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WISCONSIN NATURAL RESOURCES

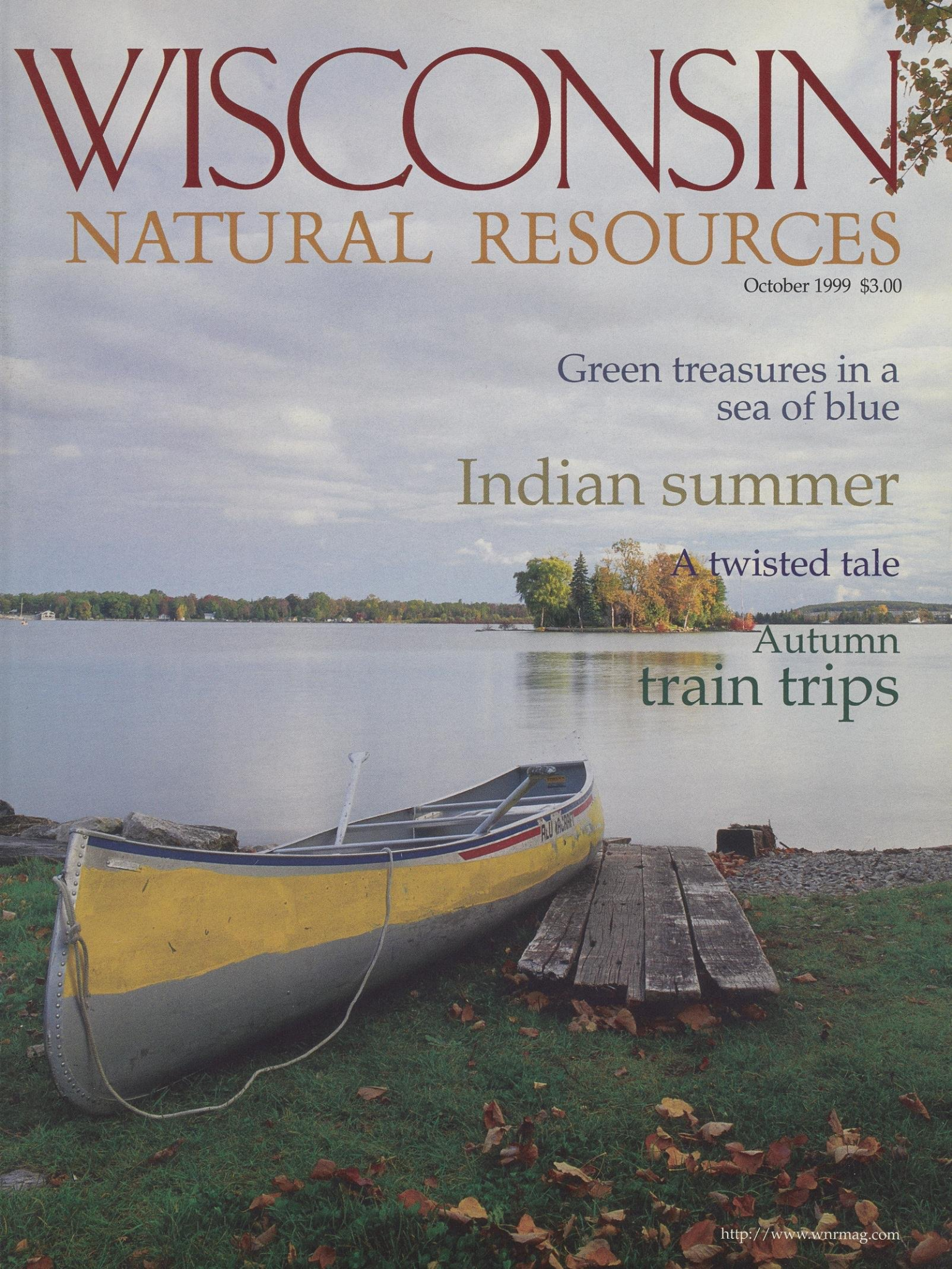
October 1999 $3.00

Green treasures in a sea of blue

Indian summer

A twisted tale

Autumn train trips



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A SLOW CROSSING TO WINTER

The woolly bear's stripes don't predict cold weather, but we know what makes its coat change color.

Anita Carpenter

Each September and October, legions of woolly bear caterpillars *(Acrea sp.)* decide that the grass is greener on the other side of the highway. Humping across the road at a fairly respectable four foot per minute pace, the furry caterpillars, (black on both ends, reddish-brown in the middle) are blithely unaware of the consternation they cause drivers who try to avoid them.

Why do these multitudes cross the highways? It's more than getting to the other side. The traveling woolly bears have finished feeding for the year and are moving about searching for the perfect spot to curl up and spend winter under bark, a rock or a fallen log, although I often wonder if the warm road somehow appeals to them.

Since woolly bears are so noticeable in autumn, they have become legendary predictors of the coming winter's severity. Folklore states that the wider the black bands, the colder the winter. Also, some believe the hairier the critter, the harsher the winter.

We take great interest in the woolly's winter coat, but don't give a second thought to what the caterpillar will become. Each fuzzy 1½ inch caterpillar becomes an Isabella moth.

continued on page 29

(above) In spring, the "bear" pupates to become an Isabella moth.
(left) Woolly bears molt six times and show more of a reddish coat and narrower black end bands with each molt.

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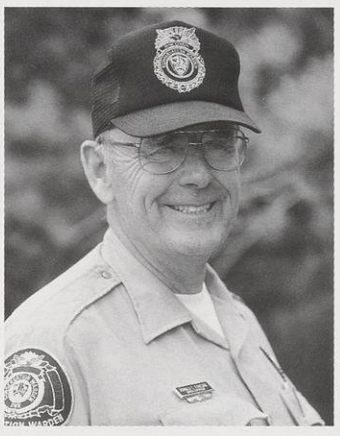
WISCONSIN NATURAL RESOURCES

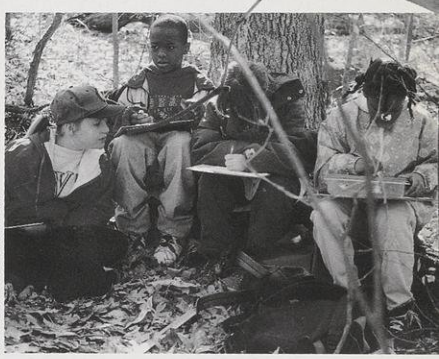
October 1999 Volume 23, Number 5

DARRYL R. BEERS

THOMAS L. EDDY



ROBERT QUEEN



EILEEN POTTS DAWSON

FRONT COVER: Sawyer Harbor at Potawatomi State Park in Sturgeon Bay. DARRYL R. BEERS, Algoma, Wis.

BACK COVER: Day Lake State Natural Area, Vilas County. For a map or more information, contact the State Natural Area Program, DNR, Box 7921, Madison, WI 53707 (608) 266-0394. THOMAS A. MEYER, Mount Horeb, Wis.

GREEN TREASURES *in a* SEA *of* BLUE

Botanists are combing Lake Michigan's isles to inventory the vegetation and discover rare plants.

David Kopitzke

What is the lure of islands? Is it their natural isolation, sparse roads and few buildings? Is it wild vegetation bounded on all sides by splashing waves and open water? Is it just our nature to be drawn to the unknown, unavailable or inaccessible? Naturalists, too, are attracted to islands for scientific reasons. These lands are often less disturbed or polluted than adjacent mainland and they pose intriguing theories to explain how plants and animals were distributed across great expanses of water.

Wisconsin is blessed with an abundance of islands, some in smaller inland lakes and others far out into the vast waters of Lake Superior and Lake Michigan. Of 19 islands in Lake Michigan's Wisconsin waters, 18 are just off the Door County coast. The Door Peninsula and offshore islands are one of the state's richest reservoirs of rare plants. This concentration of botanical wonders results from a combination of unique microclimates with varied habitats including cobble beaches, boreal forests, limestone ledges and pristine estuaries.

These places are the haunts of such rare organisms as the fringed gentian, the dwarf lake iris, Pleistocene land snails and the arctic primrose. Indeed, past surveys of this part of the state have revealed that at least 35 rare plant species live here including some that are threatened and endangered in Wisconsin and the nation. Some of these islands were

(left) Waters surrounding Lake Michigan islands create more moderate climates in which a wide variety of plants grow. Home development and invasion by nonnative plants and animals are more limited when islands are difficult to reach. DNR botanists will inventory rare plant communities remaining on 19 Lake Michigan islands, including the rugged coast of Rock Island.
(below) Arctic primrose *(Primula mistassinica)* is one of the rare finds on Wisconsin's northeast coast.

BOTH PHOTOS BY DARRYL R. BEERS

Living on an island

DARRYL R. BEERS

While most plants and wild animals living on Lake Michigan islands can find whatever they need, it is a different matter for the humans who visit or stay there.

Simply getting to an island is a challenge. In Wisconsin, only Washington Island is served by year-round, regularly scheduled ferry service. From spring to fall, campers and hikers can travel to Rock Island State Park by the "Karfi" ferry. This small but seaworthy boat carries passengers and their gear only — no cars.

The year-round residents on Washington Island are a hardy, self-sufficient lot. Vegetable gardens and wood stoves abound. Islanders are used to higher prices and reduced selection in local stores. Almost everything, from eggs and appliances to lumber and gasoline, must be brought to the island on the ferry. Families and community are strong; people depend on themselves and their neighbors in times of need. Island citizens often make their own entertainment.

