calcium carbonate from the lake waters of melting glaciers

MAYNARD MCKILLEN

The sticky, grayish mud deposited along this shore and marshy bottom is marl. The mineral was once mined and used for fertilizer and as a component of cement.

and stored the chemical in its branches. Dead chara sank to the lake bottom, accumulating and decaying over centuries to form a chalky soil. A more familiar substance, peat, also formed from partially decaying vegetation, but that happened much later, geologically speaking. In fact if one digs below peat deposits, one often finds marl.

Generations ago, farmers valued marl as a fertilizer for lime-deficient soils and as a soil conditioner for sandy soils. The lime in marl cements sand grains together so the soil can better retain heat and water. When added to clay soils, marl had the opposite effect: soil particles became less cohesive, allowing more air, heat, water and plant roots to penetrate. Scandinavian farmers, long familiar with these attributes, actively sought out marl deposits when they migrated to Wisconsin. Bricklayers and cement manufacturers sought marl for other reasons. They knew it could be incinerated to form caustic lime, an important component of mortar and Portland cement. The low magnesium content of the marl found at this particular site in southwestern Waukesha County made it ideal for creating firebrick, which was used to line furnaces and build fire-resistant structures. Calcium carbonate was also a common component of paints, lubricants and was a depilatory that leather tanners used to remove hair from animal hides.



MAYNARD MCKILLEN

A sign along the Glacial Drumlin State Bicycle Trail that passes through Dousman notes the marl bottom of Spring Lake.

Surveys suggested this marl deposit was 15 to 21 feet deep, and at 200 acres, vast enough to mine for years. The market for lime was encouraging, so in 1905 the Pereles family, wealthy entrepreneurs with diverse business interests, speculated and funded construction of a 34-foot by 200-foot building to house a kiln, and a 30-foot by 50-foot building to hydrate and package the lime. Construction proceeded quite rapidly, and soon the Eagle Lime Products Company began producing caustic lime for cement, mortar and firebrick, and hydrated lime for fertilizer.

The business was challenging. The marl deposit was remote: a full six miles south of the town of Dousman, in southeastern Wisconsin, near the Scuppernong Springs, a resort then popular with honeymooners. Dousman was large enough to have a railroad depot, so a spur from the Chicago and Northwestern Railroad was built to connect the plant to the town and from there to the markets for lime. The rail line also enabled delivery of construction supplies including the massive kiln, boilers, storage tanks and other marl processing machinery. One piece weighed almost 60 tons and had to be installed before workers could complete a building to house it.

The hiking trail that now leads to the site is the former rail bed, and the two rails left in place are silent relics of this vital link. As you walk among the scattered walls and trestles that still stand, it's hard to imagine that two shifts of 30 men toiled among massive machinery near this quiet marsh. A deafening roar once echoed in these walls: Tramcars clattered and squealed as they dumped raw marl into a hopper that fed the Allis-Chalmers kiln, a 120-foot-long, 8-foot-diameter monster, built on an incline and continuously revolving. The kiln incinerated the marl, creating quick lime. Broad 150-foot-long conveyors carried the lime from the kiln, cooling it on the way to a 35-ton storage tank. Some quick lime was then packaged for cement and mortar, while some was conveyed to the smaller building to be hydrated for use as fertilizer. The clamor in these buildings lasted for two-thirds of every workday.

If you look west into the marsh, you

MAYNARD MCKILLEN

The factory only operated for six years. The costs of fueling kilns and transporting marl to market proved uneconomical.

MAYNARD MCKILLEN

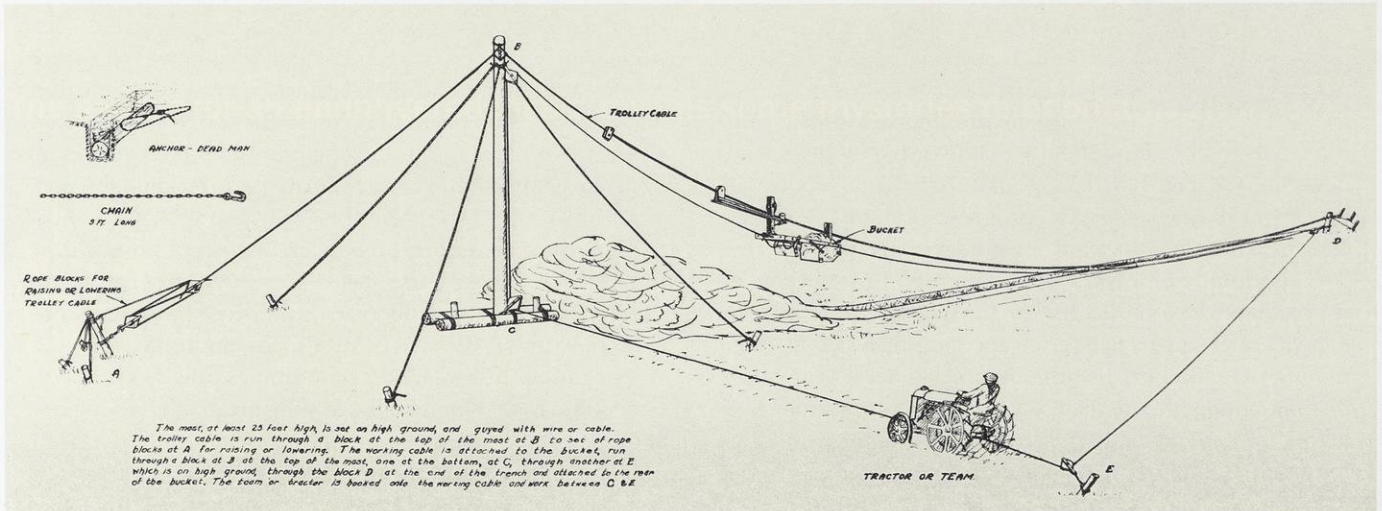
Part of the remnant bed from a six-mile railroad spur from the marl plant into Dousman now forms a hiking trail through the Kettle Moraine State Forest.

can still see a long causeway where a steam shovel carved a 1,000-foot-long trench scooping tons of marl into tramcars bound for the kiln. At a rusted culvert in this ditch, shallow water slowly drifts downstream still carrying long, cloudy white ribbons of sediment from the pale patches of exposed marl.

A strange oversight doomed the company. While the process of incinerating, cooling and packaging the lime was simple, the large-scale machinery needed to make the business economical required large amounts of fuel. Scattered hardwood trees in the vicinity quickly fell to the axe, followed by less useful softwoods. Scouts discovered a thin vein of "coal" north of the marsh, near Ottawa Lake. It was probably a peat deposit. There are no coal deposits in Wisconsin. Company officials also discovered that the regional farmers preferred to haul marl themselves from local sources, and the firm's competitors in the quick lime business routinely ran even larger scale operations.

After only six years of actual lime production (1908 to 1914), mining and processing operations ceased. A Chicago and Northwestern crew removed the six-mile long spur to Dousman in 1917, and in 1918 the Wisconsin Secretary of State dissolved the company. The plant sat vacant for decades until the machinery was dismantled and shipped to a

Marl mining used simple equipment in the early 1900s. Heavy scoop buckets were dragged via pulleys and cables tethered to a guyed mast through the soft muddy deposits. Tractors or teams of draft animals powered the simple dredge.

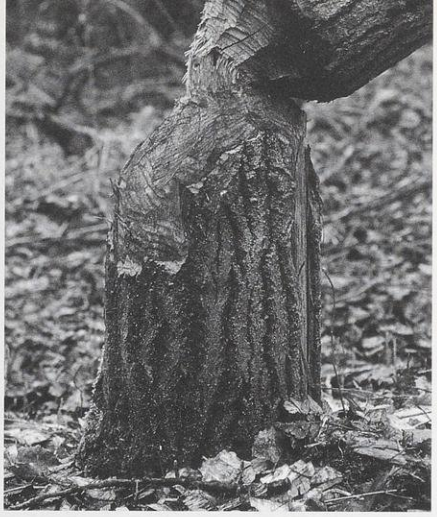


MICHIGAN STATE UNIVERSITY BULLETIN

mine in Mexico in 1942.

Other marl factories in Wisconsin met a similar fate. Farmers found uses for the raw product and could collect their own marl in many areas of Wisconsin. Marl deposits were recorded in 39 Wisconsin counties. Parts of eastern and central Wisconsin as well as the region between Madison, Fond du Lac and Racine had many marl deposits.

Limestone is another excellent source of calcium carbonate, but the grades found in Wisconsin can't be used to make cement. Even so, importing limestone to cement plants in Wisconsin proved more economical than processing marl. Extracted marl contained 50–60 percent water and it simply took a lot of fuel to dry out and concentrate the usable product. Furthermore, many of the marl deposits could not be mined from late November through March when the marshy soils froze solid. The marl that was harvested in winter was hard to handle.



MAYNARD MCKILLEN

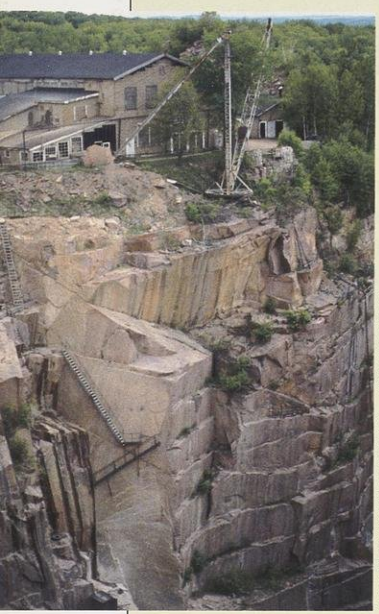
These days, beaver work is the only sign of industrious behavior near the abandoned factory.

Today, the marl factory ruins are a stopover for hikers on their way to the Scuppernong artesian springs. They are but one of the interesting trailside diversions. Observant visitors can also see fallen trees gnawed by beavers that occupied Scuppernong Marsh for centuries and share their own colorful history.

As you continue on your walk to the springs, keep an eye on the old pieces of the concrete marl works jutting out from the underbrush, tombstones to a dying enterprise that eventually petered out and now merges again into the soil from whence it came.

Maynard McKillen writes from Milwaukee. He drew from research by historian Robert Duerwachter and was assisted by DNR Naturalist Ron Kurowski in preparing this article.

Planning a future for mine sites



OPERATING GRANITE QUARRY. ROBERT QUEEN

Thousands of abandoned pits abound in Wisconsin where a variety of nonmetallic minerals like marl, soil, sand and gravel was extracted. Each year, an estimated 2,500 active mine sites continue to provide over $400 million worth of materials for construction, roadbuilding and maintenance, agriculture and other purposes. Some are privately owned, others are operated by local government.

Abandoned sites typically are unstable, pose safety hazards, environmental threats and are eyesores. Some are open pits that pose physical hazards; others provide open conduits connecting the surface to groundwater.

To ensure that those who mine these sites will reclaim them when their useful life ends, a new rule, Chapter NR 135, sets standards and responsibilities for reclaiming active and proposed nonmetallic mining sites. The new law does not cover abandoned sites.

This Nonmetallic Mining Reclamation Rule became effective statewide on Dec. 1, 2000. It requires county and municipal governments to oversee and administer nonmetallic mining sites recovery by adopting reclamation ordinances, posting bonds for site recovery, and inspecting mine sites before they are officially closed. The program is mandatory for counties and voluntary for municipalities. By law, each county had to have a reclamation ordinance in place by June 1, 2001. The Department of Natural Resources is charged with auditing each county's program and ensuring that these ordinances meet state standards for:

- safeguarding waters
- minimizing the mined areas and minimizing soil erosion
- preventing erosion and sedimentation
- encouraging plans to quickly reclaim mine sites
- ensuring that adequate topsoil is salvaged and stored to reclaim the site

The rules give counties flexibility to consider a wide range of economical approaches for meeting the state standards. By August 1st of this year, all those currently operating nonmetallic mines can apply for an automatic permit, but reclamation planning must be under way. By Sept. 1, 2001, all operators who wish to begin or to continue nonmetallic mining must have a reclamation permit for each mine site. Mine operators must also post bonds to assure money will be available to reclaim a mine site before it even opens. This permit serves as the tool to ensure that plans are in place to minimize environmental concerns as each site is mined and closed. Further, the reclamation program must collect sufficient fees to cover all costs.

The rule also requires that each deposit of nonmetallic minerals be formally registered to reserve sites for future use, incorporate these deposits in land use plans and consider how these sites will be used once mining ceases.

For further information, communities can contact members of the DNR Nonmetallic Mining Team at DNR regional offices.

— Tom Portle, DNR mining reclamation specialist

Today I saw the dragonfly
Come from the wells where he did lie.
An inner impulse rent the veil
Of his old husk; from head to tail
Came out clear plates of sapphire mail.
He dried his wings; like gauze they grew;
Through crofts and pastures wet with dew
A living flash of light he flew.

— "The Two Voices," Alfred, Lord Tennyson, 1833

Emerald-eyed dragons

The search for an endangered insect reveals some mysteries of odonatology.

Julie Hein-Frank

Meet Number Six, *Somatochlora hineana*, a male Hine's emerald dragonfly. He has a wingspan of 3.5 inches and like many other members of the *Somatochlora* genus, has brilliant bright green eyes. But there is one key difference — this *Somatochlora* is federally endangered, and the largest population in the world is in Door County. Within a 36-mile stretch of the county there are eight sites where Hine's are believed to be breeding. Adults have been found in a few other areas. All sites are less than four miles from Lake Michigan.

Recently I joined a group of respected odonatologists (dragonfly biologists), naturalists, state and federal employees and zoning administrators for an intensive Hine's emerald dragonfly workshop in Door County. Everyone in attendance needed to know what these winged creatures look like, their habits and habitat, and how to identify similar *Somatochlora* species to prevent mix-ups. The workshop hosts familiarized

us with these amazing creatures and shared details on the exciting research being done on dragonflies in the area. I'd like to share some of what I learned from our lectures and field days.

Into the field

Like all other dragonflies and damselflies, the Hine's goes through incomplete metamorphosis, meaning it passes through only three stages of development — egg, larva and adult. The egg is laid in mid- to late summer and remains in that stage throughout the winter. The larva hatches in spring and emerges in June–July. The larval stage can last three to four years. Sedge meadows and spring-fed marshes are the larva's preferred breeding habitat — and that's where the problem lies. Swampy, wet areas are often filled in or dredged up, destroying vital habitat for Hine's larvae.

After three to four years and up to nineteen molts, the larva sheds its skin one last time (that skin you sometimes find on rocks and sedges is called the exuvia and is a great indicator of populations) and flies off as a newly emerged adult. The adults will live one to two months and their flight season in Wisconsin runs mid-June through August. In that time they will mate, lay eggs and eat mosquitoes, biting flies and gnats, to name a few.

With that brief review of dragonfly biology under our belts, we head to the Ridges Sanctuary in Baileys Harbor for some fieldwork. Many in the group have nets and are experienced in the swooshing technique for capturing dragonflies in flight. Nevertheless, designated, experienced netters with permits are assigned to each group. Me? I've never seen an endangered animal. Will I get to hold it? Is that legal?

The leader of my group, Dr. Dan Soluk of the Illinois Natural History

PAUL BURTON/RIDGES SANCTUARY

JULIE HEIN-FRANK

JULIE HEIN-FRANK

(top) **An older female Hine's emerald dragonfly. The adults only live 1–2 months. The world's largest population inhabits a small area of Door County.**
(middle) **Biologists convened in a Door County workshop to study the rare insect's larval and adult stages.**
(bottom) **Researchers carefully mark each captured Hine's with tags and glues designed for bee research.**

Survey, answers my question during his explanation of the day's events: "You may try to net a Hine's but you cannot remove it from the net. My researchers will do all the handling and tagging." There's mumbling from the crowd of professionals; some seem insulted as if their credibility has been questioned. Soluk continues, "This research as you know is very important to the success of this species, and my permit only allows me to kill 25 in total."

He means that throughout all their research his team can only lose 25 dragonflies; once that number is reached the research stops. He is not killing the insects intentionally, of course, but accidents happen. Sloppy net work can decapitate and de-wing dragonflies and butterflies. I suddenly prefer to set my net aside and watch others do the swinging. I do not want to become a member of the Twenty-Five Club.