Life on the smaller islands poses even greater challenges. Summer residents usually provide the transportation in their own boats or may charter a boat. Occasionally neighbors will join forces to hire a barge to bring large items such as building materials or a vehicle to their island. Those with cottages depend on their own generators if they want electricity. Both Chambers Island and Detroit Island boast landowner associations. Their meetings address such common concerns as the condition of their communal dock, road maintenance (most roads are private), noise, sanitation and trash disposal. Questions about how many visitors and homes their island can support always yield lively and challenging discussions. — *D.K.*

LINDA P. HANCOCK DESIGN AND MOONLIT INK

(above left) Only Washington and Rock islands are served by commercial ferries.
(above) The Lake Michigan islands in Wisconsin waters that will be surveyed are clustered around Door County.
(below) To reach most of the islands, botanists have to charter small boats, find places to stay and pack in all their scientific gear and sampling equipment.

DARRYL R. BEERS

last surveyed decades ago; others were visited sporadically or surveyed incompletely.

Support for an accurate accounting

The Wisconsin Coastal Management Program (WCMP), a part of the Wisconsin Department of Administration, is by definition interested in island resources. DNR botanists Emmet Judziewicz, David Kopitzke, Betty Les and Becky Isenring (all with the Bureau of Endangered Resources) applied for and received a WCMP grant to do a thorough, botanical survey of Wisconsin's islands in Lake Michigan. Judziewicz is eminently qualified, educated in plant systematics from the University of Wisconsin - Madison, experienced in field projects throughout the state, and author of a plant survey of the Apostle Islands. Taking a similar tally of Lake Michigan's plant diversity was a natural follow-up.

Depending on the water level in Lake Michigan, there are about 19 islands ranging from the biggest that are at least several hundred acres (Washington, Rock, Chambers and Detroit) to small barren rocky islets barely poking above the water surface.

Judziewicz's past survey of Wisconsin's Lake Superior islands vegetation culminated in 1993 with the publication of *The Flora of the Apostle Islands* (co-authored by Rudy Koch and available through the Apostle Island National Lakeshore office in Bayfield). Getting permission to visit those islands for scientific work was a comparatively simple matter since the National Park Service owns and administers all of the islands but one. The Lake Michigan islands are a different matter. Most of these are in private hands. The larger islands of Washington, Chambers and Detroit have hundreds of separate landowners, many of them living elsewhere in Wisconsin and out of state. Finding the landowners and getting their permission to access the properties took research of courthouse records, many letters, phone calls and personal visits.

Nor were those the only difficulties faced before the actual survey could begin. Emmet's experience in Lake Superior made clear the need to find reliable transportation to and from the islands. Ferries service a few of the islands, but most can be reached only by private boats. Names and phone numbers of charter services, ferry schedules and fees for rides were sought and budgeted. Determining where the botanists could camp or find overnight accommodations on sparsely populated islands was a research project in itself!

Much of this preliminary work was completed during the summer of 1997. Loose ends were tied up during the winter so survey work could proceed smoothly in spring 1998. In truth, the survey had already begun. Judziewicz visited Rock Island early in September of 1997. During a three-day stay he identified an impressive species list of over 300 plants and collected "voucher specimens," samples of the plants identified. These dried and pressed plants will ultimately make their way into the major research herbaria of the state, where they will be accessible to students, professors and researchers.

Properly pressed, labeled and filed, voucher specimens are a treasure trove of information for scientists. The herbarium specimens in the Milwaukee Public Museum and the UW-Madison herbaria include plants over one hundred years old! Botanists from Wisconsin, other states and foreign countries inspect them. The researchers compare specimens to discern the range of natural variations within a group of plants. Better tools and subsequent knowledge can lead botanists to decide that the original collector misidentified the specimen. These changes can only be verified by examining voucher specimens. Such analysis would be impossible if only a written record is made.

After studying maps, aerial photos and his calendar, Judziewicz and other biologists planned multiple trips to the islands in spring, summer and fall of 1998. Some plant species would be easiest to identify when they were in flower, others when they bore fruit, still others blossomed early, then completely disappeared by mid-summer. Unpredictable weather and uncertain seas added some excitement to the scheduling.

(*LEFT*) BEN TRAVIS (*RIGHT*) EMMET JUDZIEWICZ

Emmet Judziewicz's past surveys of Lake Superior islands set the standard for examining the Lake Michigan islands.

DNR Botanist Andy Galvin collects and presses plant specimens near the Plum Island lighthouse. These "voucher specimens" are stored in herbaria for future comparison and reference.

Successes and dangers

Searching islands for rare plants calls forth images of sunny summer days, leisurely boat rides across sparkling water, walks in woods, strolls along shores and pleasant hours spent poring over field guide books. One could also imagine peaceful nights in the comfort of an island cottage, being lulled to

EMMET JUDZIEWICZ

EMMET JUDZIEWICZ

Island homeowners generously offered shelter and camping spots for the DNR researchers. A neighborly islander saved the day when a wicked storm dropped a huge maple branch on the botanists. Judziewicz survived a concussion and long trip via road and water to emergency care. His bike didn't fare as well.

sleep by lapping waves on a stony shore. And, indeed, sometimes that happened. Emmet and I were the lucky beneficiaries of numerous acts of kindness by island landowners. One family offered unlimited use of their screened, Adirondack-style cottage overlooking the waters between Chambers Island and the village of Fish Creek. Another offered sleeping space in a historic lighthouse keeper's home. Still others generously shared their campsites and their canoes.

In truth, the day-to-day reality is that biological survey work is often tedious and even dangerous. Soaked feet, wet and chilling boat trips, gray sullen weather, bone-jarring rides through high seas in small boats, and unexpected boat cancellations due to storms, were all part of the experience. Bushwhacking through pathless woods, wading across wetlands, scrambling up and over slippery rocks was a daily chore, especially while carrying backpacks filled with maps, notebooks, plant presses, raingear, food, water jugs, compasses and global positioning tools. Working long hours was the standard due to scarce boat rides and the rare opportunity to visit an out-of-the-way island. Most visits lasted from one to four days and the vast majority of the survey was completed by Emmet working long days alone.

The most dramatic reminder of the hazards of such work came on June 25, 1998, at the end of a long day of collecting on Chambers Island. As late afternoon approached, the skies darkened. A growing wind tossed the treetops. Emmet and I were biking along soft sandy roads back to a cottage when the wind snapped off the top of an old red maple, dropping it directly onto the unfortunate Emmet. I was unharmed, but Emmet lay unconscious, his arms and legs entangled in the branches of the fallen treetop. His bike was utterly destroyed and a twisted wreck. I rushed up, tossing his bike and pack to the side of the road to see what could be done.

A few anxious minutes later, Emmet gradually regained consciousness. Gently and slowly we extricated him from the entangling branches, twigs and leaves. Meanwhile, the wind grew fiercer, the sky darkened further, and rain began to pelt down. Emmet was a bit confused and had absolutely no memory of coming to the island. Amazingly he suffered no spinal injuries nor broken bones. Though scraped and bruised, he had a sense of feeling in all his limbs. And he could move his arms and legs with minimum discomfort and a little stiffness. This field botanist, it appears, is made of sturdy stuff!

Clearly, he was dizzy and disoriented. Walking to get help was out of the question. The nearest cottage was some distance away, and we didn't know if anyone was there, if the cabin would be locked, or even if there was electricity or a phone. Minutes passed. Then, through the driving rain, the headlights of a lone truck appeared. Its elderly driver proved to be one of the landowners I had contacted earlier in the year. Mr. Reinhart Krause rose admirably to the very serious occasion.

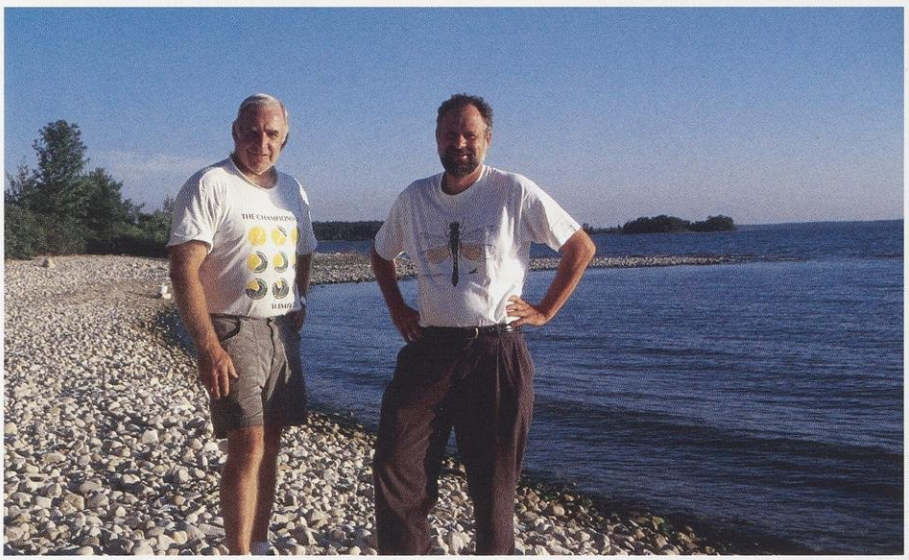
The next two worrisome and rainy hours were filled with furious activity: getting additional help, cutting up the treetop which blocked the road, dragging the logs to the side. (The weighty trunk that struck Emmet proved to be around one foot in diameter!) A patient but clearly uncomfortable Emmet was driven to the island retreat center where he received first aid. A fast boat was engaged and took us to the mainland where an ambulance was waiting. Excellent, professional help was provided by the emergency medical technicians, the staff at the Sturgeon Bay Hospital and the staff at St. Vincent's Hospital in Green Bay where Emmet was transferred. Happily and miraculously, he quickly made a complete recovery.

The tally of natural riches

Botanists returned to the islands in the summer and fall. Last winter Emmet completed a 45-page report including impressive species lists of the six major islands (Washington, Rock, Detroit, Chambers, Green and Plum), habitat descriptions, maps, illustrations and more.

All the cooperating landowners have received a list of plants identified on their islands. These landowners can now seek advice from the Bureau of Endangered Resources to make plans to manage the rare resources on their property. The survey data has recently been entered into the Natural Heritage Inventory, and is available to resource professionals who plan other actions like timber harvests for landowners and hunting policies for outdoor sports.

A detailed scientific publication on the flora of the Lake Michigan islands is being written and will be published in a professional journal. This article will reach teachers and researchers nationwide. Some key sites may be proposed for special protection in the state's Natural Area System. Both the DNR's Bureau of Endangered Resources and the Wisconsin Coastal Management Pro-

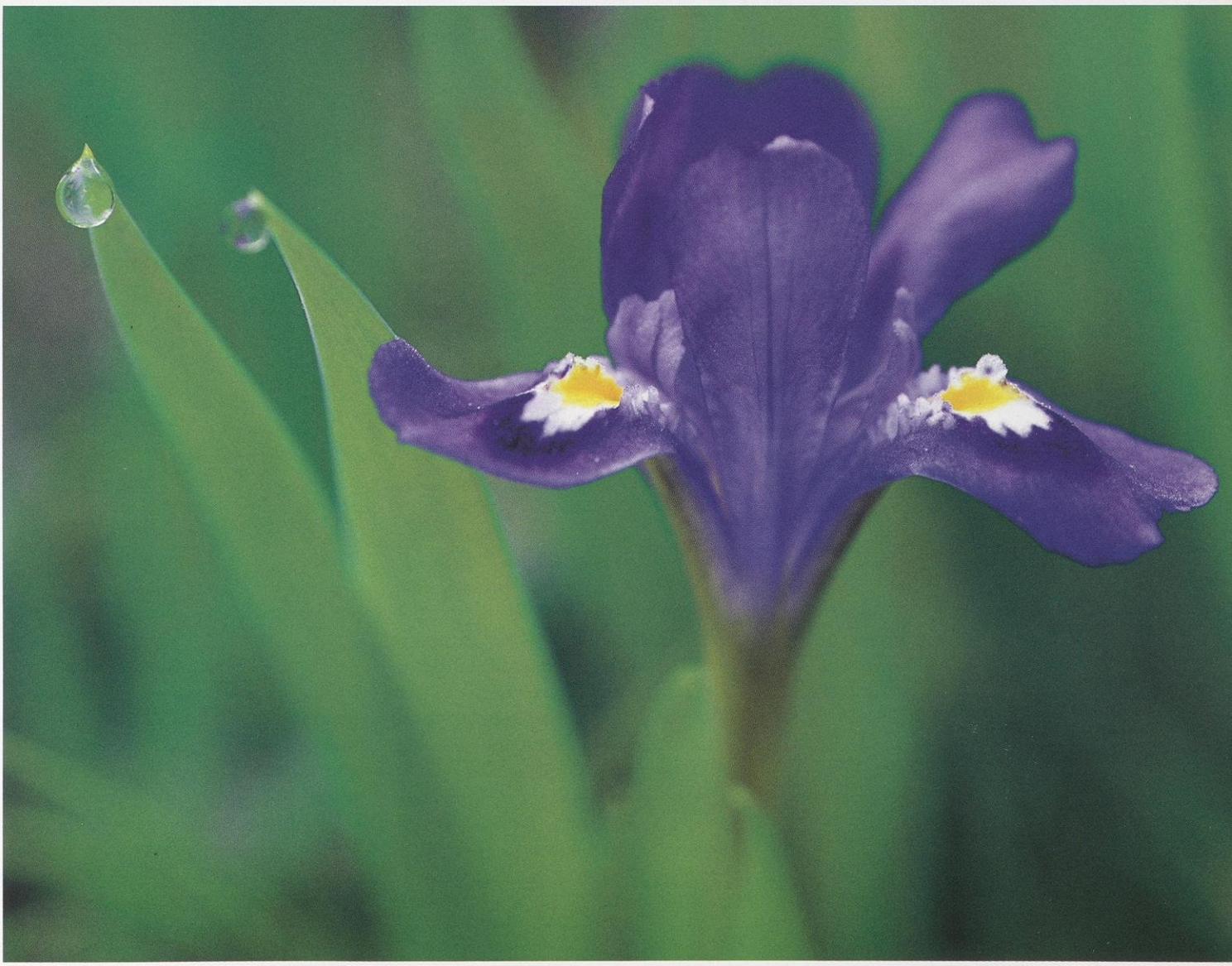


EMMET JUDZIEWICZ

gram are very interested in conserving and protecting biologically rich areas along Wisconsin's shores. The island survey now provides a sound, scientific basis for tracking and conserving these green gems in the blue expanse of Lake Michigan. □

Botanist, artist and musician David Kopitzke worked for DNR's Bureau of Endangered Resources. He pioneered programs to work with landowners to enhance wild populations of rare plants on private lands. Kopitzke now teaches at the UW-Richland campus.

(above) Judziewicz meets with a Washington Island landowner who gave permission to survey his land for rare native species.
(below) The threatened dwarf lake iris *(Iris lacustris)* blossom reaches its full three-inch height.



DARRYL R. BEERS

On the trail of Snake Creek

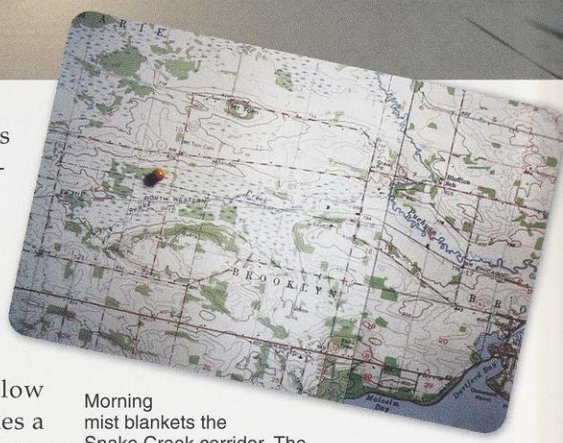
A school assignment spawned a community project and a beautiful natural attraction.

Story and photos by Thomas L. Eddy

Nestled along the base of a craggy ridge in east central Wisconsin lies Snake Creek Corridor, a scenic stream valley where you might glimpse a frolicking river otter, a low-soaring northern harrier, or hear the resonant clamor of sandhill cranes in the fog-shrouded distance. It's the kind of spiritual place where a person feels part of the chorus amid spring peepers and wood frogs.

The small oblong valley in central Green Lake County is near the town of Princeton. Throughout the corridor, expansive lowlands on the extinct lakebed of Glacial Lake Oshkosh create a pastoral landscape woven by meadows, marshes and tamarack swamps. The area is home to a variety of native plant and animal populations, notably wetlands species, some of which are state threatened and endangered.

Snake Creek, the spring-fed stream that names the corridor, originates from the lower slope of a rocky escarpment that's timbered with scattered oak woodlands and red cedar glades. The threadlike meander winds northeasterly for about four miles through a mosaic of shrub-fringed marshes, sedge meadows, tamarack swamps, low prairies, and fens before it becomes a tributary of the Puchyan River, draining into the Fox River and eventually into Lake Michigan at Green Bay.