In groups of ten or so, we search the sanctuary's swales and paths. Suddenly every subtle movement becomes larger than life; senses are heightened when you are on the lookout. Butterflies become dragonflies, flies become dragonflies. "One's coming your way!" someone shouts down the path. "We missed him, we think it's a Hine's."

The dragonfly cruises up and over my head, but I have time enough to enjoy its passing. "Coming your way!" I shout to the crew ahead of me. What an amazing experience, a group of biologists enjoying a beautiful day, exchanging information and stories, strolling along chasing dragonflies! My thoughts are interrupted by the hum of a net through the air and a triumphant "I got one, Susan, get ready!" Susan is one of the researchers working in the county for the summer. She gently removes the dragonfly from the net, identifies it as male, and determines whether or not it is a Hine's.

This is where it gets fascinating.

With dragonflies, especially those of the *Somatochlora* genus, distinguishing characteristics can be as subtle as a tri-

JULIE HEIN-FRANK

(left) **The Hine's larvae take refuge in crayfish burrows when shallow meadows dry up in late August. Some of the aquatic insects may be eaten but others survive so the endangered species survives.**
(below) **Workshop participants muck around in wet sedges looking under reeds, rocks and stumps for larvae.**

JULIE HEIN-FRANK

angular vein pattern in the wings or the clasper position of the male's terminal appendage. To make matters more interesting, there's a dragonfly that looks a lot like the Hine's. It's called *Somatochlora williamsoni* and is found (but not in abundance) in Door County. Of course Susan and many others in the group can make a positive ID rather quickly without too much study of the specimen. "This is a Hine's," she says.

We all crowd around. "Look at those eyes!" "Now *that* is emerald green!" Susan asks one of us to write down various data, the time of day, what the dragonfly was doing and where it was caught. She gets out her tagging instruments. With an adhesive made only in Germany that's mostly used for marking honeybees, she dots the glue onto the left side of the thorax behind the eye, then carefully places a tiny round bead into the glue. Each bead is numbered, and will help researchers track the insects, discover patterns, reveal possible new sites of habitation and perhaps provide new information on the adults' life span.

The tagging process ends in less than a minute. Number Six is released but decides to sit on Susan's finger a bit longer, possibly wondering what just happened, maybe even enjoying the new look. After realizing he is being watched, he flies off down the trail. Our eyes follow until we see him no more.

Searching for the second stage

The next day we focus on the larvae. Our nets are replaced with rubber boots. We drive to prime Hine's habitat: wet, shallow, cool sedge meadows. Thunderstorms are off in the distance. We walk until we are surrounded by the light yellow-green of sedges, the dark smooth green of bull rush and the airy dots of pure white marsh bellflower. My feet are getting sucked into the muck. I hear that familiar slurping sound one hears before losing a boot or sandal to the bog. A gentle rain begins. No one goes rushing to cars. We are looking for exuviae.

Insect exuviae can be found many times during the year. Cicada skins can be found in bark, high up on tree trunks. Mayfly skins can be found anywhere, even on clothesline posts. A dragonfly larva is a bit different. It is an aquatic insect, and often does not travel too far from water to molt, maybe a few feet up a reed or onto a rock or old stump. We search and search. I find a few exuviae on reeds but none is a Hine's.

Dr. Soluk has discovered the Hine's larva has a curious relationship with another creature of the wet meadow, the crayfish. The life span of the larva can be as long as four years, and many shallow meadows dry right up around the end of August. When that happens, the larvae seek refuge in the moist burrows of crayfish. Why the crayfish don't eat all the larvae is a mystery, but enough larvae hide out safely until the wet season returns.

To find a crayfish burrow and remove a larva without destroying its (and the crayfish's) refuge, we stick our fingers in the water and feel around for a burrow. Sometimes the crayfish let us know we've made contact by extending a "handshake." Ouch! Then we pump out the contents of the burrow and begin the painstaking job of sifting through the muck, counting larva that can be placed in four size classes from tiny to large. We place everything back into the burrow as carefully as possible, hoping to avoid a parting pinch from the crayfish.

What's ahead for the Hine's?

The Hine's emerald dragonfly was listed as a federally endangered species in January 1995. It is known to persist in three populations in Illinois, Wisconsin and Michigan. The Illinois population is the most genetically diverse and the Wisconsin population is the largest and presumably most secure. Information on the status of the Michigan population is limited due to its recent discovery. Historically known in Ohio and Indiana, the Hine's is thought to have been extirpated from these states. It has recently been found in a Missouri fen as well.

The Draft Recovery Plan prepared by the U.S. Fish and Wildlife Service hopes to restore the Hine's emerald dragonfly to six viable populations, each composed of at least three subpopulations of 500 reproductive adults.

It won't be easy. The species occupies marshes and sedge meadows fed by calcareous groundwater seepage and underlain with dolomite bedrock — rare habitat becoming even scarcer as more acres are lost to agriculture, development and quarrying.

A first step in protecting the Hine's is to learn more about its precious habitat. So build a visit to dragonfly haunts into your next Door County visit. Take a walk along the Mink River. Stroll through the Ridges Sanctuary. Hike by Mud Lake. You may be rewarded with a glimpse of bright emerald eyes and a display of aerial agility and beauty on amber wings.

Julie Hein-Frank is a DNR naturalist at Newport State Park in Door County and the C.D. Besadny Fisheries Facility in Kewaunee.

Learn more about dragonflies

For a copy of the Hine's Emerald Dragonfly Draft Recovery Plan, contact the U.S. Fish and Wildlife Service, Fort Snelling, Minn. (612) 713-5337.

Visit the following websites:

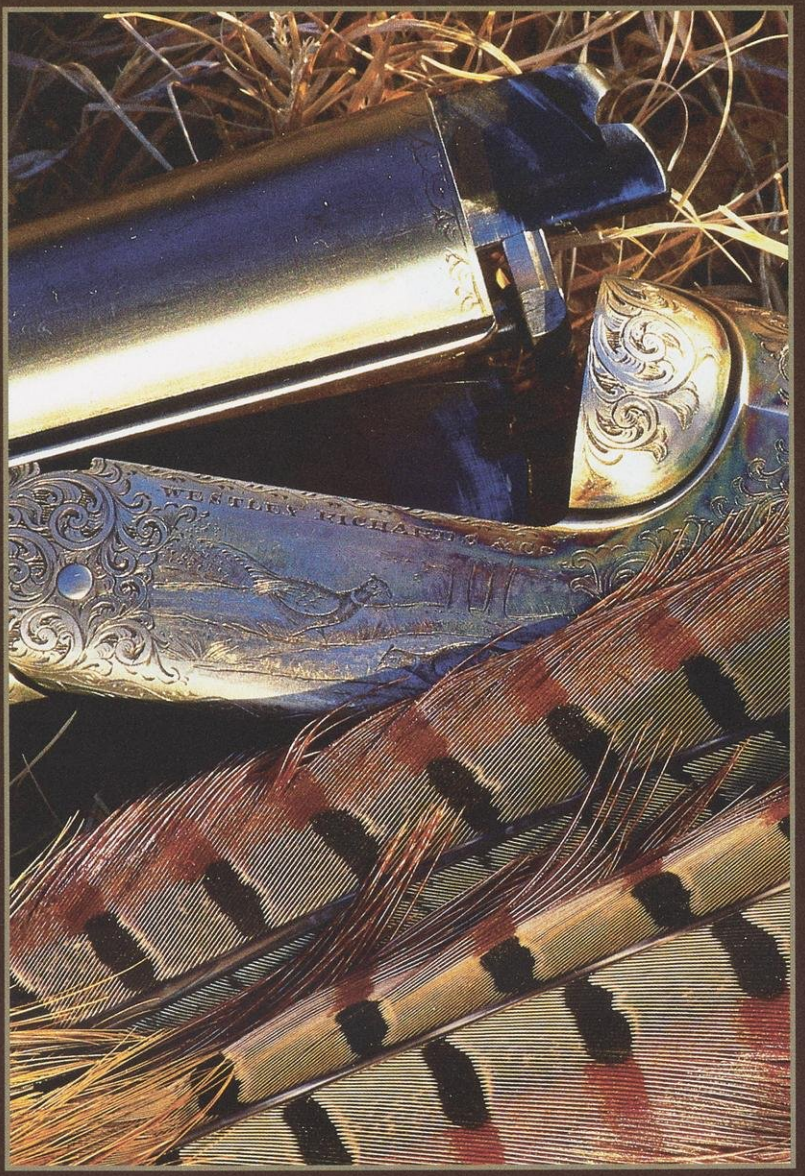
Odonatology Pages
http://members.bellatlantic.net/~dbarber/odonatology.html

International Odonata Research Institute
www.afn.org/~iori/

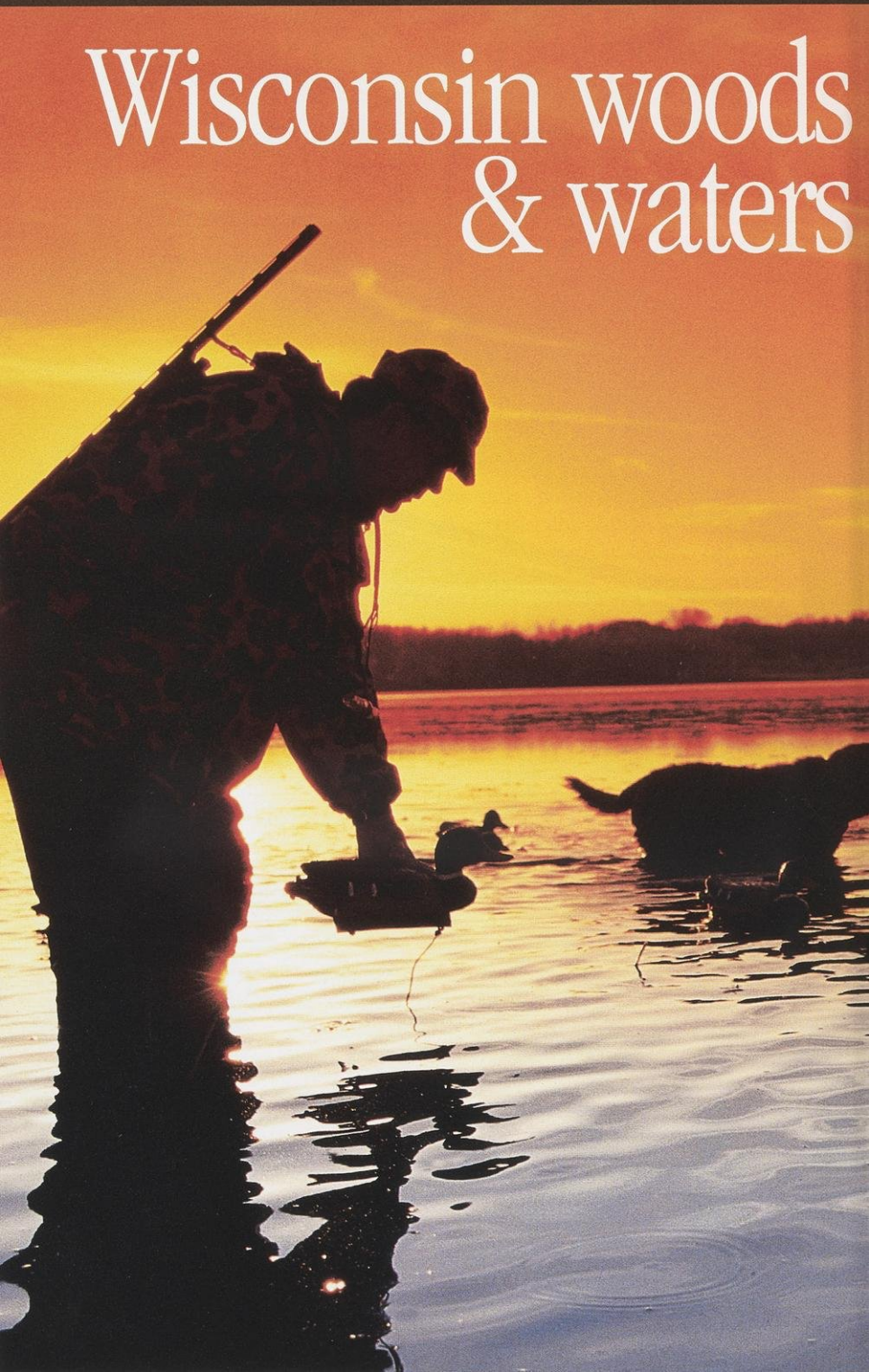
Dragonfly Society of the Americas
www.afn.org/~iori/dsaintro.html

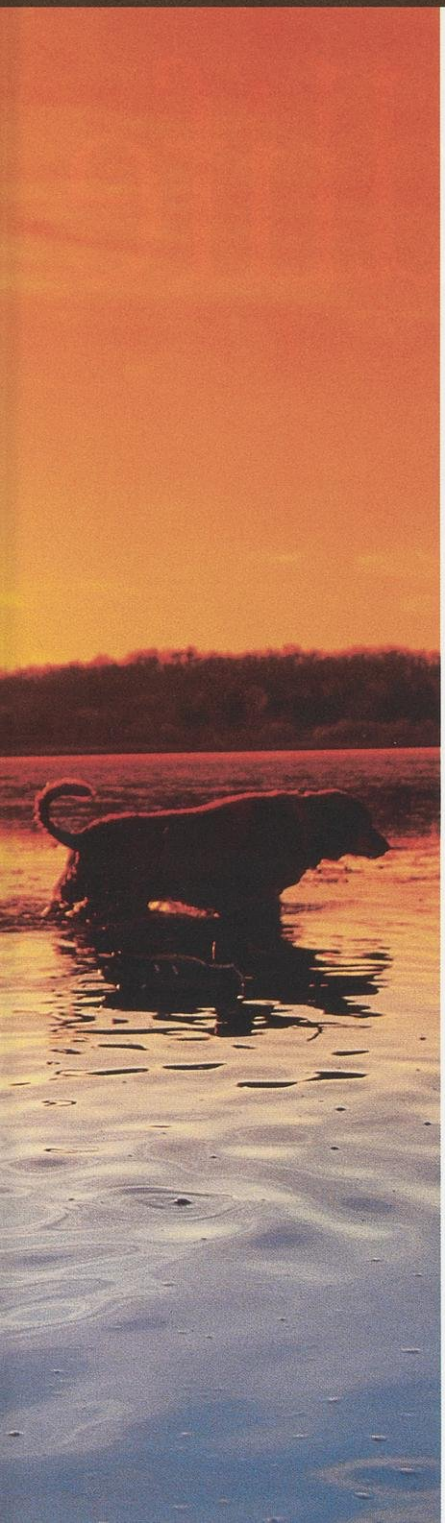
Door County sites
www.hinesdragonfly.org/
www.hinesemeraldgallery.org/

Hunt & Fish Wisconsin



Wisconsin woods & waters





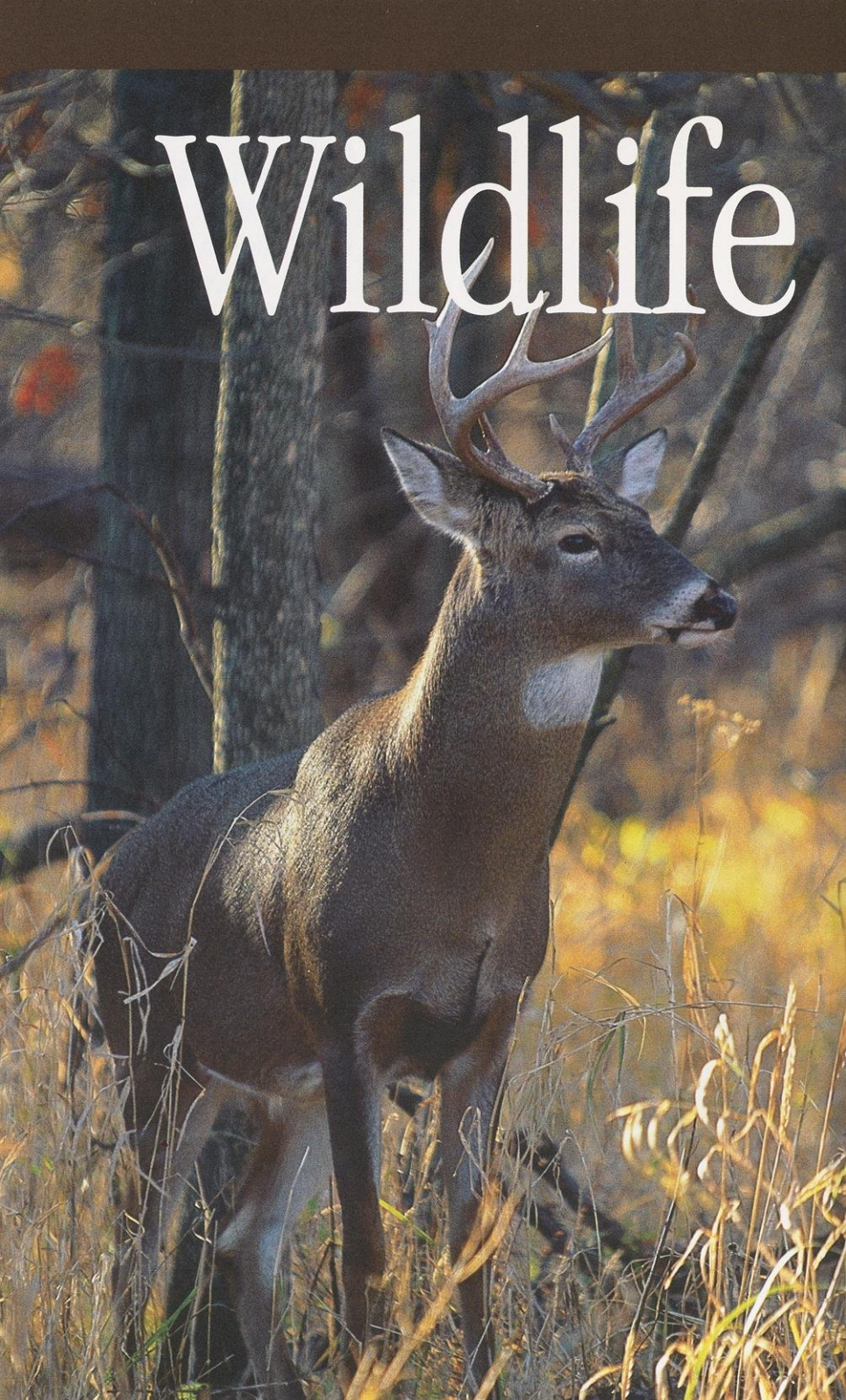
DOUG STAMM

Wisconsin - the very name stirs images of white-tails in the sundown shadows of a wood line; of a coldwater trout stream rushing through green field and meadow; of an October dawn on a Mississippi slough teeming with ducks; of a fighting "smalley" bending rod tip and line in an anxious arch to the waterline.

Wisconsin is a place that delights in the outdoors; a place made for hunters and anglers. With 15,000 inland lakes and more than 5 million acres of public hunting land, Wisconsin is a sportsman's paradise. Close your eyes and picture limestone bluffs, boreal forests, pothole lakes, prairie grasslands, whitewater rivers, marsh, oak savanna and Great Lakes - all are part of a glacial-born legacy that has blessed Wisconsin with an abundance of both woods and water.

These spectacular natural resources, coupled with a careful balance between recreational use and conservation, have made Wisconsin a national leader in wildlife and fisheries management.

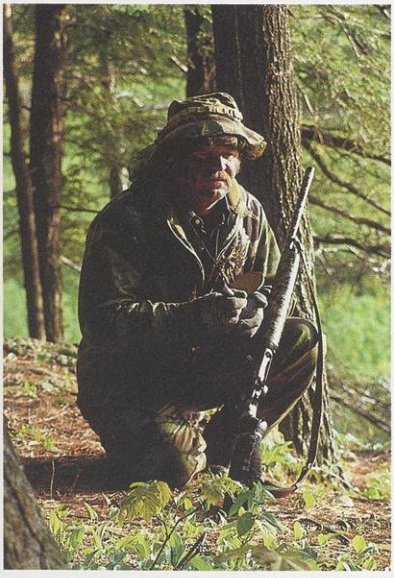
In all the world, you'll find no better place to hunt and fish than Wisconsin.


Wildlife

Three natural frontiers of the North American landscape merge in Wisconsin: the boreal forest extends from the north, the great hardwood forest advances from the east, and dry grasslands sweep in from the west. This mix of forest, grassland, prairie, wetland, lake and barren, coulee and farmland provides habitat for a wide variety of wildlife.


DOUG STAMM

Modern management techniques and a commitment to environmental protection, coupled with the continuing support of Wisconsin hunters, have produced a period of abundant wildlife. Atop this remarkable success have come initiatives to reintroduce once-native species and to jump-start populations in decline. The efforts of Wisconsin sportsmen and the Wisconsin Department of Natural Resources have done much to develop and maintain quality populations of birds and animals for hunting. At the same time, their efforts have enhanced the natural world in which we all live.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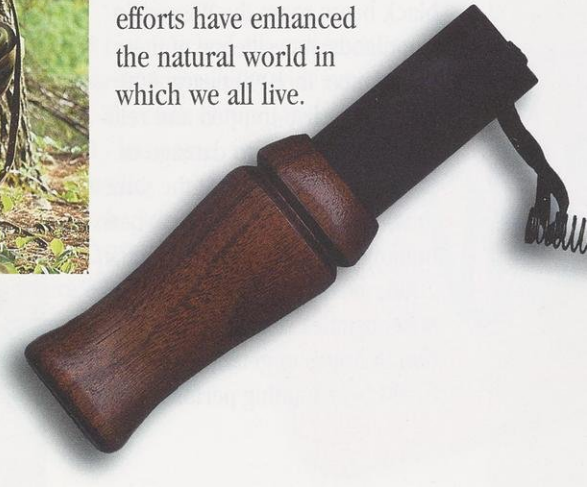
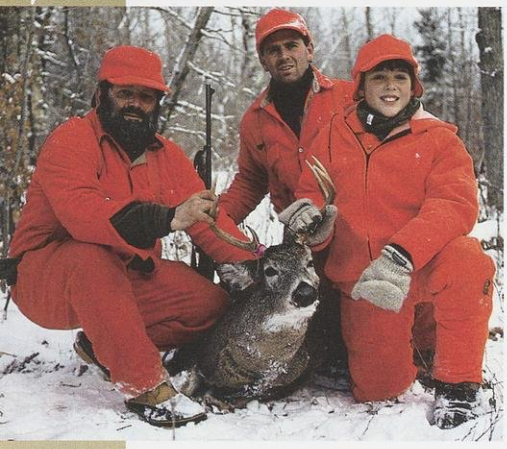


White-tailed Deer

In the fall of 2000, Wisconsin's white-tailed deer herd reached 1.7 million animals - an all time high. During the ensuing 2000 gun hunt, 695,000 hunters harvested 529,000 deer; 172,000 antlered and 357,000 antlerless. The 2000 archery season licensed an additional 258,000 hunters who harvested 87,000 deer; 41,000 antlered and 46,000 antlerless. The 2000 hunt was the most successful ever with an impressive 76% of gun hunters and 34% of bow hunters taking a deer.



ANDY KRAUSHAAR

There is no doubt that these magnificent animals provide a wonderful resource to watch or hunt. Even so, resource managers agree that a herd of 1.7 million is not sustainable and is likely harmful to our land resources. The deer seasons for 2001 and beyond will be designed to reduce the herd to a more healthy level of 1.1 million. Consequently, Wisconsin deer hunters will enjoy longer seasons and bonus limits for many years to come.

Black Bear

Black bear populations are thriving and spreading across the Wisconsin landscape. Nearly 13,750 black bears roam the Wisconsin woodlands. As evidence of their abundance, in 1999 nearly 500 bears were live-trapped and relocated in response to damage or nuisance complaints. At the same time, the popularity of black bear hunting has never been higher. In 2000, more than 51,000 Wisconsinites submitted an application in hopes of getting one of 6,500 bear hunting permits.

JIM CHURCHILL

Wild Turkey

Once native to Wisconsin, wild turkeys were hunted to extinction here in 1881. But today, they are again delighting wildlife enthusiasts all over the state.

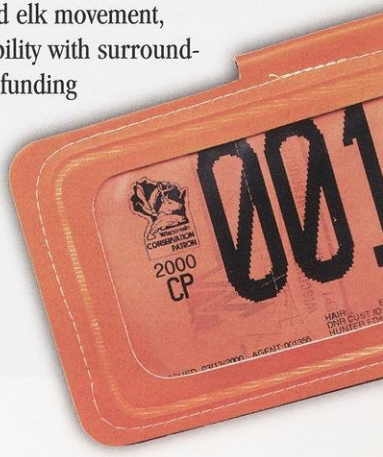
This remarkable restoration story began in 1974 when 334 birds were transplanted from Missouri to southwestern Wisconsin. The birds thrived in Wisconsin's "coulee country" – a sparsely populated area of steep ridgelines and deep valleys, woodlot and farmland. As the turkey population grew, DNR staff trapped and relocated turkeys to 49 of Wisconsin's 72 counties. The current statewide population is estimated at more than 320,000 birds. In the spring hunt of 2000, permits were issued to 117,000 hunters who matched wits with the gobblers. A whopping 33% were successful. In the fall hunt, 63,000 hunters took to the field with a success ratio of 18%.

DOUG STAMM

Elk

Extirpated in 1866, elk were twice reintroduced unsuccessfully in 1913 and 1928-32. Following extensive study and public discussion, 25 elk from Michigan were again reintroduced in 1995. They have established a home range on 315 square miles of the Chequamegon National Forest; a mix of forest rangeland, grasses, wildlife openings and aspen clearcuts ideally suited to elk. Perhaps the third time is indeed the charm as the herd is expected to reach 100 animals after the spring 2001 calving.

For the last five years, researchers have tracked elk movement, recorded herd reproduction and assessed compatibility with surrounding resources and human populations. The bulk of funding for this important research - $480,000 - has come from more than 4,000 Rocky Mountain Elk Foundation members in 19 Wisconsin chapters. State grants since 1993 also provide $25,000 annually to continue assessing where elk may thrive, how they interact with communities as the herd spreads and what management strategies may again include elk in the widespread mix of native Wisconsin species.



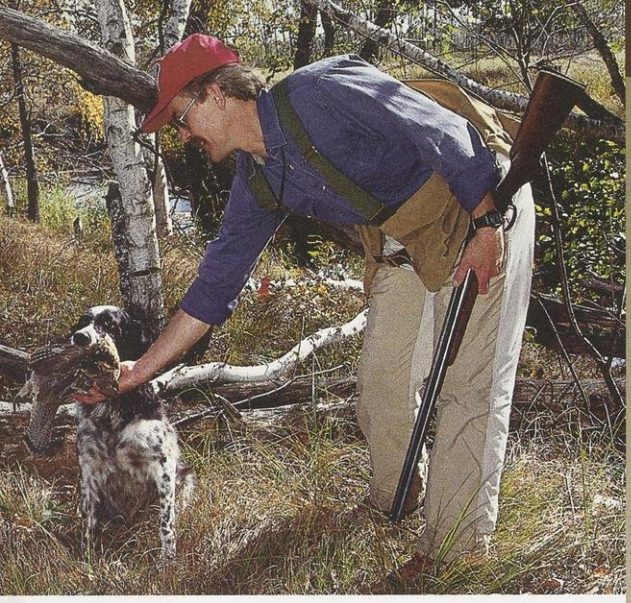
Waterfowl

Wetland habitat protection in Wisconsin is a state, regional and national success story. In 1991 the DNR coordinated an effort to involve other Midwestern states in forming the Upper Mississippi River and Great Lakes Region-Joint Venture of the North American Waterfowl Management Plan. This partnership with other agencies, private organizations, and corporations pooled resources to protect and restore wetland and grassland habitat in each state. The resulting improved habitat can now sustain strong waterfowl populations during years with average weather and growing conditions.

The goal in Wisconsin is to protect and restore an additional 400,000 acres of wetland and grassland habitat between 1991 and 2005. This should increase our breeding duck populations by an additional 200,000 ducks each spring. By 1999, we had attained just over half of the habitat objective – 206,000 acres. Spring breeding waterfowl responded to this additional habitat with an increase of approximately 85,000 ducks (43 percent of the goal). In 1999, hunters harvested 386,000 ducks – an average year.

2000 continued the upward population trend. Spring waterfowl surveys showed duck numbers, including mallards, up again. Surveys of the Mississippi Valley population of Canada geese in northern Ontario remained stable in 2000, while local nesting populations increased. Wisconsin's Horicon Marsh, 32,000 acres of prime wetland habitat, continues to harbor enormous numbers of geese and ducks on their spring and fall migrations.

DOUG STAMM



DOUG STAMM

Upland Game Birds

For centuries, Wisconsin has maintained huntable populations of upland game birds. A day afield with a favorite shotgun and a working dog is a joy in itself. Successful hunts are a tradition here with seasons for Ruffed and Sharp-tailed grouse, Bobwhite quail, pheasant, woodcock and Hungarian partridge. Seasons and bag limits vary with year-to-year population estimates, but generally limits are liberal (3-5 birds) and seasons are long (three weeks to four months).

Small Mammals

A variety of small mammals, native to Wisconsin, can be hunted. Gray and Fox squirrel, and Cottontail rabbit have fall through early winter seasons. The Jackrabbit season is shorter – one month in early autumn. Bobcat can be hunted by permit in late fall and early winter. Red and Gray fox and raccoon can be hunted with unlimited bag and possession restrictions in late fall and early winter, while Snowshoe hare and coyote have year-round seasons.

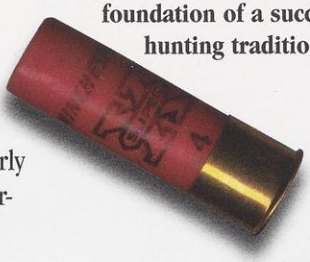
Hunting Safety Program

Thirty-four years ago, in response to a rising number of hunting accidents, the Wisconsin DNR began to offer hunting safety classes. In 1985 the safety program was made mandatory for all Wisconsin hunters born on or after January 1, 1973.