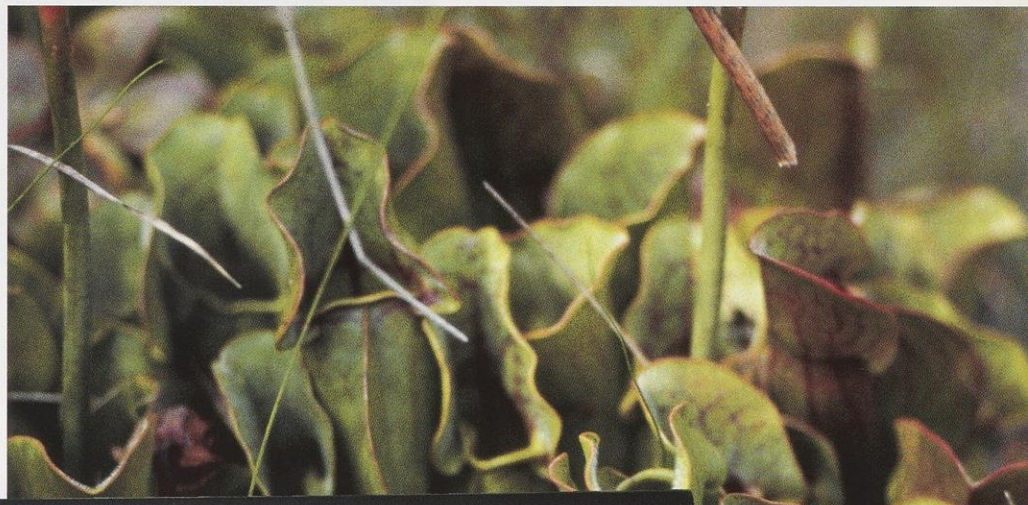


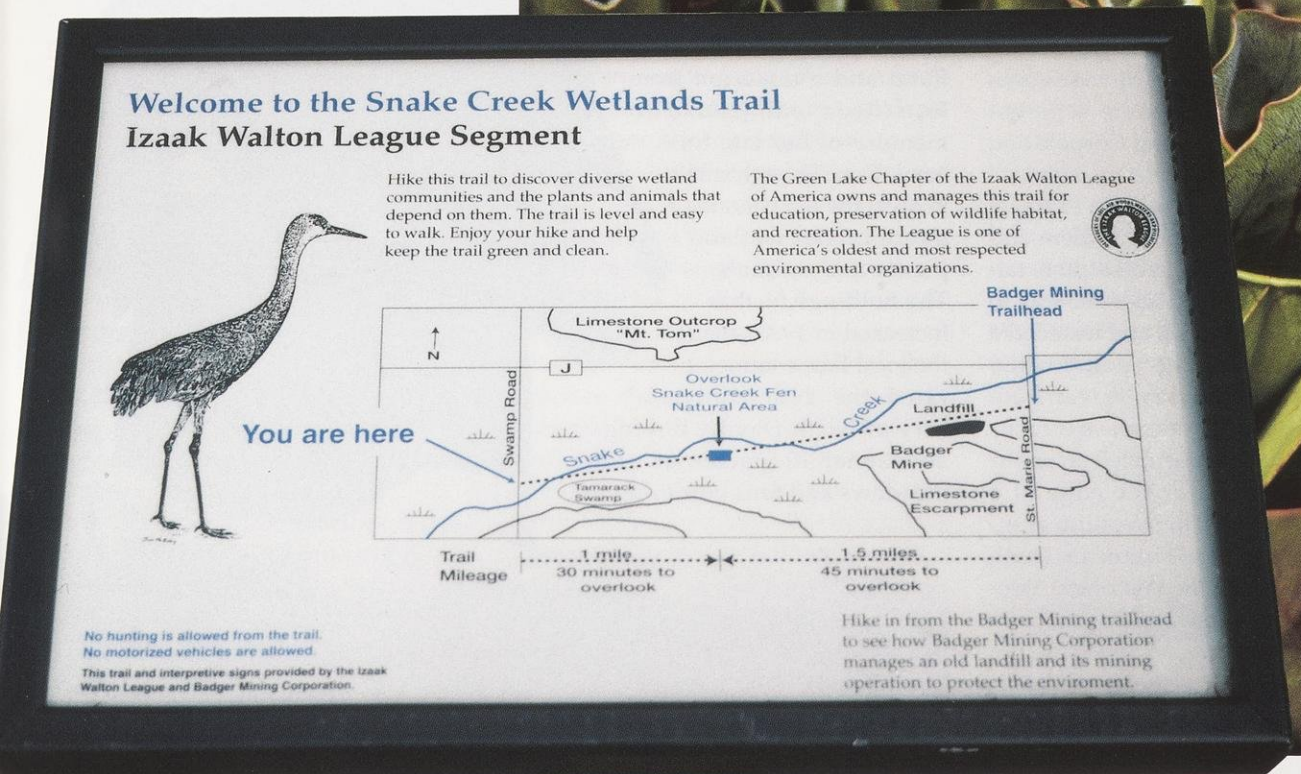
Morning mist blankets the Snake Creek corridor. The oblong valley in Green Lake County contains a mix of meadows and wetlands.

Back in 1978, my biology students were studying the vascular plants in the corridor as part of a Student Teacher Integrated Research program. After two years we had collected more than 1,400 specimens that we later identified as 501 different species — a little more than half the total number of plant species known in the county. Our study provided the driving force to interest communities in establishing a nature trail through the valley. Of course, good timing, a little luck and generous benefactors didn't hurt.

Extensive wetlands had kept the Snake Creek area largely undeveloped. A railroad grade to usher in rail service had been built through here in 1871 and was discontinued in 1979 when the Chicago and Northwestern Railroad

(clockwise from left) Creating the trail combined the talents of local students, businesses, community groups and outdoor enthusiasts. Local snowmobile clubs built solid trestles over three railroad bridges. In different seasons visitors can see pitcher plants *(Sarraconida purpurea)*, stop to read nature signs, or hear the American toad *(Bufo americanus)*.





A railroad grade traversing the valley provided a solid base for a nature trail through Snake Creek.

Company sold the ties and tracks for salvage, and offered the abandoned right-of-way to adjacent landowners and other prospective buyers.

The offer came at the same time we were starting to sense the corridor's natural diversity and appreciate that the site would make a great place to promote wetlands education. I worked with the Green Lake Area Chapter of the Izaak Walton League of America (IWLA or "Ikes") to acquire a segment of the abandoned railroad grade and develop it into the Snake Creek Wetlands Trail (SCWT). In 1980, the Ikes bought 1.75 miles of abandoned railroad between Green Lake and Princeton with matching funds from the late Clarence F. Busse, a teacher and amateur naturalist. The 66-foot-wide corridor and adjoining ¾-mile segment owned by Badger Mining Corporation formed a 14¼-acre parcel.

The community pitched-in to transform the railbed to a trail. Student and adult volunteers contributed time, talents, and labor. They graded the trail to better drain water; built and installed a trailhead welcome sign; constructed and placed birdhouses; researched, crafted and erected interpretive exhibits along the trail; and assembled an observatory platform near the edge of a tamarack swamp. Their volunteer efforts garnered the Wisconsin Earth Guard Award from the Wisconsin Association for Environmental Education in 1984.

In 1987 to further preserve wetlands, the Green Lake Area Ikes bought 8.4 grassy acres of calcareous fen contiguous

(above) Green Lake students and Badger Mining Co. employees installed a trailhead kiosk on Swamp Road as an Earth Day project in 1998.
(below) Students surveyed flora along the trail, designed displays, built and installed marker posts.

to the wetlands trail. They used grant money from the IWLA National Endowment Fund and a donation from Jean (Redmond) Jahnke in memory of her late husband, Don. Though small in area, the fen contains a rare mix of wetland plants and animals. The holdings further increased in 1990 when the local Ikes commemorated the 20th anniversary of Earth Day by buying an additional 10.5 acres of sedge meadows and fens bordering the

property. These private donations by local businesses, industry, civic organizations and individuals pieced together a whole wetland complex.

As the Snake Creek project grew, the Green Lake Ikes and their partners realized they needed a strategy to protect, manage and maintain the wetlands they had acquired. Using the original plant inventory prepared by Green Lake students, the Ikes convinced the Department of Natural Resources to do its own field surveys. These verified that the property contained rare plants and warranted special protection. In 1994 nearly 20 acres of calcareous fen, wet prairie, and southern sedge meadow was deeded to the Department of Natural Resources. The Natural Resources Board accepted the land gift and the small, but distinctive, land parcel was dedicated as the Snake Creek Wetlands State Natural Area, assuring its preservation into perpetuity.

Green Lake students keep sprucing up the Snake Creek Wetlands Trail with nature notes, benches and animal nesting boxes.

In 1997 the Green Lake Ikes and the Badger Mining Corporation of Berlin, Wisconsin, collaborated to lengthen the wetlands trail by approximately one-mile in two segments. Signs along the St. Marie segment underscore the role of industry in monitoring and maintaining groundwater quality, while the Swamp Road segment emphasizes natural history and discusses how people and wildlife benefit from wetlands protection.

Green Lake students kept adding fine touches that spruced up the trail for visitors. In March 1997 they received a grant from the Natural Resources Foundation, Inc. to construct an information kiosk at the trailhead. To celebrate both Earth Day and Wetlands Week in 1998, the Green Lake School District, students and Badger Mining employees took a few mental health days, rolled up their sleeves, dug postholes, installed new gates and built new trail exhibits. Nesting boxes for bats were designed, built and installed as part of two students' Eagle Scout projects. Another group of students enrolled in a technology production class placed benches made from old pier timbers along the wetland trail. Yet another group of students created an illustrated trail guide of common wetland plants. The sustained stewardship for the trail gives volunteers a sense of achievement and ownership for the whole corridor.

In winter the developed part of the Snake Creek hiking trail becomes part of a snowmobile route. In November 1998 a local snowmobile club was awarded a state grant to purchase lumber and shore up three railroad trestles along the trail. Now these bridges are sturdy, planked structures with handrails that are enjoyed by the summertime walkers as much as by the winter trail riders.

What will we take on in the future? One challenge is eradicating two non-native shrubs that are invading the property. European buckthorn *(Rhamnus cathartica)* and glossy buckthorn *(R. firangula)* have colonized the margins of the trail. Songbirds consume the fruits, digest the fleshy pulp, and then defecate the resistant seeds, readily dispersing the woody shrubs considerable distances with frightening ease. Fortunately, buckthorn appears to be confined to the trail edges and thus far has not taken hold in surrounding wetlands. Small controlled burns may be needed to maintain some sections of Snake Creek Trail. Most of the plant communities at Snake Creek are fire-dependent and burning will suppress woody plants to keep such open habitats as marsh, sedge meadow, fen and low prairie.