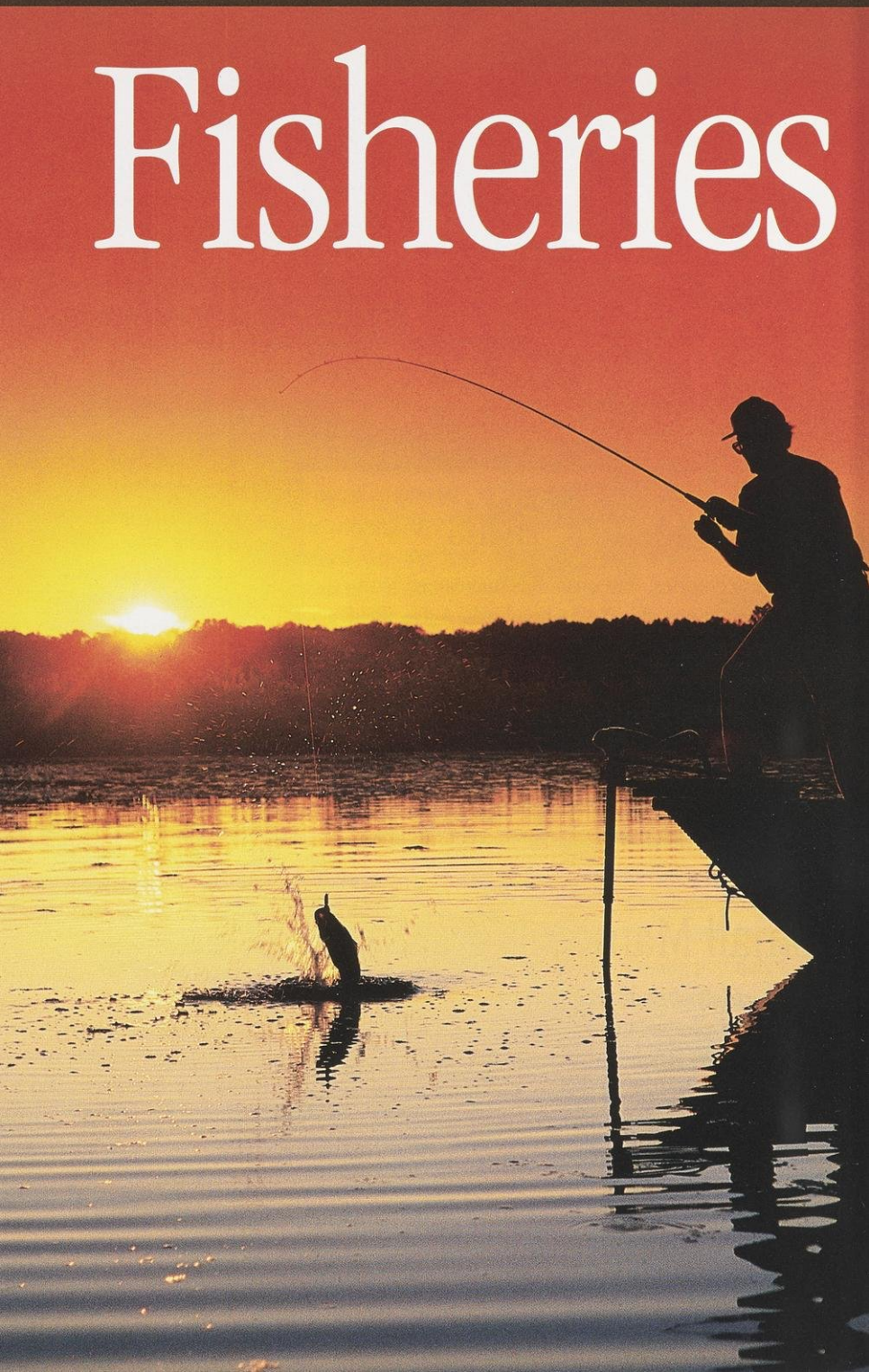
Today, out-of-state hunters are also required to complete a hunter safety program; they must present safety certification the first time they apply for a Wisconsin hunting license.

The Hunting Safety Program is taught by a corps of 4,000 volunteer instructors. DNR conservation wardens administer the program and provide the curriculum. Since 1967 the program has been dramatically successful, reducing accidents by nearly 70% and fatalities by 85%.

In Wisconsin, safety education has become the foundation of a successful hunting tradition.



Fisheries



Wise old anglers will tell you that fishing is a state of mind; a chance to get away and relax amid the simple pleasures of boat and water, and something tugging on the end of your line.

There's no better place to do that than Wisconsin.


DON ABRAMS

Wisconsin is a freshwater fishing paradise. Truth be told, we've got water comin' out of our ears. Just how much water is there in Wisconsin? We count 15,057 inland lakes – nearly a million acres of water inside the state's borders. Wisconsin also boasts 2,444 trout streams – end-to-end they stretch 9,235 miles – and another 5,002 warm water streams extending 17,732 miles. Their total mileage would more than circle the globe at the equator. Add 238 miles along the banks of the Mississippi River and 860 miles of Great Lakes shoreline along Lake Michigan and Lake Superior.

We have fish too. Each year nearly two million people fish in Wisconsin. They catch about 72 million fish of various species.

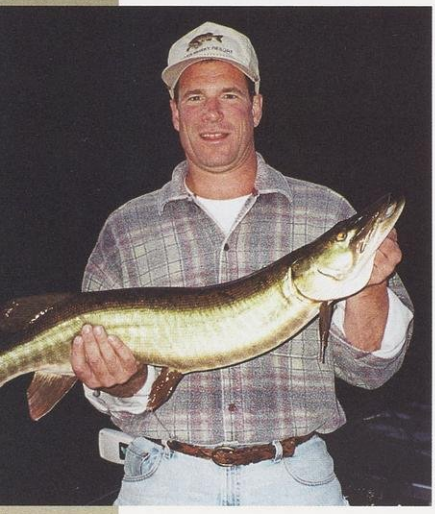
Research tells us that good habitat is the key to healthy, sustainable fish populations. To bolster natural reproduction, fourteen state-owned hatcheries produce more than 11 million fingerlings each year including 7 million trout and salmon, 150,000 muskellunge, 3.5 million walleye, 550,000 bass, and 60,000 northern pike.

Additionally, Native American fish hatcheries operated by Wisconsin's six Ojibwe bands raise and release millions of fry each year. These fish stock reservation and non-reservation waters throughout northern Wisconsin with walleye, muskie, trout and bass.

Inland Lakes

Wisconsin divides into four inland lake regions: Northern Lakes & Forests, North Central Hardwood Forests, Southeast Wisconsin Plains, and the Southwestern Driftless Area.

Northern Lakes & Forests: One of the nation's largest concentrations of natural lakes is found in the northern third of Wisconsin. The ecoregion contains 10,979 lakes covering 466,129 acres of water. Most of the land remains as forest and woodland; its pristine beauty makes it a popular area for tourists and anglers. Some of the state's clearest lakes nestle in these forests.



JEFF SPEROS

The incredible diversity of lakes and their fisheries allow anglers the widest lake selection possible - from a small wilderness lake to the sprawling acres of the Chippewa Flowage. The northern lakes support walleye, muskellunge, northern pike, smallmouth bass, largemouth bass, sturgeon, panfish, lake trout, cisco, whitefish and stocked stream trout. Most lakes and impoundments more than 200 acres in size host self-sustaining walleye populations.

North Central Hardwood Forests: Clusters of shallow lakes and impoundments set in a wide, sandy plain characterize the North Central Hardwood Forests. The ecoregion contains 2,960 lakes covering 211,553 acres of water.

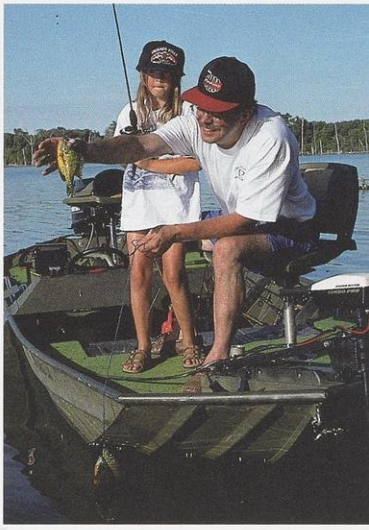
Although similar in many respects to the Northern Lakes & Forests, this ecoregion is markedly different due to the diversity of agricultural use. Increased lake fertility allows these waters to support more adult gamefish and panfish per acre. Substantial plant growth provides excellent fish habitat. Warm water temperature and an abundance of food typically result in higher fish growth rates.

DOUG STAMM

Lakes in this region support a wide variety of fish species including walleye, northern pike, muskellunge, largemouth and smallmouth bass, and panfish. They also include less sought-after fish like bullhead and carp.

Southeast Wisconsin Plains: Rich, organic soil well-suited for agriculture marks the Southeast Wisconsin Plains. The ecoregion contains 844 lakes covering 560,529 acres of water. Lakes here range from shallow, expansive impoundments to deep, natural, glacial lakes. There is a concentration of older, nutrient-rich lakes that support substantial amounts of aquatic vegetation and an abundance of fish. A longer, warmer growing season also enhances the size and abundance of fish.

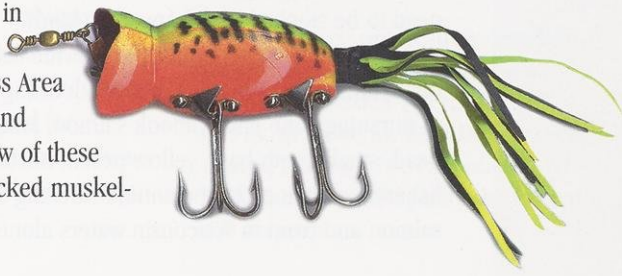
With plenty of vegetation, these lakes naturally support large numbers and pounds of bluegill, crappie, yellow perch, largemouth bass, catfish, carp, bullhead, and northern pike. Walleye are stocked in many of the region's lakes.


DOUG STAMM

The region includes Wisconsin's largest lake – Lake Winnebago at 137,708 acres. The Lake Winnebago System is recognized as one of the nation's most productive walleye waters. The lake also offers perch, whitebass and sauger fishing as well as a unique sturgeon fishery.

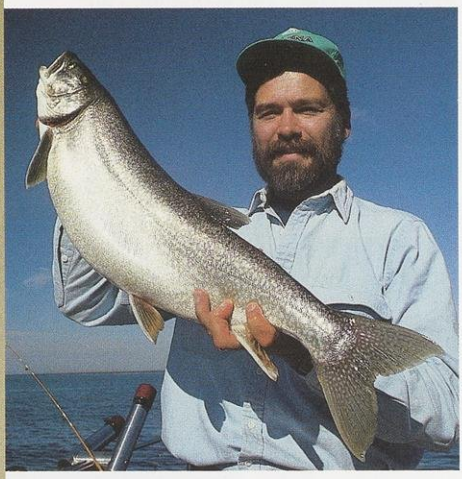
The Southwestern Driftless Area: The southwestern corner of Wisconsin includes that portion of the state not covered by glacial ice 12,000 years ago. The ecoregion contains 345 lakes covering 36,005 acres of water. Many of the lakes are impoundments created by the damming of rivers and streams. There are few wetlands and natural lakes; most are found near and around the floodplains of the Wisconsin and Mississippi Rivers.

Lakes in the region have moderate to excessive amounts of nutrients. The fertility level of most of these lakes promotes above average growth rates. Fish communities also tend to be varied, with a greater number of species here than in the northern region. The impoundments of the Driftless Area offer good bluegill, crappie and largemouth bass fishing. A few of these impoundments also offer stocked muskellunge and walleye.



Great Lakes fisheries

Wisconsin's Great Lakes waters are some of the most productive in the world with tremendous potential for trophy fish. In 1997, the Wisconsin charter fleet achieved the highest fish per-angler-hour catch since records have been kept by the Wisconsin DNR. 10-20 pound Rainbow and Brown trout as well as 20-30 pound Lake trout are common, as are limit catches of King and Coho salmon. Catching one can be the thrill of a lifetime, for if these fish have any one thing in common, it's size. BIG is the operative word.



GARY KNOWLES

Trophy fish are the star attractions, but they aren't the only thing drawing anglers to the Great Lakes. The fishing itself is unique. Ocean fishing is the nearest thing to it. No surprise, since the Great Lakes are like inland seas. Trolling, surf casting, and stream, pier and breakwater fishing are the choices, each with its own appeal.

Wisconsin is the home of a vibrant sportfishing industry. Seventeen port cities on Lake Michigan and another seven on Lake Superior harbor 240 charter fishing operations. You'll find experienced captains and fully-equipped boats ready to take you on the blue-water fishing adventure of a lifetime.

An agreement among state, tribal, provincial, and federal agencies guides management of the Great Lakes fisheries. Renewed in 1997, the Joint Strategic Plan is a model for the management of interjurisdictional fisheries. Work to restore lake trout in Lake Superior has been such a success that it has allowed increased harvests. Lake trout no longer need to be stocked in the Apostle Islands.

Lake Michigan continues to provide exceptional sport fishing opportunities as well, with anglers devoting nearly three million hours to pursuing coho and chinook salmon, lake trout, brown trout, steelhead, smallmouth bass, yellow perch, northern pike, and walleye. The fishery is sustained by the annual stocking of more than 4.5 million salmon and trout in Wisconsin waters alone.

Stream Management

Wisconsin's longtime commitment to improving trout habitat, along with a new focus on using wild fish as the brood for its stream stocking program, appear to be paying off. Anglers are reporting some of the best trout fishing in recent memory.

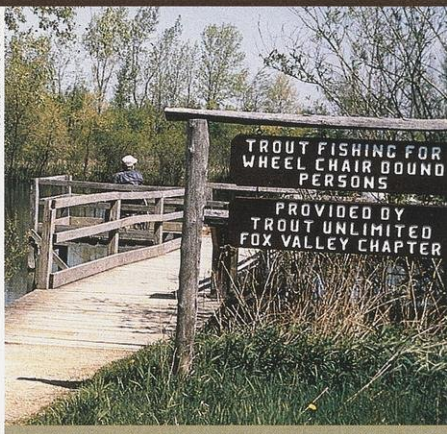
In 1999, Trout Unlimited (TU) released a report saying, "Wisconsin's trout management programs set an example of habitat stewardship that other states should emulate."

In fact, Wisconsin has more than 9,000 miles of coldwater trout streams. We lead the nation in miles of high quality trout streams – those with naturally self-sustaining trout populations – with 3,500 miles of Class I trout streams. That mileage reflects the state's approach to building and protecting healthy, self-sustaining trout communities by improving habitat and using wild trout as brood stock.

TOURISM PHOTO FILE

TU further praised Wisconsin's more than 50-year tradition of protecting trout habitat and rehabilitating stream structure. The report stresses that Wisconsin is unique in earmarking trout stamp funds for habitat protection and improvement instead of hatchery work. From 1977 to 1997, Wisconsin's inland trout stamp program paid for improving more than 530 miles of coldwater streams on almost 400 different waters.

TOURISM PHOTO FILE



Hunting & fishing for the disabled

Wisconsin offers a variety of special hunting and fishing opportunities designed for people with disabilities. If you have a permanent or temporary physical disability, or if you are legally blind, these special permits allow you to:

- **hunt from a stationary vehicle,**
- **hunt with a crossbow,**
- **sponsor or participate in special gun deer hunts,**
- **participate in special spring turkey hunts in state parks,**
- **fish while trolling with an electric motor,**
- **receive a discount on your annual Wisconsin Resident Fishing License.**

For a free publication detailing these programs for the disabled, call 608/266-2621 (TTY: 608/267-6897), or write to: DNR Information Center, P.O. Box 7921, Madison, WI 53707. Be sure to specify the format you require.

Find out more

The Wisconsin Department of Natural Resources publishes extensive information about hunting and fishing on its Web site at www.dnr.state.wi.us. Get information about regulations, seasons, lakes and public hunting grounds, wildlife census information, license fees, safety and much more.

Wisconsin DNR
P.O. Box 7921
Madison, WI 53707-7921
608/266-2621
Fax: 608/261-4380
Web site: www.dnr.state.wi.us

The Wisconsin Department of Tourism publishes extensive travel information on its Web site at travelwisconsin.com. Get information about Wisconsin accommodations, destinations, attractions, events, state parks, golf courses, historic sites, bike trails, and many more recreational opportunities.

Wisconsin Department of Tourism
P.O. Box 7606
Madison, WI 53707-7606
800/432-8747
e-mail to: tourinfo@travelwisconsin.com
Web site: travelwisconsin.com

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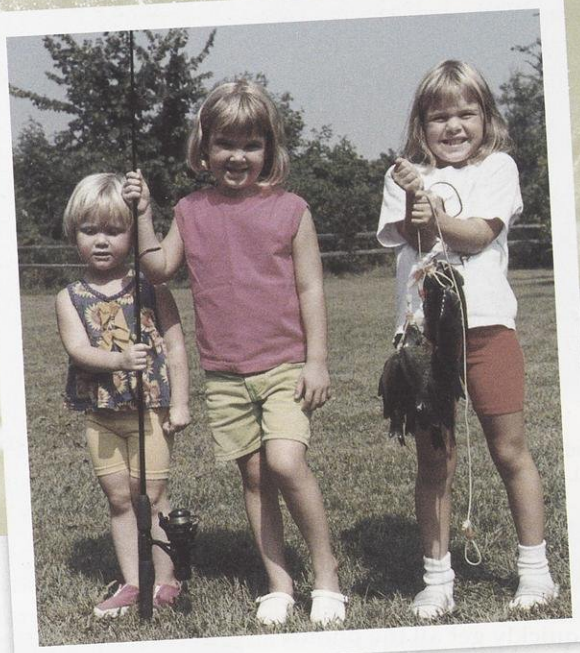


The "Special K's" — *(left to right)* Karley, Kacey and Kallee Scheidegger — display the bass that dad will measure and release before carving a lifelike replica.

Carving a memory

With a block of wood, some time and an eye for detail, you can create a special memento of a favorite fishing expedition.