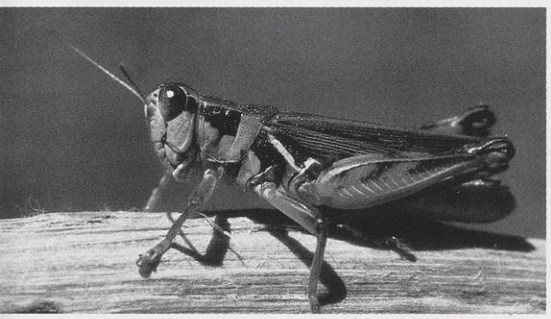
The renovated Snake Creek Wetland Trail adds to the outstanding tourist attractions and fine resorts in the Green Lake area. It will continue to provide out-of-town guests and local residents, a high-quality natural experience while also providing a home for wildlife, a buffer to lessen floods and a filter to maintain good water quality. Of equal importance, the trail is peaceful and appealing, rekindling human spirits and inspiring an emotional regard for land. Whether you come here to listen to the love songs of spring peepers and western chorus frogs some spring evening or cross-country ski past a slumbering tamarack swamp in the dead of winter, we hope you find some inner peace on the trail of Snake Creek. □

Thomas L. Eddy teaches for the Green Lake School District and at Marian College in Fond du Lac. He is a past recipient of the National Association of Biology Teachers' Outstanding Biology Teacher Award and a Kohl Teaching Fellowship Award. He is currently inventorying vascular plants at Mitchell Glen in Green Lake County.

A twisted tale

Horsehair worms appeared from nowhere and posed a tangled history of mystery.

Don Blegen



(LEFT AND INSET) JOHN BAKER

As larvae, horsehair worms parasitize roaches, beetles and grasshoppers that can carry them to water.

Two fishermen, father and son, sit anchored on a northern lake over a concentration of walleyes whose appetite could be a lot heartier. The younger fisherman, Josh, is getting a bit bored. He spots an off-white, spaghetti-like strand in the water and dips it out with the tip of his spinning rod.

He swings the rod tip toward his dad.

"What is that thing?" he asks his father.

"Oh, it's just a piece of string or thread or something."

"But Dad, it's alive!"

The thread-like object was indeed alive, wrapping itself around the rod, with the other end waving slowly back and forth in the air. The anglers had stumbled across a creature that has puzzled countless others when they encountered it in lakes, ponds, puddles, springs, watering troughs and even toilet bowls.

The horsehair worm (or *Gordius* worm) is widely distributed with at least 80 species worldwide. Most are from 10 to 14 inches long but only about 1/25 inch in diameter. They are called horsehair worms because they look like hairs from a horse's mane or tail. They even come in the horselike colors of white, tan, brown, and black. People once thought the worms were horsehairs come alive. When you find them in watering troughs where they didn't exist the previous day, what other conclusion would you come to?

Sometimes horsehair worms form groups of a couple dozen, wrapped together in an intricate tangle on the bottom of a spring or pond. Sometimes they are free swimming near the surface thrashing in slow motion like the one Josh snagged. On cold fall mornings they may be spotted on leaves of ragweed, covered in dew. Closer to home, they might create an early morning surprise in Fido's water dish or your toilet.

Horsehair worms are harmless to people, pets, and plants. They start life as a larval parasite in a cockroach, beetle, cricket or grasshopper. Some may also infect snails and slugs. The worms we see in water are adults lucky enough to have made their way from their host to water. Those that can't reach water, like those living in grasshoppers perched on the ragweed on a cold September night, die quickly of dehydration. After leaving the host, the adults are no longer parasites. They do not eat — but live for months, mating in tangled masses and laying eggs — millions of them.

What happens next is the subject of some debate. Some sources say the larvae hatch out and bore their way into aquatic insects like mayfly nymphs. When the nymphs become adults, the mayflies fly to land, mate, and die. The flies are also land insects that become infected with the horsehair worm larvae. Other sources say the eggs end up near water's edge where they are swallowed by thirsty cockroaches, crickets, grasshoppers, or beetles. However they enter their host, it is certain that the larva often grows in these land insects into a sinuous, skinny parasite that saps its host's vitality and hastens its early death.

How do the worms manage to get in ponds, lakes or springs, when the larvae live in land insects? Good question. Contact with cold water apparently triggers the parasite into abandoning its host from the nearest orifice. If the cold temperature is from standing water, the worms escape to a life of sensuous ease (up to six months) as a free-living adult without eating (because they lack mouths!). If the worm's exodus is triggered by cold dew, like that condensing on a grasshopper, the evacuated worms will be fried and dried by sunlight and be dead by day's end. This is the fate of most worms. The odds are very much against them completing their life cycle. How then do they manage to be so numerous? Fertility. One mated female may lay several million eggs to neutralize the formidable odds against survival.

How do horsehair worms appear in toilet bowls or water dishes? You need to view your house from the worm's perspective. A house is a desert environment. Insects in houses are desperate for water. They head for sinks, toilet bowls, and other in-house water

sources, often while we are sound asleep. A lady I know, a very fastidious housekeeper, was disturbed one night by the song of a cricket that had the gall to sing in her house! She located it, and, Kleenex in hand and nerves steeled, captured it and threw it in the toilet bowl. Cold water! Almost instantly, to her horror, a writhing white worm struggled out of the cricket's body. She flushed them both with great enthusiasm. What she had seen often happens in the dead of night without a witness, as house insects seek water from the toilet or a pet's water dish, fall in and prompt the worm's "great escape."

What about the worms in the horse troughs, appearing overnight? Same thing. Crickets and nocturnal beetles seeking water from the trough contact cool water and the worm evacuates the host, coming to rest on the trough bottom or swimming lazily near the surface by morning's light.

The horsehair worm is harmless, even beneficial, because it shortens the life of several insect pests and reduces their populations by drastically cutting into their reproductive rates. It played a role in the early history of science and its scientific name is rooted in Greek history and mythology.

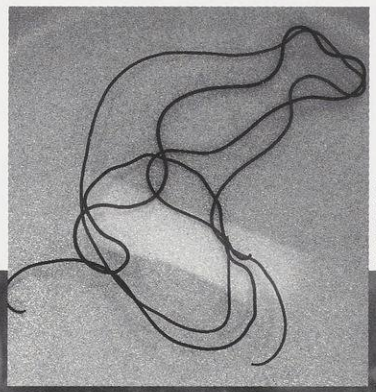
A long lineage and a knotty history

Horsehair worms were used in the late 1700s and early 1800s as an argument to support abiogenesis, the idea that life could spring from nonliving things on a constant and ongoing basis. Meat broth left standing would spoil and produce countless creatures that could be seen with the recently invented microscope. Frogs were believed to come from mud, maggots from rotting meat, mice could supposedly be produced by putting sweaty clothes in a box for 21 days, etc. And horsehairs dropped in water became living worms. Just common sense, some folks claimed.

Others, more scientifically-minded, doubted that nonliving material could automatically produce living things. A series of scientists including Francisco Redi, Lazzaro Spallanzani, and the brilliant Louis Pasteur finally demonstrated that all of these creatures, including even microbes, came from pre-existing living things and were not, despite appearances, coming from nonliving materials. This idea, called biogenesis, is a core idea of modern biology.

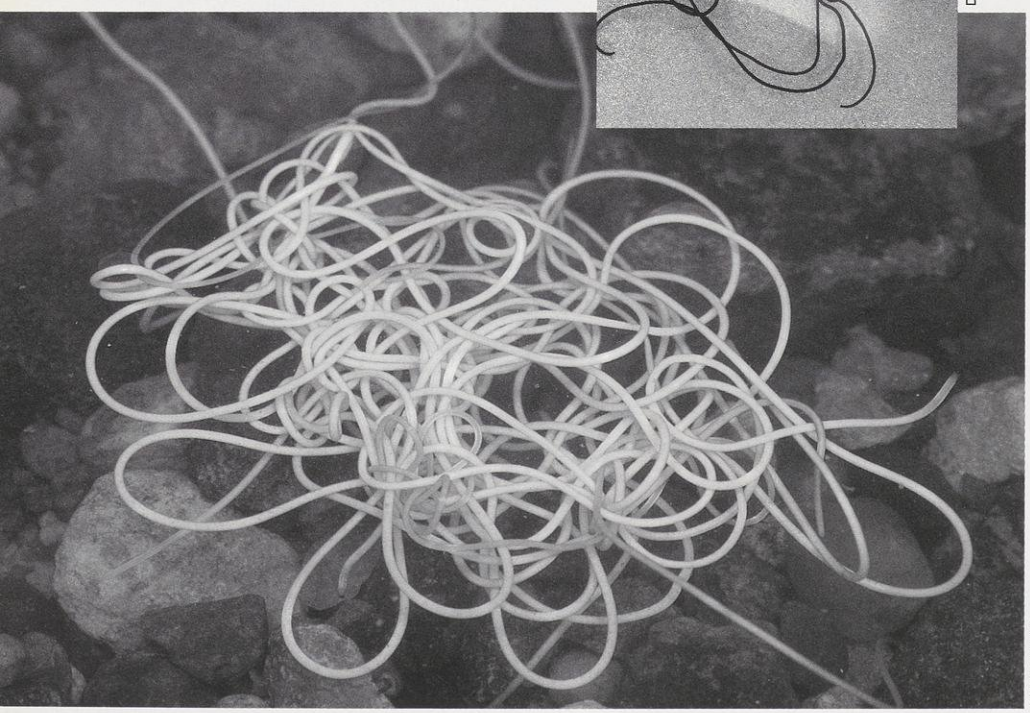
The horsehair worm gets its scientific name, *Gordius*, from Greek legend. Gordius was the father of Midas, and attained royalty by being lucky enough to enter the marketplace with a chariot pulled by a team of oxen right after an oracle predicted that the next king of the Phrygians would enter the marketplace pulled by a team of oxen. He was immediately made king, and in celebration tied his yoke to his lucky chariot with a humongous knot. The well-secured yoke and chariot remained there as an object of veneration. Upon Gordius' death, his son, the legendary Midas, became king. He attained great wealth, but produced no heirs. The priests proclaimed that the next king would be he who managed to untie Gordius' knotted yoke from his chariot. Many tried, but all failed, until Alexander the Great came along on one of his expeditions and learned of the priestly prediction. He couldn't untie it either, but, being a very practical man, he put his sword to work and cut the yoke loose. Some of the earlier contenders complained loudly that this drastic solution wasn't fair. The priests looked at Alexander, surrounded by his army; and, being practical men, they decided that it was fair — and Alexander became the new king, adding Phrygia to his empire.