Karl Scheidegger

PHOTOS COURTESY OF THE AUTHOR

My name is Karl Scheidegger, and I'm a fishaholic. I work with fish professionally and in my spare time, so much so that some have accused me of having gills! What can I say? I chose this path at an early age and my angling addiction has only intensified over the years. There's no recovery in sight for me, thank goodness.

With someone like me around, no family member is safe. Take last summer for instance. We Scheideggers were perched on the bank of the Fox River where it passes through Montello. My daughters were learning the art of bank fishing. I could see the delight on their faces as they pulled in one fish after another: "This one looks different, it's all speckled, and this one's got a bigger mouth, is a lot skinnier, and it's kind of green." Music to my ears.

Wisconsin surely is a great state to fish, but not every fishing trip is going to be successful. The fish may not bite or you may not catch a keeper. A young angler's enthusiasm can wane if he or she has to throw back a slightly undersized fish: "Daddy, that was the biggest fish I'd ever seen! Why can't I keep it?" Of course, a short discussion about regulations and putting a fish back so it can grow follows, but it's always difficult to see that excited face turn to a disappointed one as the fish is ceremoniously plopped back into the water.

How is it possible to keep your child's "trophy" fish alive? Photographs preserve many special moments; just tuck a camera in the tacklebox and you're ready to document the fish and the day. I'd like to suggest an alternative, however. How about capturing that fish and the habitat it came from — in wood!

Resources for fish carvers

Aspiring and experienced fish carvers or anyone interested in the art form should visit the fishcarver website, www.fishcarver.com. World champion carvers and others share useful information through the site's discussion group. Participating in the discussions is a great way to get questions answered, pick up tips and quickly improve your work.

The following books provide good carving instruction and guidance:

Berry, Bob. *Fish Carving: Second Edition*. Stackpole Books, 1999

Fliger, James. *Freshwater Fish Carving*. Schiffer Publishing Ltd., 1989

Frazier, Mark. *The Breakthrough Fish Carving Manual*. Wildlife Artist Supply Company, 1996

Hillman, Anthony. *Carving Sharks*. Dover Publications, 1996

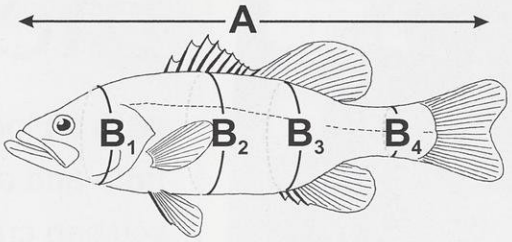
— *Carving Whales and Dolphins*. Dover Publications, 1993

— *Carving Traditional Fish Decoys*. Dover Publications, 1993

Roth, Richard. *Carving Fish and Pond Life*. Schiffer Publishing Ltd., 1994

The carver's craft

Carving fish from wood has its early roots in American history. At the beginning of the 19th century, someone thought of the idea of tracing a fish on a board, sawing out the pattern, and displaying the trophy for everyone to see. These early fish silhouettes still grace many old riverfront lodges. Today, traditional carvers have been joined by a modern group of artists who have raised the craft of carving to new heights.



Measure the length (A) and girth (B) at several points along the fish before releasing it.

Fish carving (Dare I say, sculpting?) is an exciting art form. It's rewarding to shape a block of wood into a lifelike replica of a shimmering trout or feisty bass. Unlike taxidermy, a specimen is not needed. With a little effort and knowledge, a pattern can be made for any fish. If you want to carve a great white shark, you can carve a great white shark — I know because I have!

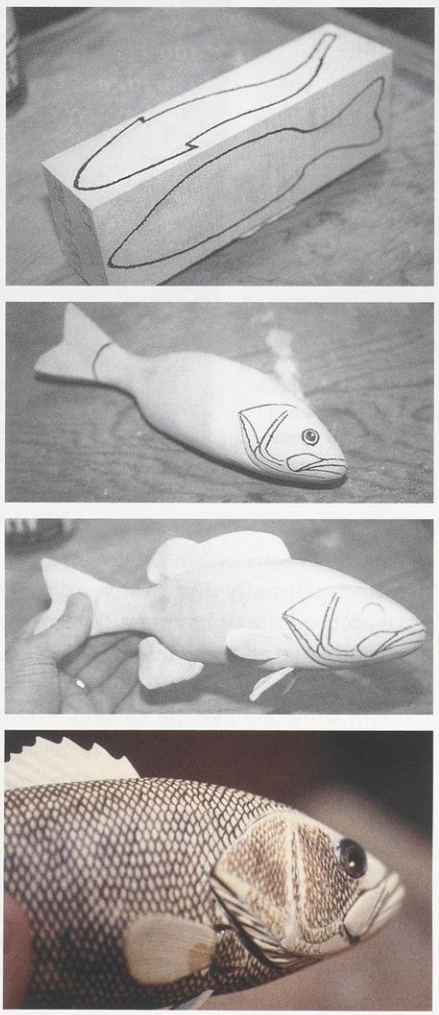
I'll walk you through the steps here, just enough to give you a taste of the carving experience and an idea of what's involved. The references listed in the sidebar cover carving techniques in greater detail.

Remember, the most important aspect of fish carving is observation. You'll want to get a good look at the fish and its habitat and fix that image in your mind before you set saw blade to wood. Books and other reference materials with photos and illustrations will stir your memory, encourage authenticity and inspire creativity, so take time to research the species you want to carve.

Roughing out a blank

First, I create a pattern of the fish based on photographs and length and girth measurements at different locations along the body. The fish doesn't have to be kept to do this. I usually take a camera and a measuring tape on my angling trips, quickly get all the photos and measurements that are needed, and return the fish to the water unharmed.

Next, I trace the pattern on a block of carving wood. I use either basswood (a common Midwestern wood) or tupelo (native to the southeastern U.S.). Both woods are lightweight and shape without chipping. For the largemouth bass project depicted here I used tupelo, because it details and sands a little better than basswood. The profiles are cut from the block of wood with a bandsaw. The top profile is usually cut first. The pieces are temporarily rejoined with hot glue, and the wood around the lateral profile is removed.The pieces are rejoined because it is much easier and safer to cut a solid block of wood. Cutting thin, irregular-shaped pieces can chip the wood, damage the saw blade and endanger the saw operator. Once both profiles are cut away, the hot-



Top views and lateral views are drawn onto a block of carving wood like basswood or tupelo. Cut the top view first on a band saw. After the rough cuts are made, use finer shaping tools following the lines you draw on the wood blank. Fins are added later and details are etched in with burning tools.

glued pieces are separated, leaving a wooden fish blank.

I then draw a center line on the top and bottom of the fish blank. This is a vital reference point. Without a clear center line, you might remove too much wood from one side and be left with a less than symmetrical fish.

I rough out the fish body with a flexible-shaft power carving tool equipped with a cylinder burr or sanding drum. Carving can be done by hand or power tool. I've chosen the power route because it is a quicker way to remove wood. I've also found I have more control with the hand piece and the various carving bits.

Safety equipment is a must, especially with power tools. Wear safety glasses, a dust mask, earplugs and hand protection. Keep the dust down with a vacuum or other collection device.

ROBERT QUEEN

The replica largemouth bass is carefully painted and mounted to wooden habitat crafted from scrap wood, sawdust and wood strips that are soaked and cut to look like aquatic plants.

The fish comes alive

Now the fish starts breathing: I transfer the head and body details from the pattern onto the rough-shaped blank, and carve those details into the blank with a variety of bits and tools.

The fins are next. I trace and cut out the fins from scrap pieces of the wood, taking care to ensure the grain runs the length of the fin to add stability. I cut slots in the body of the fish to accept the fins. I try to shape and contour the fins to create the appearance of movement.

I'll cut in the fin ray detail and get the fish ready for engraving and painting scales by sanding the blank smooth with a variety of sandpaper, from 120–400 grit. Carefully following the girth measurements results in an accurate cross-section of the body shape.

I burn the scales into the wood with a homemade burning pen and tip. I have made a variety of tips to match different scale sizes. The burning tips create a surprisingly accurate representation of scales.

Detailing and burning take a considerable amount of time and can be very frustrating (patience is a must), but once these steps have been completed, the piece begins to come alive.

The fin-ishing touches

I attach the fins permanently with epoxy. After I complete the scale burning, I burn in some of the smaller details, such as the undercut of the maxillary bone in the jaw, the forked and frayed fin rays, and the throat and gill membranes.

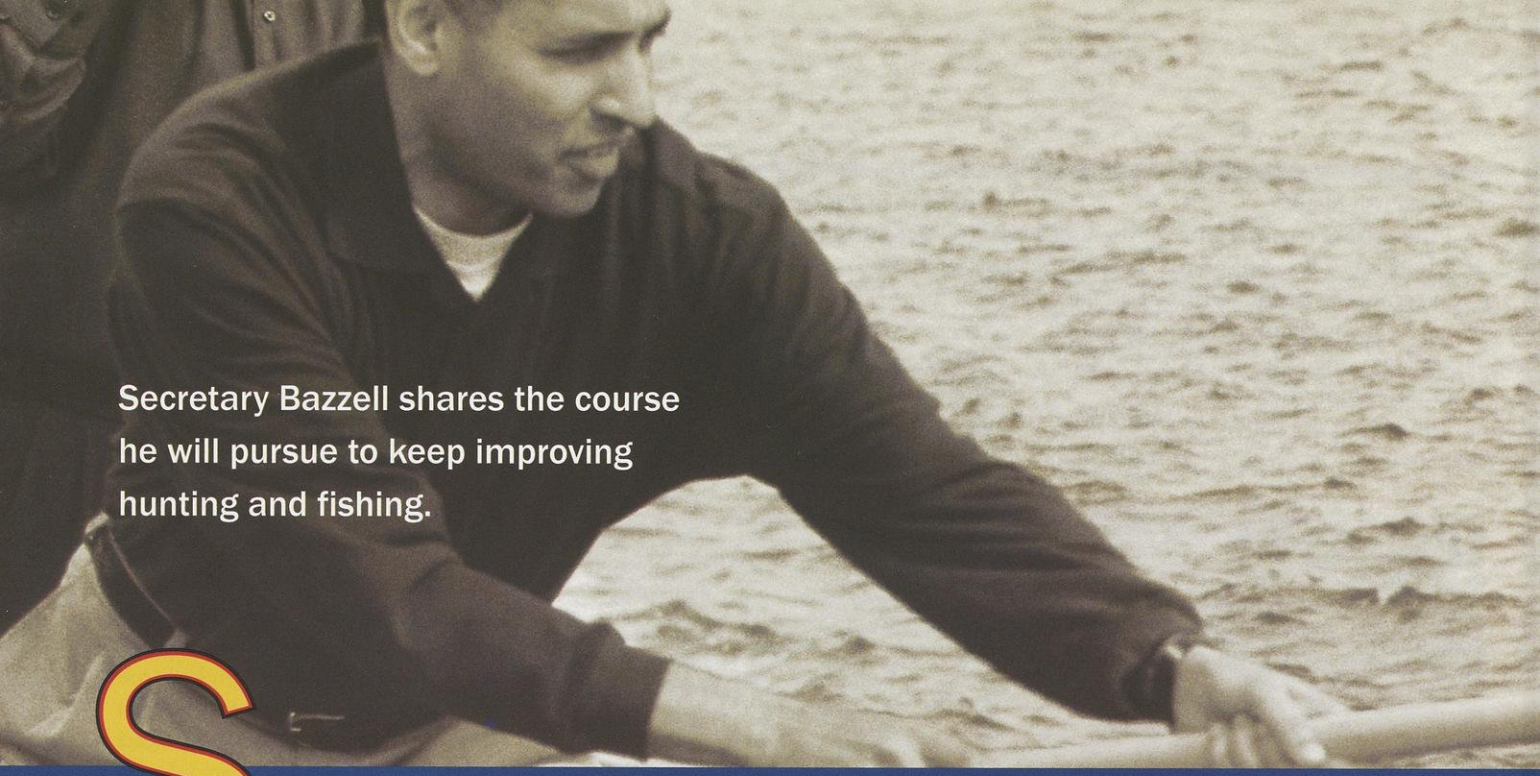
With the fish in good form, I can move on to building habitat from scrap wood. I've chosen to portray this bass swimming through a small stand of aquatic vegetation. I soak the "leaves" in white vinegar for several hours, bend and twist them around different sized cylinders, and allow them to dry overnight. I'll shape the contour of the lake bottom, cover it with glue, and sprinkle fine wood dust over the base. I then mist the wood dust with alcohol. When it dries, it looks very sand-like and natural. Rocks, tree branches or maybe even a crayfish can be crafted from scrap wood and placed in the habitat. It's your "world," and the possibilities are endless.

Both the fish and habitat must be sealed with a sanding sealer to prevent the wood grain from raising and destroying the smooth look of the wood. Once the wood is sealed, I prime it with a diluted concentration of gesso, a plaster-like material made of gypsum and glue, to provide a base to which all subsequent colors will adhere.

I use an airbrush to paint the fish and habitat with water-based acrylics. I'll also use a hand brush to paint some of the smaller details. The color of a largemouth bass may appear pretty straightforward, but I needed almost 20 colors to capture the subtleties of this particular fish.

And that's all there is to creating a lasting memory of a special fish, time and place. The hours spent at the workbench copying one of nature's finest creations will heighten both your woodworking and observation skills. If you carve with care and attention, you'll fashion a fish so lifelike it seems ready to jump off the wall. More importantly, the children will never forget the day they let that one get away!

Karl Scheidegger, a DNR fisheries biologist, has been carving fish for a little less than two years. One of his pieces was recently judged second best in the miscellaneous warmwater fish category in the professional division at the 2001 World Fish Carving Championships in Springfield, Ill.



Secretary Bazzell shares the course he will pursue to keep improving hunting and fishing.

Setting a hunting

Editor's note: *On May 11th, DNR Secretary Darrell Bazzell addressed the annual Conservation Congress convention in Mishicot. The secretary discussed short-term issues and long-term challenges to bolster hunting and fishing. We found his remarks meaty, provocative and worth sharing with an even wider audience of people concerned about the outdoors. Here's a summary of his thoughts.*

I appreciate the opportunity to assure you the Department of Natural Resources is in good hands, tell you a little about myself, and talk about some challenges we face. I'll describe eight new ideas I want on the conservation agenda to help promote and expand hunting and fishing opportunities.

My transition from deputy to secretary of the Department of Natural Resources has been exhausting, but exhilarating. Former DNR Secretary George Meyer remains my mentor, my coach and my good friend. And I'm honored to continue providing leadership that the agency and Wisconsin's natural resources need and deserve. Wisconsin has a tremendous natural legacy: diverse and abundant fish and wildlife, clean air, clean water, beautiful landscapes. We have a top-notch, dedicated corps of natural resource professionals. We have citizens who care deeply about Wisconsin's natural resources and are willing to commit their time, money and energy to sustain our outdoor opportunities. I am honored to work with you and other citizens to safeguard Wisconsin's natural resource treasures and the recreation they support.

I take counsel from the expertise of DNR's dedicated fish and wildlife managers and other natural resource professionals, then I make my decisions based on sound science by working with partners. By partners, I mean you and other citizens affected by DNR decisions who have an interest in those actions and issues.

Secretary Bazzell stocking Arlee rainbow trout, a new strain that returns to the nearshore habitat and conditions.

I also am well prepared for this job. As DNR's deputy secretary for the last five years, I've been responsible for running the day-to-day business of an organization with 3,000 employees and a $462 million budget. I'm experienced managing DNR's planning and analysis office. At the Department of Agriculture, I oversaw the first program to control gypsy moths. When I worked at the Department of Health and Family Services, I specialized in environmental issues.

My life experiences also guide how I approach my job. I've lived in congested cities with poor air quality, and I'm deeply committed to assuring that everyone has the opportunity to enjoy clean air, clean water and healthy landscapes. I'll never forget my childhood memories of the smog in Los Angeles and the heat in downtown Washington, D.C. We moved frequently when I was a child. I have learned to be open to change, to new ideas and to work well with others. I am a listener and a collaborator as well as a leader. As DNR Secretary, I will bring people together to get the job done.