Ever since, a "Gordian knot" has been a metaphor for an intractable problem. And "cutting the Gordian knot" has been a figure of speech for a brilliant, pragmatic or unconventional solution. When scientists became aware of these peculiar worms that mate in intricately knotted masses, it was only natural to name them after Gordius, that lucky, knotty charioteer of ancient Phrygia. □



DON BLEGEN

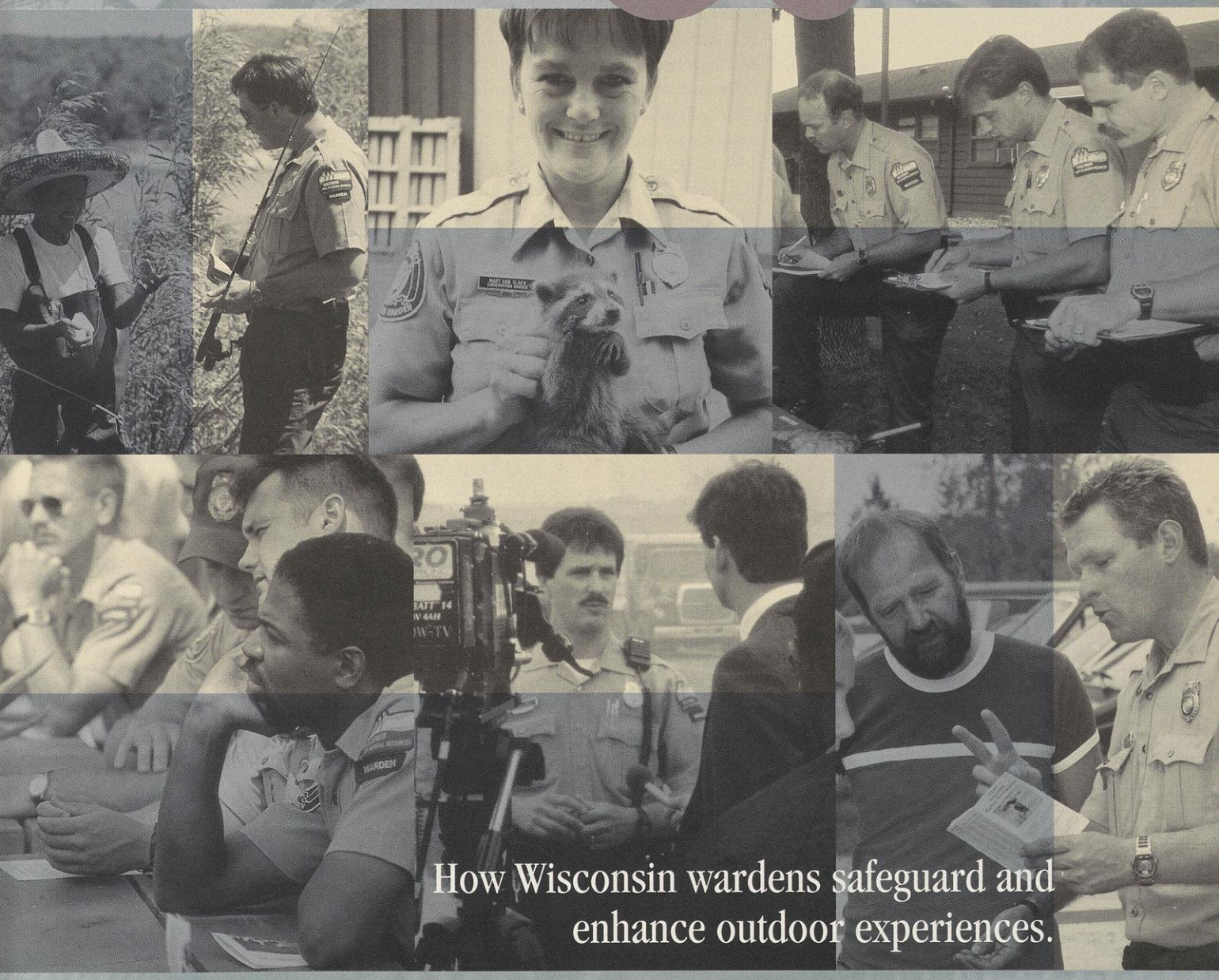
(below) Worms can mass into a tangled Gordian knot.
(right) Gordius worms can survive for up to six months squirming in water.



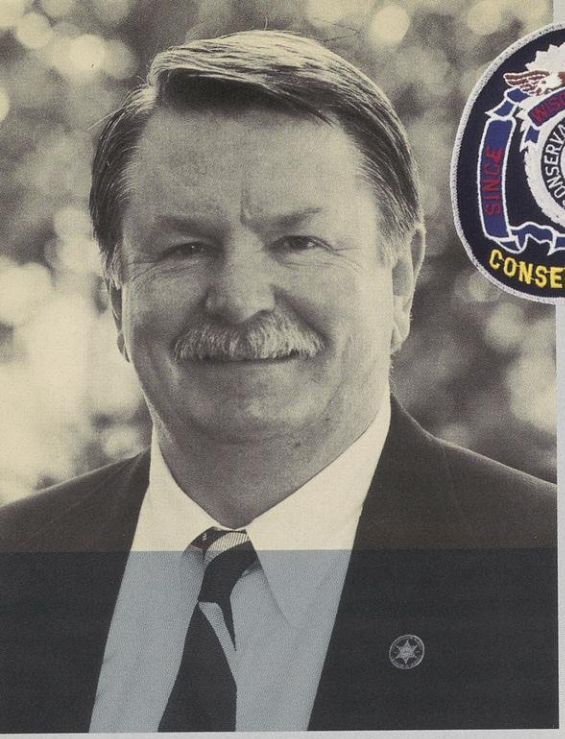
DON BLEGEN

Photographer, author and former biology teacher Don Blegen unravels mysteries of science from Spring Valley.

Resourceful & vigilant



How Wisconsin wardens safeguard and enhance outdoor experiences.



ROBERT QUEEN

We've come a long way together since the conservation warden service started 120 years ago when Rolla Baker, Wisconsin's first warden, was assigned to patrol Ashland, Bayfield, Douglas counties, and the Lake Superior fishery. Rolla had no uniform. No expense allowance. No transportation except for his horse and his own two feet. And his daily wage was about what you and I spend on a cup of coffee these days.

The early wardens faced tough challenges. Market hunters and settlers struggling to survive in the wilderness generally ignored or resisted limits on their hunting and fishing, despite the signs all around them. Elk had vanished from the land. Deer numbers were bottoming out. Fish and ducks were stacked like cordwood on the shores of Lake Michigan bound for commercial markets, and the passenger pigeon was on its way to extinction.

The change we've seen in attitudes, resource management and enforcement in 120 years has been remarkable. Deer populations are at record levels, turkey have rebounded beyond belief, elk again roam the Wisconsin woods and fishing is great. This didn't happen by chance. It took advances in science and our understanding of the natural world around us, and hard work from fish managers, wildlife managers, pollution control staff, conservation wardens and citizens.

We are proud of the role that Rolla Baker and the 1,610 men and women who followed him in the warden service have played in this recovery, and we celebrate their accomplishments.

We are also turning to the future. Today's conservation wardens face increasingly complex challenges; their authority and responsibilities are broader than Rolla Baker could have ever imagined — wardens enforce laws regarding fish and wildlife, boating, snowmobiling, all-terrain vehicles, the environment, water regulation, shoreline protection, and forestry. At the same time, the number of people enjoying the outdoors, and enjoying new kinds of recreation, has surged. Personal watercraft and all-terrain vehicles are but two of these new activities that provide new outdoors opportunities. They also create more conflict with traditional users and with others seeking beauty and solitude in Wisconsin's outdoors.

These conflicts and demands on our natural resources will continue as our state's population increases. We, both citizens and visitors of this state, are challenged to work smarter to insure that we can continue to enjoy and pass down to our children a clean environment, abundant natural resources, and safe recreation. To help achieve these goals, our conservation warden service will focus in the coming century on the following areas:

Partnerships — We can't protect Wisconsin's natural resources alone. We respond to our communities by listening and by encouraging our employees to form working partnerships to identify and resolve natural resources problems, and to capitalize on opportunities to enhance our natural resources for future generations.

Recruitment/training — We will recruit and hire the best qualified individuals who demonstrate good interpersonal skills, are committed to protect natural resources, and want to understand people — both those who enjoy outdoor recreation and those who don't. Once hired, we will provide staff with a wide range of training in enforcement techniques, legal changes, technology and changing human behavior.

Conflict resolution — The warden service will act to resolve conflicts among recreational users, and between users and non-users. The concerns of all constituencies are considered.

Commitment to ethics — As professionals, we will adhere to the Law Enforcement Code of Ethics and place the welfare of citizens above personal concerns while rendering our services.

Changing technology — The warden service exists in a dynamic, changing environment. We will actively seek opportunities where technology improves service and better protects natural resources.

We are pleased to share these articles that describe our aims and our operations. We hope they help give you an understanding of how these men and women have been proud to serve you and our natural resources for 120 years, and how we will work together in the coming century to do so.

Sincerely,

Thomas L. Harelson

Thomas L. Harelson
Chief Conservation Warden

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Caught in the middle

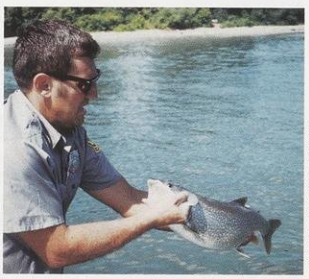
Protecting resources can place the warden in an uncomfortable squeeze among cultures, consumers and the courts.

James Blankenheim

Throughout its 120-year history, Wisconsin's conservation warden service has been called upon to moderate difficult situations. Individuals or groups competing for the same resource, cultural practices of ethnic groups that don't mesh well with Wisconsin rules and laws, or reports from people who have misinterpreted what they see, all put the conservation warden smack dab in the middle of controversy.

Share the harvest

One of the oldest competitions places the wardens between commercial fishers and sport anglers vying for the same fish species. In the early 1970s, complaints from sport anglers spurred the Department of Natural Resources to ask its wardens in Racine and Kenosha counties to check perch nets set close to shore by part-time commercial fishermen. The "beachcombers," as they were called, were catching a lot of brown and lake trout in their nets, according to complaining sport anglers. The wardens kept records of the numbers, approximate weights and condition of the trout and salmon ensnared. The documented damage warranted a rule change requiring gill nets to be moved away from areas where they were prone to catch large numbers of trout.



JAMES BLANKENHEIM

When nets snared game fish near shore, the warden was caught between the interests of commercial businesses and sport anglers.

In recent times, the harvest of Lake Superior's lake trout has to be allocated among tribal commercial fishers, state-licensed commercial businesses and anglers. Mike Vogelsang, warden supervisor at Bayfield, has been involved in forging the Lake Superior Agreement used to make the allocations. Vogelsang also spends time with clubs and individuals explaining how and why the agreement works. A big part of Vogelsang's job involves monitoring the commercial catch and equipment used by commercial fishermen. He accomplishes this, in part, by twice weekly joint patrols with both Red Cliff and Bad River tribal wardens. "It's hard to please everyone, but I feel the Lake Superior Agreement works," says Vogelsang.

Two undercover investigations that showed illegal perch sales by Lake Michigan's commercial perch fishers led to a Commercial Fishing Task Force in 1998. Conservation Warden Tom Solin was assigned to the task force to answer questions and provide direction on law enforcement issues. The task force also includes a DNR fisheries representative, two legislators, four sport anglers, three commercial fishers, a wholesale fish dealer and four members of the public at large. Their goal? To devise a viable method of regulating commercial fishing. Solin and Charlie Henrickson, a task force member and commercial fisherman from Bailey's Harbor, are both pleased by the progress. Henrickson says he's encouraged that law enforcement staff is willing to consider new and different ways to regulate commercial fishing. "I'd like to see a more efficient way to make the system work," says Henrickson.

Cultural clashes

Wardens are also caught in the middle when people with diverse cultural backgrounds use public resources. Dick Wallin, the conservation warden at Viroqua, works with the Amish community — a group he judges as violating natural resource laws less often than average. Yet Wallin receives a fairly high number of unfounded complaints involving the Amish. Some complaints are clearly due to Amish cultural practices that others don't understand. A good example is the Amish dress code, which calls for a dark coat, pants and cap during the fall and

JEAN B. MEYER

Wardens work with immigrants whose native cultures can have different views, habits and practices of using natural resources than state laws dictate.

STEPHEN J. LANG

On-water patrols aim to protect wild populations, public safety, respect other outdoor users and prevent overharvest of shared resources. For instance, where loons nest, boats need to keep their distance and control their wake. Wardens like Heather Gottschalk monitor the interactions among animals, boaters, anglers, shoreland owners and the water environment.

JEAN B. MEYER

winter seasons. Amish hunters wear blaze orange during the deer season, but immediately remove that clothing when they are done hunting. Consequently, Amish hunters have been seen standing around a wagon or loading a deer in their traditional black clothing. Others assume the Amish have been hunting deer without blaze orange clothing.

Wallin has worked with Amish leaders to help them understand the need for hunter education courses. Until a 1985 law mandated hunter safety classes for all hunters born after Jan. 1, 1973, Amish youngsters didn't take the courses because Amish law required that their youth wait until they turned 16 to hunt. When the 1985 law took effect, Wallin worked with elders to identify and train Amish hunters to provide safety instruction. Each year Amish instructors conduct a class and invite Wallin to attend.

There are other challenges wardens face when working with people whose traditional practices are different than those generally accepted by society. "I remember the first time I was going to put Amish witnesses on the stand," recalls Wallin. "When told of the procedure and the swearing-in oath, the Amish said they could not take the oath because of its wording. That meant a criminal deer case was going to be lost. The D.A. and I researched the statutes and found an alternate oath of affirmation which proved to be acceptable."

John Buss, conservation warden at Sauk City, also works with the Amish community. Buss says he set out to educate the Amish about our resource laws and ended up being educated himself. "We go through life seeing things through our own eyes," says Buss. "Yet, if we take the time to gain an understanding of someone else's culture, it makes our job so much easier."

Buss recalled a buggy ride to a hunter safety class provided by an Amish bishop. He said he learned so much from the experience that warden recruits now spend time on an Amish

farm as part of their training.

Since the end of the Vietnam War, Wisconsin has become home for many Southeast Asian people whose cultural traditions and practices at times put them at odds with our state's resource laws. Don Mezei, warden at Wausau, sums it up this way: "These folks come from a culture where they spent the majority of their day hunting and gathering food. They didn't recognize such things as size limits, bag limits and closed seasons."

Mezei and Roy Kalmerton, the warden at Sheboygan, focus on education to help tackle the problem. Mezei has used a Hmong radio station and a facility called The Neighbor's Place in Wausau to reach area Hmong. Hunting and fishing regulations were printed in both Hmong and Laotian. Kalmerton worked with Judy Powers, the Dean of Public Safety at Lakeshore Technical College, to bring the concepts of natural resources conservation to the Hmong. Powers calls the hunter safety program "the best thing we ever did. Not only did it provide very useful information to the students, but it really helped establish communication and trust between us."

Mezei and Kalmerton note that at least 50 percent of complaints about alleged violations involving Hmong are unfounded. Kalmerton remembers one complaint accusing Hmong hunters of sneaking out an untagged buck during the gun season. The hunters had covered the animal's head with a pillowcase, which the witness believed was done to mask the lack of a tag. Kalmerton found the group, found the buck properly tagged and learned that in their homeland, Hmong often traveled far to hunt. It was their custom to cover the eyes of the dead animal so it wouldn't know it was being removed from its home area. "It was out of respect," says Kalmerton.

"There seems to be a perception that Hmong people violate conservation laws at every opportunity," says Mezei. "That's just not the case. We've spent a lot of time working to change the Hmong view of wildlife as an unregulated food source and feel we're definitely making headway."

Harmony on the water

Over the years, the number of people competing for space on our lakes and rivers has skyrocketed. One northern Wisconsin warden recently mused that in summer, water conflicts were so prevalent he thought he should change his warden grays for a referee's striped shirt and whistle.

Wardens spend a lot of time working with lake associations, local units of government, boat manufacturers and boaters to resolve on-water conflicts. Bob Tucker, retired law enforcement safety specialist for the DNR's Northern Region, advocated that one lake bay where loons nested needed protection, and he worked with town officials to achieve that goal. The township subsequently enacted an ordinance restricting motorboats in the bay to slow-no-wake speeds during the nesting period.

"Many times, the answer to an on-water problem is a compromise that modifies the offending activity by local ordinance," Tucker says. Limiting high-speed motorboat operation and water-skiing to midday hours, establishing slow-no-wake areas to protect wildlife, limiting nearshore access to fragile aquatic vegetation, or barring boats in narrow bays used by swimmers are examples of local ordinances resulting from the field warden's involvement.

Keeping the peace

Wisconsin wardens faced one of their most difficult challenges in the team effort to keep the peace during Northwoods spearfishing protests. Demonstrations began in the mid-1980s after appellate courts reaffirmed Chippewa treaty rights to fish off the reservation. During the height of the unrest, state troopers, sheriff deputies and police officers from across the state were summoned to northern Wisconsin. Access to boat landings was tightly controlled. Wardens were assigned to keep peace on the water, as well as enforce state boating laws and tribal spearfishing codes.

BUREAU OF LAW ENFORCEMENT

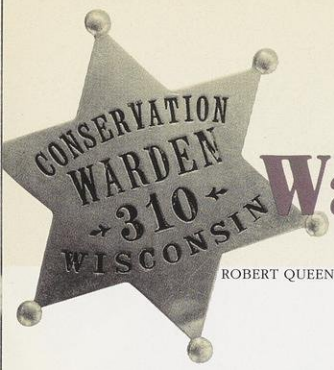
During spearfishing demonstrations, warden patrols helped ensure that court-ordered rights to public waters and resources were upheld.