As Special Assistant on conservation matters, Tim Andryk, DNR attorney and wildlife biologist, will bring added attention to hunting, fishing, trapping and outdoor issues.

DENNIS SWENO

and fishing agenda

I've been very lucky to have friends who introduced me and encouraged me to discover Wisconsin's great outdoors. These hunting mentors have enriched my life. I've grown to enjoy hunting and fishing and I appreciate the almost spiritual bond these activities form with nature, family and friends. I am deeply committed to preserving these traditions.

How do we work to sustain our collective natural home and pass on what is best in it? I believe we preserve the Department of Natural Resources as one integrated, comprehensive agency because it is the best, most economical way to assure quality outdoor recreation.

The decisions we make on land, on water quality and on the state's air directly impact our game, fish, forests and recreation. You can't have abundant, healthy fish without good water quality. You can't restore species such as elk, wolves or whooping cranes without good habitat. You can't hunt without places to hunt. You can't fish without boat ramps and access to piers.

We also continue protecting and restoring the habitat that fish, wildlife and people equally depend on. We retain our hunting, fishing and trapping heritage and expand outdoor opportunities for all Wisconsin citizens.

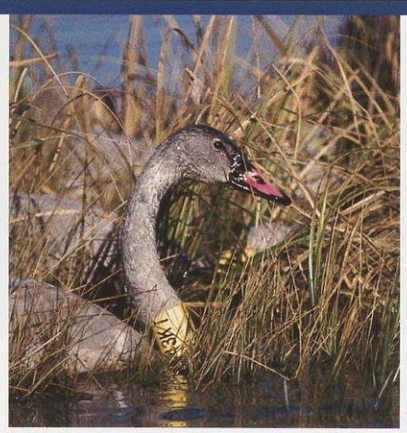
This year, everyone had the chance to enjoy the benefits of integrated natural resources management. Hunting and fishing have *never* been better in our lifetimes. Wisconsin hunters set a national record for deer harvest in 2000 — 618,374 deer, and they will find great hunting opportunities again this fall. We are a whitetail heaven, and last year we drew hunters from all 50 states and from 27 countries. Turkey hunters received a record 150,129 permits for the spring hunt. Waterfowl hunters enjoyed their third consecutive year of a 60-day season. Bear hunters harvested 3,071 bears, 100 more than the year before.

HERBERT LANGE (ABOVE) ROBERT QUEEN

The opportunity to watch or pursue deer, waterfowl and bear is a tribute to sound management, improving habitat and strong populations.

Anglers enjoyed excellent fishing last year, and our fish managers predict similar prospects for 2001, with particularly strong opportunities for bass, trout and walleye. Trout anglers are in particularly good shape. They just wrapped up their first permanent early trout season. This summer, they can find trout in several thousand more miles of Wisconsin waters that have been reclassified as trout streams, thanks to long-term erosion controls and projects to improve in-stream habitat.

We are also deeply encouraged by sound public policy shown by legislative action to preserve upland wetlands that are the nesting and fueling stations for our waterfowl; nurseries for many of our fish. Wisconsin just became the first state to restore protection for wetlands left in limbo by a recent U.S. Supreme Court decision. We will become the first state to require utilities to reduce the mercury emissions that contami-



ROBERT QUEEN (ABOVE) ROBERT QUEEN

Trumpeter swan recovery started in 1987. Volunteers helped staff collect eggs in Alaska, incubate eggs in Milwaukee, raise swans with decoys and release them to the wild. Our goal was 20 pairs by 2000. Currently more than 45 pairs nest in Wisconsin.

nate our waterways, our fish and ultimately, ourselves.

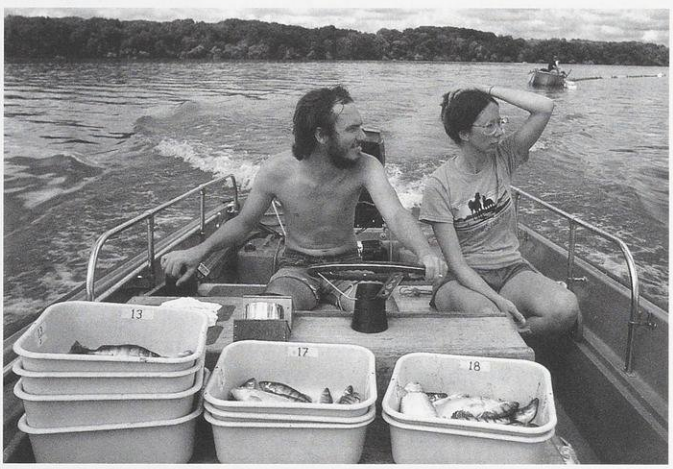
Our agency actions are equally impressive. We lead the nation in removing obsolete dams to improve fisheries, and we are a leader in restoring wild species to our landscape. Elk, wolves and whooping cranes are the latest, following on the heels of spectacular successes with turkeys, trumpeter swans and bald eagles. Trout Unlimited has called our inland trout program a national model.

Funding our outdoor future

The tightening budget climate presents challenges to continue that fine history of performance. While the Department of Natural Resources is spending your fish and wildlife dollars appropriately, we have been powerless to stop numerous raids on DNR accounts. The forestry and parks accounts have been repeatedly raided to pay for general tax relief. In the last several biennia, $39 million has been taken out of the Forestry Account for tax relief. $2.3 million has been removed from the Parks Account for the same purpose.

At the same time, we need to address funding and staff shortages for fish and wildlife management. Twenty-four of Wisconsin's 72 counties do not have wildlife managers, yet wildlife managers are being asked to do far more now than they were asked to do 30 years ago. The amount of public land to manage has nearly tripled since the 1960s, and we have added new programs for wild turkey, pheasant, elk and other species. Whitetail deer numbers are at record highs, and require constant management attention. Our wildlife staff is stretched to the point of breaking.

The situation is equally tough for fisheries staff. They must accommodate a growing number of anglers at the same time shoreline development is destroying habitat and exotic species are taking their toll. Fifty biologists cover all 72 counties and the Great Lakes, with some biologists responsible for all the lakes and rivers in one, two, and sometimes three counties. One biologist in Vilas County is responsible for managing 1,318 lakes and hundreds of stream miles in his county; others in northern Wisconsin face similar challenges.



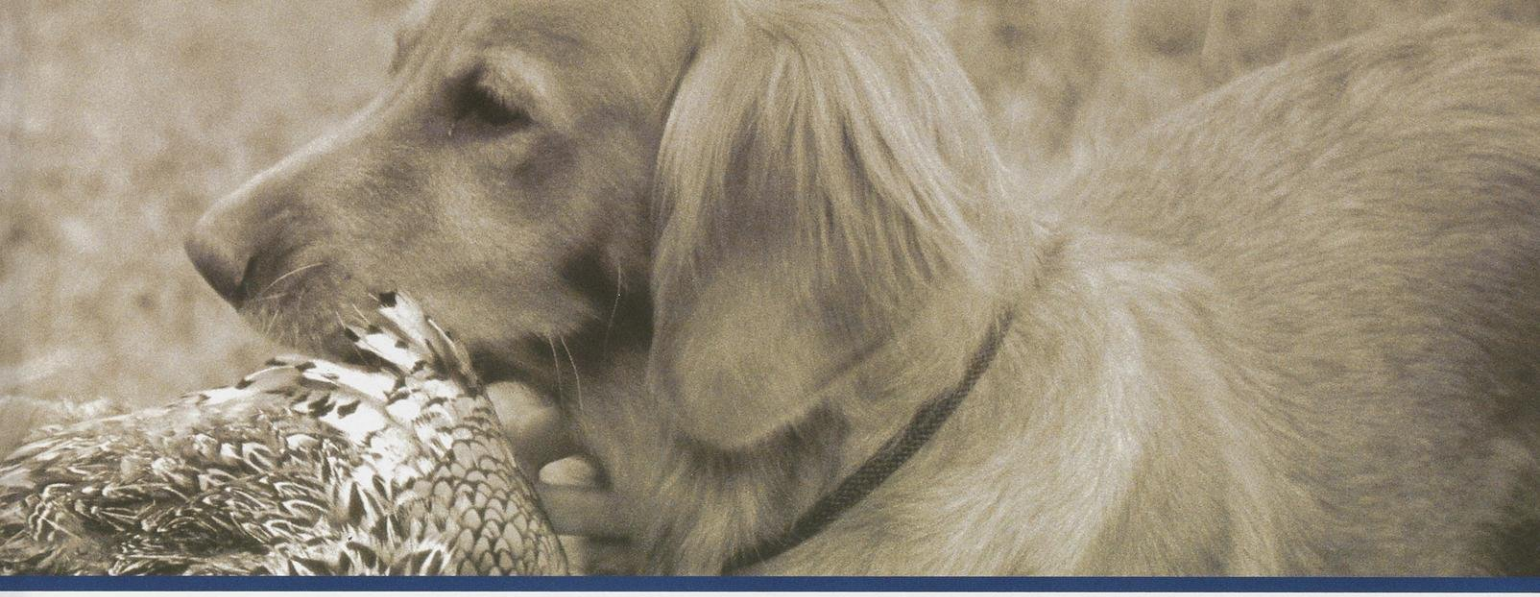
ROBERT QUEEN

Sustained funds to sample and estimate fish populations, monitor shoreline habitat and examine human behavior are key to gauging our success in maintaining quality outdoor experiences.

We need to increase the number of fisheries biologists to survey fish populations, identify and protect critical shoreline habitat, and evaluate whether stocking and fishing regulations are working.

With your help, we hope to get additional federal help through the Conservation and Reinvestment Act, also known as CARA. This act would invest federal oil revenue in state projects. Wisconsin would receive about $28 million each year for efforts like coastal habitat restoration, land acquisition, wildlife and historic preservation. Wisconsin's CARA coalition is the largest in the nation, with more than 300 conservation organizations participating. We need your active leadership again this year to finally pass CARA.

We also need your support to reinforce with state lawmak-



ers that fish and wildlife management should receive the attention and resources they deserve. Wisconsin's natural resources anchor an $8 billion tourism industry, they foster our high quality of life and they create our favorite memories. We must invest more in these valuable assets. A report by the Izaak Walton League of America shows that wildlife-related recreation generates $208 million in sales and income tax revenues for Wisconsin. Yet, the state returns less than one percent of that money to the Department of Natural Resources to invest in fish and wildlife programs that produce so well for our economy. The state's fish and wildlife — its hunters, anglers and other outdoor recreationists — deserve more than that.

Eight hunting and fishing challenges

Finally, I want to talk to you about the challenge that is probably closest to your heart...outdoor recreation.

Outdoor experiences connect people with natural resources in a way few other activities do. Our changing lifestyle can be a barrier to building these connections. More children are growing up in urban areas in families that don't hunt or fish, as I did. I was fortunate to have mentors who gave me the gift of hunting and fishing.

We can introduce new people to the outdoors and bolster the right to hunt, fish and trap. I have created a new position and two teams to advise me on conservation matters, to make preserving, promoting and expanding these traditions a top priority.

I'm pleased to announce these initiatives to help expand hunting and fishing to build the next generation of stewards.

- **Implement Deer 2000** — First, I have directed our wildlife and research staff to prepare a five-year plan to implement the Deer 2000 recommendations to improve the public's confidence in deer population estimates. The recommendations were the result of three years of hard work by the Conservation Congress and the public who attended meetings and hearings. Nearly all of the $323,900 in the governor's budget for implementing Deer 2000 will be used on this five-year plan. In addition, we recommend investing a one-time addition of $300,000 from Pittman-Robertson dollars for this effort. We have a 21st century deer herd. We should not try to manage it with 1960s-era monitoring budgets.
- **Stock more pheasants** — I know that increasing pheasant hunting opportunities is important to many, particularly hunters in southeastern Wisconsin. Wildlife Management Director Tom Hauge told me that producing 10,000 more pheasants each year at the Poynette State Game Farm would go a long way toward meeting this need. So we will. We'll find the first $100,000 needed for this increase and work with lawmakers to find long-term funding to keep it going.

  I'll also ask the legislature to give our fledgling elk program resources to keep moving forward as we prepare for Wisconsin's first limited elk hunt.
- **Stock new fish and sustain habitat** — Anglers will benefit from a number of new efforts to introduce new species or re-establish fisheries.

  Since late April, DNR fisheries crews have stocked a new strain of rainbow trout in six ports along Lake Michigan to increase opportunities for people who fish from shore and from small boats. The shore anglers' share of the trout and salmon sport harvest has slipped from 6 percent to 3 percent over the last decade, possibly because clearer water and other factors drove the fish further out. We expect this new strain of Arlee rainbow trout will stay in the near-shore areas. We stocked 72,000 seven-inch fish in Sister Bay, Algoma, Milwaukee, Kenosha, Manitowoc and Sheboygan. The fish should be legal-size by late summer or early next year. We will stock these same ports for the next

We recognize that resources can be managed to better meet a broader range of people's interests. A new strain of rainbow trout that stays in shallower water can provide fishing for those who fish from shore or in smaller boats.

ROBERT QUEEN

two years, and will use creel surveys to decide if the program should continue.

We will move ahead with plans to reestablish Great Lakes spotted musky in Green Bay and portions of Lake Michigan. We started stocking in lower Green Bay and would like to expand to Sturgeon Bay, the upper Fox and the pool lakes of the Winnebago system. This spring we sent fisheries crews to Lake St. Claire in partnership with the Michigan DNR to collect eggs for this effort.

- **Keep strengthening sturgeon populations** — We continue to restore and enhance sturgeon in Wisconsin to capitalize on the removal of old, unsafe dams and to improve habitat on streams that historically supported sturgeon. We're propagating sturgeon too. DNR staff at the Wild Rose Hatchery and in Oshkosh have pioneered the ways to raise sturgeon with financial support from fishing organizations. We have stocked sturgeon in the Menominee, Wisconsin, Flambeau, Namekagon, Chippewa and Wolf rivers, and the waters of Lake Superior.
- **Restore Lake Superior brook trout** — We are working with the U.S. Fish and Wildlife Service and Trout Unlimited to complete a restoration plan for Lake Superior brook trout. Brook trout remain in most of our streams, but the large colorful lake-run coasters are a casualty of overfishing and degraded habitat.
- **Invest in our hatcheries to bolster fishing** — It's especially useful to provide fishing opportunities in waters where pollution, habitat loss and other factors mean the lake, river or stream no longer supports naturally reproducing fish populations.

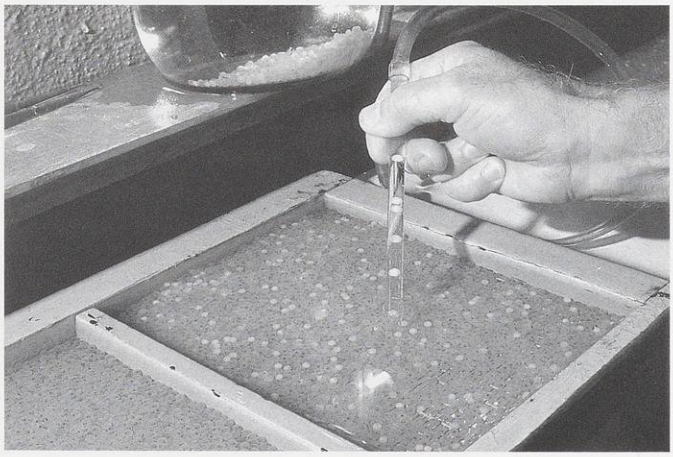
We are starting projects to stock larger walleye and musky fingerlings so more will reach adult size. Creel surveys confirm that walleye remains number one in the hearts of anglers. DNR is raising 92,000 larger walleye fingerlings this fall in addition to 4,867,000 small fingerlings that were stocked in spring and summer. As we stock these larger walleye we will evaluate the costs per fish that reach adult size. If it's effective, we will increase production in the future.

Fisheries Director Mike Staggs and his staff just completed a report that compares statewide fish stocking needs with capacity at our existing hatcheries. Our 14 hatcheries and three rearing stations can't meet long-term demand. Some hatcheries, most of which are 50 to 100 years old, fail to meet environmental laws.

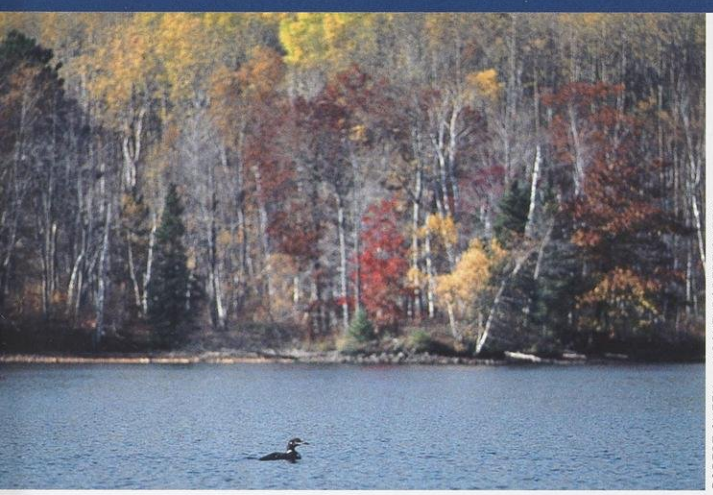
I will ask lawmakers for funding for hatchery maintenance and expansion so we can increase fingerling production by 200,000 wild trout, 760,000 walleye, 27,000 muskellunge, 80,000 northern pike, and 70,000 sturgeon. We especially need to renovate the Wild Rose State Fish Hatchery, which produces one-quarter of the trout and salmon we stock, three-quarters of the northern pike, and all of the sturgeon and Great Lakes spotted musky. Wild Rose is old. We bought it in the early 1900s and we need to repair failing outdoor rearing ponds, earthen raceways and artesian wells there. Nevin State Fish Hatchery in Fitchburg needs work, too. We need to replace a large, outdated rearing tank with several smaller tanks more suited to wild trout. We also need to renovate the raceways and improve our well and wastewater systems.

- **Keep providing public spaces** — All outdoor users will benefit from continuing efforts to acquire more public lands. We've added an average of 16,000 acres every year through the Stewardship Program. Our priority this year is protect-

DNR will ask lawmakers to invest in better fishing by supporting hatchery upgrades and maintenance to produce more fish, bigger fish and environmental improvements at hatcheries.



DEAN TVEDT



ROBERT QUEEN (ABOVE) ROBERT QUEEN

Buying or setting aside public spaces for public enjoyment will continue as a hallmark of a quality life in Wisconsin.

ing lands along the Peshtigo River flowages that are in danger of being sold and carved up for development. These 9,000+ acres next to the new Tommy Thompson State Park have a wilderness quality that would be a tragedy to lose.

Other acquisitions are in the works: the new 5,500-acre Turtle Valley Wildlife Area in Walworth County, a 3,000-acre expansion to the Grand River Wildlife Area in Marquette County, 110 acres to the Onion River Fishery Area in Sheboygan County, and 555 acres to the Killsnake Wildlife Area, just a few miles west of Mishicot.

We also will work hard with the Natural Resources Conservation Service and the U.S. Fish and Wildlife Service to restore wetlands under the federal Wetland Reserve Program. We have a goal of restoring 10,000 to 20,000 acres a year on top of what we can do through the Stewardship Program.

- **Expand information, education and outreach** — We've made great strides to get information about natural resources and outdoor recreation on the web, on the airwaves and into the hands of readers. We will continue that commitment, and use it to help us get more kids and adults into the great outdoors.

We'll support the kids' television show, *Into the Outdoors*, that we launched in January with Discover Wisconsin. It follows the adventures of young hosts who communicate by e-mail and surf the Internet to find out what's going on outdoors. They go outside to have fun and learn about outdoor recreation. The show has already taken kids ice fishing and turkey hunting, they've practiced recreation safety and attended a sturgeon celebration and feast on the Menominee Reservation. The show airs on Saturday and Sunday mornings on ABC affiliates statewide. We hope it fills a long-standing request to offer more educational leadership about the environment and natural resources. We are seeking outside groups to help us sponsor *Into the Outdoors*. The Wisconsin Wildlife Federation has stepped up and pledged $10,000. We hope this generous gift will spur other organizations to help fund this show.

Our online magazine for kids, called *EEK!* (Environmental Education for Kids), supplies background information for *Into the Outdoors* and offers a place for kids to go for more details. It's designed for kids in grades 4 through 8, their teachers and their parents. It's one website you don't have to worry about your kids visiting.

EEK! has hauled in some prestigious national awards, including the Wildlife Society's Conservation Education Award for 2000. The online magazine was recently named a semi-finalist in a program to award innovation in state government. The National Science Teachers Association informed us it will feature links to *EEK!* in its textbooks so kids, their parents and their teachers can enhance what they learn with online information.

We didn't ignore traditional media this year. We published a fishing season preview in tabloid newspaper format, sent 100 copies to each license agent and larger supplies to our service centers. And of course our magazine *Wisconsin Natural Resources*, continues to reach outdoor enthusiasts and Conservation Patrons at their homes.

•

These eight initiatives will help provide greater opportunities for those who have already discovered the joys of Wisconsin's great outdoors. We believe they will help introduce new generations to our time-honored traditions, and they will help create another generation of outdoor stewards for the 21st century.

Senseless killer

Without any warning, campers, hunters, boaters and ice fishers die every year from carbon monoxide poisoning. We'll help you prepare to stay alive.

Daniel A. Daggett and Lynda Knobeloch

Overnight camping trips are supposed to be filled with fun and adventure. Occasionally, however, tents, campers, boats, shanties and cabins can be filled with a dangerous, silent killer. Last year alone carbon monoxide (CO) killed seven campers, hunters and boaters in Wisconsin, turning a season of outdoor fun to tragedy for affected families and friends.

The deaths resulted from five separate incidents involving small propane heaters, cabin and trailer heaters, a boat generator and a charcoal grill that liberated carbon monoxide. In all these instances, the victims were away from their homes on camping, hunting and fishing trips and died while they slept. These tragedies teach us that vacationers need to be more aware of the dangers CO can pose.

Everybody is at risk

Carbon monoxide is an odorless, colorless and tasteless gas. Any heat or energy source that burns fuels such as wood, gasoline, charcoal, propane, kerosene or diesel, produces carbon monoxide. Unvented sources, like the popular "sunflower" or catalytic

Gases from unvented heaters, grills and even car exhaust that get trapped in boat cabins, truck beds, tents and campers can be silent killers.

heaters, charcoal grills, kerosene heaters and propane stoves are examples of CO-producing devices that require extra caution. Since these devices do not have a vent to carry CO emissions outside, they should only be used for outdoor activities. Operating unvented devices in enclosed spaces is very dangerous. It is especially dangerous to heat with an unvented device in an area where people will be sleeping. CO levels can accumulate quickly inside a tent or a cabin without warning and if you're not prepared, the results can be deadly.

Watch it!

Vent these fumes

- gas or diesel engine exhaust
- gas grills
- charcoal grills
- propane or kerosene heaters
- unvented furnaces

Vent these spaces

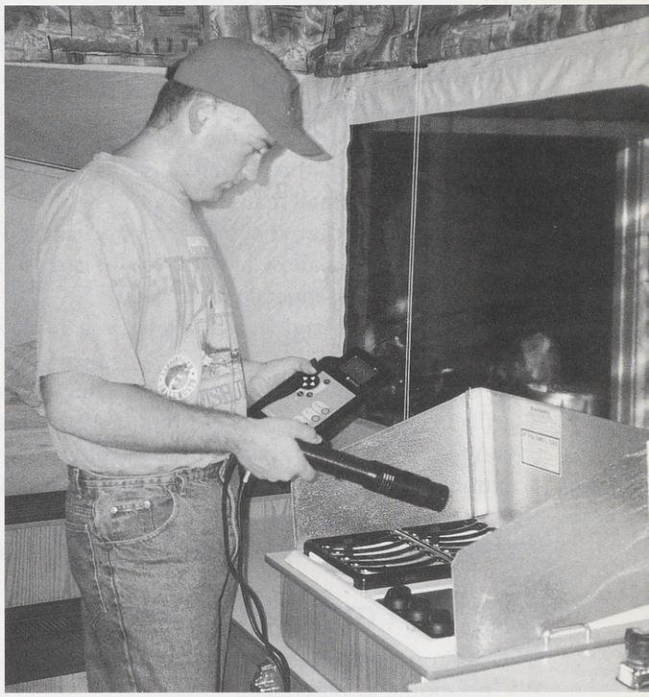
- houseboats or boat cabins
- tents
- pick-up truck beds with caps
- campers
- RVs
- ice fishing shanties
- trailers
- cabins

JAY SALVO

Vented heat sources, such as fireplaces, woodstoves, gas stoves, water heaters and furnaces, have chimneys or vents to carry CO and other combustion products outdoors. Though these appliances are generally safe for indoor use, they can also cause CO problems. All fuel-burning appliances should be inspected annually to ensure they are operating properly and the chimneys and vents are not plugged by snow and ice, or by animal or bird nests. Annual inspections are especially important at vacation properties where furnaces and fireplaces are used less often, animals have more time to build nests, vents can get blocked without notice, and vent obstructions may be more common.

Signs of CO poisoning

Since you can't see, smell or taste carbon monoxide, you won't know that you are being exposed to it unless you have installed CO detectors. The first signs of poisoning — including headache, fatigue, dizziness, shortness of breath, nausea and mental confusion — are often mistaken for other illnesses. Symptoms of CO poisoning might also include weakness, stomach pain, diarrhea, blurred vision, chest pains and numbness. Sometimes people being poisoned by CO mistakenly think they are coming down with the flu.



WIS. DEPT. OF HEALTH AND FAMILY SERVICES

Toxicologist Dan Daggett measures carbon monoxide emissions from a propane camping stove. Keep windows open when you are cooking and equip your shanties and outdoor shelters with carbon monoxide detectors to sense this deadly pollutant.

If somebody is experiencing these symptoms and CO might be involved, take immediate action. Don't assume that everyone will have the same symptoms at the same time. Individuals who have heart disease or breathing problems may be more sensitive to CO than others. Also people often receive different levels of exposure depending on their activity and distance from the source. People with higher exposures or underlying health problems often experience symptoms earlier than others and their symptoms can be more severe.

If you suspect a CO problem, move everyone outdoors immediately. Mild symptoms of carbon monoxide poisoning usually improve within a few minutes after getting fresh air. If you experience severe symptoms, such as dizziness, throbbing headache or vomiting, you should seek emergency medical care. Don't attempt to drive to an emergency room if you are feeling dizzy or sleepy — call 911 for assistance instead.

Be prepared and stay safe

- Use carbon monoxide detectors. Just like smoke detectors, a CO detector is easy to install and reasonably priced ($20–40). Install plug-in units in your home, vacation cottage or RV, especially in the sleeping area. Consider buying a battery-powered CO detector to take with you while vacationing. Battery-powered detectors can monitor CO levels in campers, tents, boats and cars. Be sure the batteries are fully charged and that the detectors are placed near the sleeping area, so they will wake you up if there is a problem.
- Trust your carbon monoxide detector. If it sounds the alarm and anyone has symptoms of headache or drowsiness, leave the area immediately and call 911. If the alarm sounds and you have no symptoms, reset the detector. If it sounds again, you probably are being exposed to low levels of carbon monoxide that can cause chronic fatigue and other illnesses. If you can identify the CO source, turn it off until it can be repaired or replaced. If you can't find the source, call the fire

department or local health department for assistance.

- Have the heating system and chimney of vacation cottages inspected at the beginning of each heating season by a professional heating contractor. Maintain your furnace and gas appliances according to the manufacturer's instructions. Consider placing animal excluders over the exhaust vent to keep birds and small mammals out.
- Maintain the exhaust system of your car, truck or RV. A leaky muffler can allow lethal levels of carbon monoxide to seep into the passenger compartment.
- Never idle a car engine near a tent, in a garage or in other enclosed space.
- Never use fuel-powered space heaters, gas grills or charcoal grills in enclosed spaces. Cold weather or rain might tempt you to bring a grill or heater indoors, but never do this! It is extremely dangerous. When camping, keep grills and vehicles away from your tent so that CO won't enter the sleeping area. Never use a gas oven to heat your home.
- Consider sending a CO detector to college or summer camp with your children. Teach them how to respond if the alarm sounds.
- Remember the warning signs of carbon monoxide exposure — throbbing headache, drowsiness, dizziness and nausea. Teach children about the sources and signs of carbon monoxide poisoning. Tell them to call 911 if they suspect a problem.

Carbon monoxide facts

- Carbon monoxide is the most common cause of fatal poisoning in Wisconsin.
- Nationwide, CO is responsible for about 2,100 unintentional deaths per year.
- The U. S. Consumer Product Safety Commission estimates that portable heaters, stoves and lanterns cause 30 deaths and 450 injuries to persons in tents, campers and vehicles every year.

JAY SALVO

Daniel A. Daggett and Lynda Knobeloch are toxicologists with the Wisconsin Department of Health and Family Services where they work on environmental health issues.

BLUEBIRD BONANZA

Nothing is so good that it can't be better. Please send the new bluebird box plans.

P.S. I'm for the birds.

Bill Troyanek
La Crosse

I've had bluebird boxes out for about eight years with moderate success. Please send me the plans for the new bluebird box. The rebar and electric conduit post is a great idea.

Terry Jahn
Black Earth

We have a lot of bluebirds coming through our area. Maybe now we can get them to stay.

Mrs. A.M. Marifke
Augusta

Last year I tried placing two houses back to back. The holes in these houses were round and 10 inches from the floor. Tree swallows nested in one box and the other was not used. Now I know why.

Ken Henning
Montello

I appreciate articles like this one that show simple, inexpensive things we can all do to assist and improve our environment.

Thank you.

Ron Mack
Delavan

I have been building birdhouses for many years but have had no luck with my bluebird houses. I have plans that are close to yours, but are deeper. I'll sure appreciate receiving your plans. I expect to place the houses around lake property and near farmland.

Joseph Zubarik
West Allis

I hadn't seen a bluebird since I was a kid 75 years ago, but last fall while roaming around a meadow in Ashland Township (Fond du Lac County), I saw a whole flock. What a sight!

Roland P. Richards

When I was a young 4-H Club leader we cut out patterns for bluebird houses on a band saw that the 4-H'ers put together.

Some of the boxes were painted the wrong color (bright red), some were put in the wrong place (along cow pasture fences near woods), some never got erected (still in the farmer's machine shed), but some actually managed to attract young bluebirds.

I've been interested in bluebirds ever since then.

Edgar W. Paddock
Augusta

Over 15 years ago I designed a 4-H project for my two children to monitor a bluebird trail of 36 houses they constructed with the help of a local contractor. We had some success. One nest even had six eggs. We continue to monitor the trail and a lot of those houses now need replacing. We have problems with tree swallows that have built nests on top of the bluebird nests and on occasion have even killed the bluebirds. Very frustrating!

Jan L. Londowski
Green Lake

Just last summer my mother had a bluebird land on her outside rearview mirror while she was waiting in her car for me. She was so happy to see it so close. This new subdivision in Colgate used to be a big farmer's field with tree lines between the fields. I thought after all the houses were built that the bluebirds would be gone. It bothered my mother and me. We read the bluebird article and I sure would like the plans. I would make some houses and hope they stay [where I put them] so other people can continue to see bluebirds too. I would give some nest boxes to the people who own the nice big lot. They are teachers and would take good care of the boxes.

Please send more information on bluebirds with the plans.

I will also look for books at the library since I read every day anyway because I am nine years old.

Brett Kromrey
Menomonee Falls

We received more than 600 requests for bluebird box plans, which verified that wildlife watching ranks second only to gardening as America's favorite pastime. After we started mailing out nest box plans, we received an even simpler design from author Joe O'Halloran. We print it here in the hopes that more will enjoy seeing bluebirds and participate in their recovery across Wisconsin.

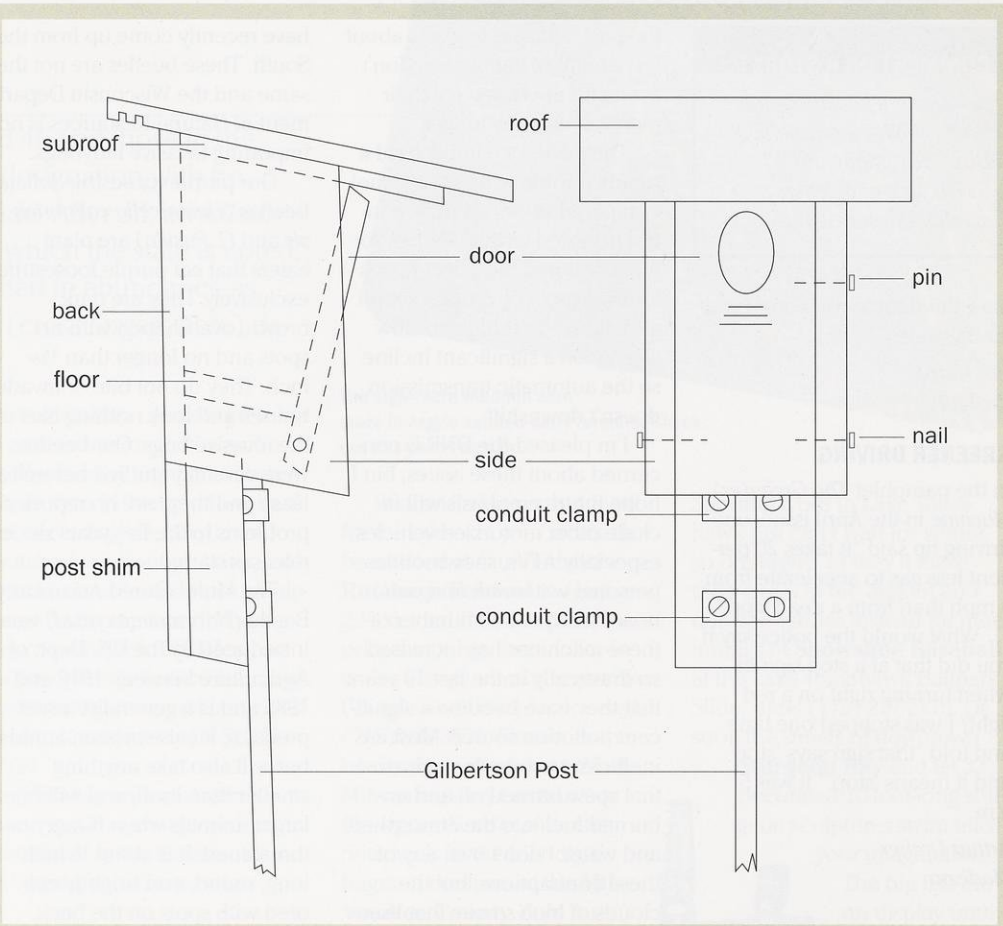
UPPING THE ANTE TO HUNT

I read the letter in the April issue about the person whose land was fenced out by neighbors. Everyone is buck crazy. We also had an experience in Trempealeau County. Last year, the farmer whose land we have hunted wanted $600 apiece to hunt his land. That is $2,400 for me, my son, his daughter and son, so I gave up deer hunting. Some people won't even let you on their land to trail a wounded deer. They claim you might get lucky and kill their big one.

Chester Anderson
Eau Claire

Your letter talked of a landowner whose neighbors erected a 10-foot fence around his property because a free-roaming trophy buck was taken on his land instead of theirs. This is very alarming. The Department of Natural Resources should help adopt legislation to eliminate this practice. I would hope that legal action was also considered.

These people who erected this fence are nothing more than "canned hunt" hunters. I would encourage anyone who knows of this practice, especially those in Trempealeau County, to pressure local officials to ban this practice. No one should



DRAWING DESIGN BY MOONLIT INK

SIMPLE BLUEBIRD BOX

Parts

12 inches of 1" x 10" lumber
34 inches of 1" x 4" lumber
6 inches of 2" x 4" lumber
20 inches of 1" x 6" lumber
1¼-inch wood screws
3 nails
two ½" conduit clamps
5 feet of ½" conduit pipe
5 feet of ½" rebar

Assembly

1. Cut wood as follows:
Roof — 1" x 10" piece cut 12 inches long
Subroof — 1" x 4" piece cut seven inches long
Back — 1" x 4" piece cut 15 inches long
Door — 1" x 4" piece 8½ inches long
Floor — 1" x 4" piece cut three inches long
Sides — two 1" x 6" pieces cut 9¾ inches long
Post shim — 2" x 4" piece cut six inches long

Note all wood can be left square. You can also cut the ends of all pieces sloping 10 degrees down toward the front as shown so the nest box will shed water.

2. The 1½" diameter hole should be cut as a vertical oval one inch down from the top of the door. File off the inside and outside edges of the hole to remove the hard edge.

3. Cut two slots across the rear underside of the roof to keep water from dripping on the back of the nest box.

4. Countersink pilot holes for four screws through the subroof. Apply waterproof glue then join the subroof to the roof from the underside using wood screws. Do not allow screws to protrude through the top of the roof.

5. Drill pilot holes to join all surfaces then attach with both screws and waterproof glue.

6. The top rear of the floor should be about 6½ inches below the subroof.

7. Ventilation holes at the top of each side are optional.

8. Paint all exterior surfaces of the assembled box with a light color.

9. Mount the box on a Gilbertson Post: Drive a five-foot length of steel rebar half way into the ground. Slip over a five-foot length of ½" metal conduit pipe. Secure the conduit to the front of the post shim with two conduit clamps and screws.

COMMENT ON A STORY?

Send your letters to Readers Write, WNR magazine, P.O. Box 7921, Madison, WI 53707 or e-mail letters to sperld@dnr.state.wi.us.

have the right to rob you of your land's value.

Jim Harris
Cashton

GREENER DRIVING

In the pamphlet *The Green(er) Machine* in the April issue, one driving tip said "It takes 20 percent less gas to accelerate from 5 mph than from a dead stop."

What would the police say if you did that at a stop sign or when turning right on a red light? I was stopped one time and told "that sign says 'stop' and it means 'stop.'" It was 5 a.m.

Arthur Dreher
Madison

In drafting this text, we were envisioning traffic jams and entrance ramps where momentum might be safely maintained by allowing just a bit more space between your car and the vehicle in front of you. We certainly wouldn't sacrifice safety for economy by rolling through stop signs or coasting through intersections before turning right on red.

I'm a bit bemused by *The Green(er) Machine* advice concerning ways to maintain a car to reduce its negative effects on the global environment. Though the text was updated from the 1991 version, it still demonstrates just how much has changed in the last 10 years. I think a fair amount of the content really does not apply to most people. For example, few people change their own oil anymore, and those who do likely know the proper recycling techniques. Also, doing a "tune-up" at home is a largely thing of the past. I hazard to guess about 95 percent of car owners don't even attempt to service their own vehicles any longer.

The advice to simply hold a steady throttle will not save fuel compared to using cruise control in varied terrain. Rather, for fuel economy, the driver needs to disengage the cruise control and allow the vehicle to slow slightly on a significant incline so the automatic transmission doesn't downshift.

I'm pleased the DNR is concerned about these issues, but I hope future emphasis will include other motorized vehicles, especially ATVs, snowmobiles, personal watercraft and outboard motors. The number of these machines has increased so drastically in the last 10 years that they have become a significant pollution source. Most are inefficient two-cycle engines that spew burned oil and unburned fuel into the atmosphere and water. I don't own any of these contraptions, but the clouds of blue smoke that I see hanging around them make their "contribution" clear.

Regulations have forced auto manufacturers to clean up their act. It's going to take similar pressure to do the same for these recreational vehicles. We are all contributors to environmental degradation, but some of us make a larger contribution than others do. I think the DNR should push for cleaner personal recreational machines for those who insist on using them.

Your best advice is on the front page: WALK! But there seems to be a move (ahem) afoot against that too, as evidenced by the absence of sidewalks in all too many places.

Jim Perry
Larsen

BUGGED BY WRONG BEETLE

Several people have called or written because they mistakenly believe the beetles we use for purple loosestrife control are the same invasive ladybugs that have recently come up from the South. These beetles are not the same and the Wisconsin Department of Natural Resources is not importing invasive ladybugs.

Our purple loosestrife foliage beetles *(Galerucella calmariensis* and *G. Pusilla)* are plant eaters that eat purple loosestrife exclusively. They are dark brown, oval shaped with no spots and no longer than 3/16-inch. They do not bite or invade houses and look nothing like the invasive bugs. Our beetles were carefully studied before release and there are no reported problems in the five years since releases started.

The Multicolored Asian Lady Beetle *(Harmonia axyrisid)* was introduced by the U.S. Dept. of Agriculture between 1916 and 1985 and is a generalist insect predator. It eats soybean aphids but will also take anything smaller than itself, and will bite larger animals when hungry or threatened. It is about 1/3 inch long, round, and brightly colored with spots on the back. The Asian Lady Beetles are so aggressive that they may be replacing our more benign native ladybugs.

Brock Woods
DNR Research Center
Monona

LIFE IN A PUDDLE

My third graders recently discovered a horsehair worm in a puddle they had been monitoring for tadpoles. The puddle had dried up for about a week, then we had another rain. It took quite a bit of searching for me to find out what we had captured. Thanks for the information about these worms ("A twisted tale," October 1999).

Joyce Mitchell
Mapleton Grade School
Mapleton, Ill.

Ephemeral spring ponds are vital breeding grounds for amphibians, insects, fish and birds. The Gordius worms can grow in any wet spot including puddles, ponds and water dishes.

TALKING TURKEY

I read "Memories of Gobblers Nob" (April 2001) and would like to purchase a book on turkeys in Wisconsin. I want to learn how turkeys live, breed, and what predators hunt them. Can you suggest a source?

James H. Sieckert
Antigo

A new DNR wildlife bulletin on Wisconsin turkeys will be available later this summer. In the interim, you might contact our regional safety wardens who can put you in contact with a nearby hunting safety instructor who may loan or sell copies of the turkey hunting handbook used in courses.

Thanks for your great turkey article. I'm a big turkey hunter and I was doing a research paper on how wild turkeys got introduced back to Wisconsin. The article was a big help.

Casey Plvonka
Reedsville

I enjoyed the turkey story and thought you might be interested in my spring turkey hunt. I was hunting in the Stevens Point area with my friend's dad. He bagged a 20-pound tom and I bagged what I thought was a 16- to 18-pound jake with a four-inch beard. It had a white/blue head and a sign of spurs. Imagine my surprise when I found eggs inside while cleaning the bird!

SSgt. Gary Linder
United States Air Force
Milwaukee

Hens do occasionally have beards, and in the spring season any turkey with a beard is legal game.

4F4U

Wisconsin is classified 4F, and those in the know boast of that designation with no small amount of pride. After all, it's *fellowship, fun, food* and *foolery* for which the state is noted, not flat feet. All can be harvested in abundance as summer begins its protracted (cross fingers here) departure from the landscape.

FAITH GROSSEN

The eight-acre windmill corn maze in Argyle saluted dairy farmers. Check-out this year's design!

If your idea of fellowship constitutes the sharing of similar interests or experiences in a congenial atmosphere, you've come to the right state. The residents of Chippewa Falls invite all upstanding citizens who value the merits of a respectable beverage to celebrate **Pure Water Days**, August 11–12. Toast your drinking companions with a glass of sparkling spring bubbly, then enjoy the citywide festival featuring a parade, fireworks, live music and more. (888) 723-0024. Two-wheel enthusiasts will grease gears together during the **Nicolet Wheel-A-Way** on September 1; the 30- and 40-mile bike tour begins in Three Lakes and passes through the beautiful Nicolet National Forest. (800) 972-6103. Birds of a feather do stick together, it seems, as the curators at Wausau's Leigh Yawkey Woodson Art Museum well know. The museum's 26th annual **Birds in Art** exhibition opens September 8 and runs through November 4. The display highlights birds in more than 110 original works of art, including oil, acrylic and watercolor paintings; batik; and bronze, marble and wood sculpture. On September 29, the museum hosts **OctoBIRDfest**, an outdoor family festival featuring children's games, craft activities and entertainment. (715) 845-7010.

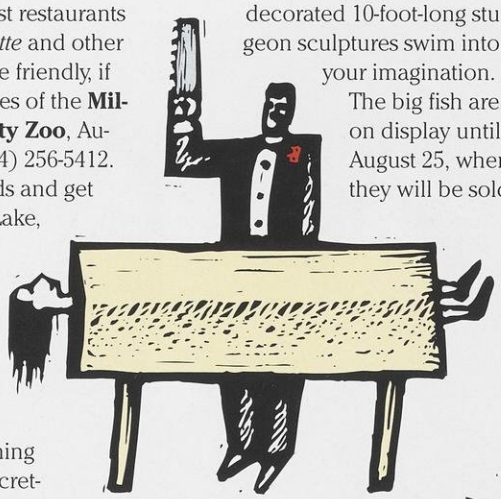
Find fun under a late-afternoon sun by getting lost in a cornfield. At the Grossen Farm in Argyle, you can wander through two miles of paths in the 8-acre **Windmill Hill Corn Maze**, a life-sized puzzle cut into a cornfield in the shape of a giant windmill. It's open now through October 31. (608) 465-3386. In Campbellsport, ramble from nose to tail in the **Llama Corn Maze**, open now through September 30. For reservations, call (920) 994-9294.

Hitch a ride with Pure Water Drop in the annual parade in Chippewa Falls, August 11–12.

CHIPPEWA FALLS MAIN STREET, INC.

Wisconsin isn't only a feast for the eyes. Let your stomach be satiated at Cumberland's **Rutabaga Festival**, August 22–26. It's difficult to put into print the things these folks do with a common root vegetable. Go see (and taste) for yourself. (715) 822-3378. Feast with the beasts when chefs from 28 of Milwaukee's best restaurants flip *crepes Suzette* and other delicacies in the friendly, if fragrant, confines of the **Milwaukee County Zoo**, August 16–19. (414) 256-5412. Grab the Rolaids and get thee to Green Lake, where the **Wisconsin State Chili Cookoff** will blast off on September 8. Contestants stew over steaming cauldrons of secret-recipe, four-alarm, to beans or not-to-beans concoctions in hopes of gaining a berth at the World Champion Chili Cook-Off in Las Vegas. Visitors are welcome to sample the chili, which will be auctioned off at the end of the day. (920) 294-6504. Still hungry? Hold on until September 29 for Minocqua's 37th annual **Beef-A-Rama**, featuring the famous "Parade of Beef" and tasty beef sandwiches. (715) 356-5266, (800) 446-6784.

To end this foray into 4F Wisconsin, fall in for a little foolery. Sporting types in Lake Tomahawk just can't wait for winter, so on August 13 they'll leave their cleats in the dugout and don snowshoes instead for nine innings of **Snowshoe Baseball** at the Lake Tomahawk Ballpark. Slide, slide! (715) 277-2116. Or stroll the streets of downtown **Sturgeon Bay** and let 32 decorated 10-foot-long sturgeon sculptures swim into your imagination. The big fish are on display until August 25, when they will be sold by auction. One could make a nice conversation piece for the coffee table. (920) 743-5958. Finally, to see all of the people fooled all of the time, watch closely while the **Houdini Club of Wisconsin** hosts its 63rd annual **Magic Convention** in Appleton on August 31-September 1. More than 200 magicians will gather to dazzle and astound the public with incredible feats of clairvoyance and legerdemain. Poof! (608) 274-9411 or (800) 2DO-MORE.



Wisconsin, naturally

Swenson Wet Prairie State Natural Area

Notable: Visitors entering Swenson Wet Prairie are engulfed by a lush, verdant grassland of big bluestem, bluejoint grass and sedges. In summer, the lowland prairie along Taylor Creek blazes with cardinal flower, swamp milkweed, blue lobelia, gayfeather, Michigan lily and spiderwort. Oak savanna borders the prairie to the west.

How to get there: From the intersection of County Highway T and State Highway 11 in Brodhead (Rock Co.) go south on T 5 miles, then east on Smith Road 0.25 miles to a parking area on the south side of the road. Walk south and east through the oak savanna 0.25 miles to the prairie. *Wisconsin Atlas*: page 28, grid D2.