Then-Assistant Chief Warden Rollie Lee briefed the wardens about their difficult assignment. Lee said that he, like them, had spent numerous hours protecting spawning game fish, but the wardens would now protect individuals spearing those same fish. Lee went on to say that we are a nation of laws and the court had ruled in the tribe's favor. As professional law enforcement officers, wardens now had to fairly and firmly enforce the court's decision.

Unfortunately, some protesters were not content to demonstrate peacefully. Rocks were hurled along with ugly racial slurs. Gunshots occasionally rang out along the lake to intimidate the spearfishers and the peacekeepers. Protesters took to the water to block landings and disrupt spearfishing by creating large wakes and roiling the shallow water. At times each spearboat had a warden boat assigned to protect it. One warden was struck in the head by a rock and had to receive emergency treatment. Gunshots and threats of violence made body armor and riot helmets standard issue.

In the end, with the help of Wisconsin lawmakers who passed a "hunter harassment" law, the conservation wardens were able to continue fulfilling their sworn duties in the midst of a contentious issue. □

James Blankenheim retired in January 1998 after 30 years of service as a Wisconsin warden.



ROBERT QUEEN

Warden History Timeline

1787–1848
Territorial laws regulated game, fish and trapping activities, water navigation, wildfires and timber trespass

1851
First statewide hunting regulations enacted

1853
Fishing regulations initiated

1862
Commercial fishing regulated statewide

1879
Rolla Baker of Bayfield appointed as first fish warden in northern counties

1887
First four game warden positions created

1897
Deer hunting licenses issued — $1 for residents and $30 for non-residents — provided first funding for state conservation purposes

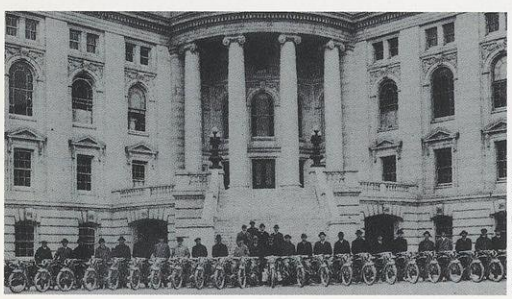
1905
Civil Service established in Wisconsin, which ended political appointments to the warden force

DNR FILE PHOTO

Early wardens like Ellis "Pop" Weaver also assumed forestry and pollution duties.

1915
Major year for conservation developments:
- Wisconsin Conservation Commission created (it later became the Wisconsin Conservation Department)
- natural resource laws restructured for 1917 publication became the basis of current natural resource laws
- $1 non-resident rod & reel fishing license required
- fish and game wardens' titles changed to "conservation warden"

1915 — First state-issued vehicles for wardens were 25 motorcycles.



DNR FILE PHOTO

1848 1862 1887 1915

Memories and memorabilia

In 1979, when wardens met in Wausau to celebrate their centennial, the old-timers brought artifacts from the past and shared their old stories. That moving experience prompted the group to build a permanent museum where people could discover the past efforts of Wisconsin's warden service and consider future issues in managing natural resources.

The Wisconsin Conservation Wardens Association (WCWA) took the lead in exploring possible locations and developing exhibit ideas. The new museum will be housed at the MacKenzie Environmental Education Center in Poynette, about 25 miles north of Madison. The center already attracts 40,000 visitors annually, who come to walk the nature trails, visit a display of Wisconsin native animals, see exhibits on environmental issues, and spend a few days learning about the outdoors.

The museum will be housed in a renovated building nestled near a pine plantation, the state game farm and a picnic area. Visitors can learn about warden history and conservation enforcement techniques, see the tools of the trade, and hear narratives from 120 years of warden life. The museum will also serve as an archive for artifacts, manuscripts, photos and files from the conservation wardens' colorful past. Anyone willing to donate relevant artifacts or documents is encouraged to contact the Law Enforcement bureau at (608)266-2141.

Renovations are slated to begin in July 2000 and the museum anticipates opening by spring of 2001. — *Ralph Christensen, former chief warden from 1982 to 1997*

1935
Warden Pension Fund established, becoming first retirement plan for state employees, provided $50 per month during retirement

1946–1958
Two-way FM radios issued, starting in northern counties, to aid communication during emergencies

The 1928 uniform worn by Jack Worden.

DOROTHY CASSODAY

Arthur "Doc" Chase wears the 1930 uniform.

1947
Special Investigation Section created

1948
State Crime Lab established, made available to wardens investigating violations

Amount of training required to become a warden:

1957 — 80 hours
1972 — 240 hours
1998 — 810 hours

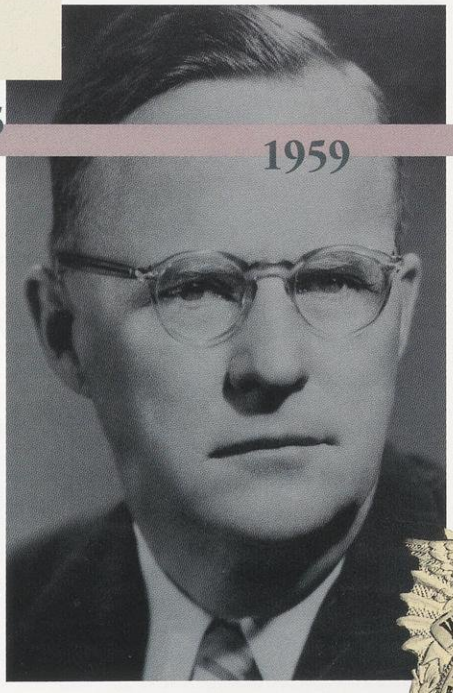
1959
Boating safety and aerial surveillance programs started

1960s
Social unrest resulted in wardens working riot control at the State Capitol, the University of Wisconsin and military installations

1962
Wardens issued state cars, and legislation required wardens to receive emergency preparedness training

1966–69
The office of Justice of the Peace is phased out, transferring fish and game violation cases to the state circuit court system

Ernie Swift — field warden in 1926, Conservation Dept. Director 1947-54 and prominent voice for outdoor conservation.



DE LONGE STUDIO

1967
A pivotal year for Wisconsin's natural resources:

DONALD HOLL

Conservation Day at Eau Claire High, 1954

- Functions from the Conservation Department, Board of Health and Department of Resource Development combined to form the Department of Natural Resources
- Wardens' duties expanded to include environmental investigations and enforcement
- DNR administers hunter education classes
- A federal court ruling reduced wardens' workweek to 40 hours

Mid-1970s
Wardens given additional duties of enforcing Native American treaty rights and the Endangered Species Act

1976
Most natural resource law violations decriminalized, reducing charges from criminal to civil citations

Celebrating the warden's centennial in 1979

1979
A fish and game violation hotline established, 1-800-TIP-WDNR

1981
The state legislature expanded warden authority to include general law enforcement in some circumstances

1935 1959 1967 1981 1998

1955
Warden force increased from 105 to 130 members

1957
Training officer position created, the start of organized training for the warden service

DNR FILE PHOTO

1970s
Wardens started coordinating a 500-volunteer effort to protect sturgeon spawning runs on the Winnebago Watershed

Mid-1980s
New laws dramatically increased fines for fish and game violations

1985
Environmental warden positions created

1998
The number of credentialed wardens increased from 191 to 209 □

Timeline information prepared by Judith J. Borke, curator for the Wisconsin Warden's Museum.

The unseen team

Behind every successful warden is a family that understands the special demands of "the job."

Lisa Gaumnitz

Sandy Brown answers calls at bar time from tipsy patrons demanding to talk to her husband to settle bets about fishing regulations.

Rita Engfer takes her son to the church alone for his first communion and faces a houseful of guests afterward while her husband pursues a big break in a hunting violation case.

Tom Schartner leaves the family business and relocates so his wife doesn't have to commute three hours from her Green County station to be with him and their children.

Families quickly learn that when their loved one gets hired as a Wisconsin conservation warden, the whole family gets hired. "It's not a job — it's a lifestyle, and it involves the whole family," says Jill Schartner, a conservation warden since 1990.

Long hours, weekend work, night patrols, calls from strangers, and round-the-clock scrutiny from the community are all part of the job for conservation and environmental wardens. They're also part of the special pressures and demands spouses and children face by default, and single wardens shoulder in their personal and social lives.

On the job while others play

Sandy Brown thought her job as chief deputy clerk of courts in Barron County had prepared her for the life she'd live when she married conservation warden Terry Brown seven years ago. But she hadn't expected that the telephone would ring at all hours at home, that Terry would be called away from Christmas dinner to return four hours later, and that planning a night together would be nearly impossible. "I was under the assumption it was like a law enforcement officer," she says. "You worked your shift and then you were done."

But Terry was always "on" because conservation wardens don't have a second or third shift. Wardens are "assigned" — sometimes by themselves or with one other warden — to cover an entire county and follow up on all calls.

Wardens set their own hours, usually early morning, evenings, nights, and weekends when hunters and anglers are afield. Most use their homes as offices. But this flexibility often becomes a double-edged sword that cuts into personal and family time, wardens say. They know if they don't respond to a complaint in their county, no one will, so their hours are scattered throughout the week.

"You may work all night and then go to work again the next day," says Terry Brown. "Your biological clock gets screwed up and you can't sleep — and that goes on all fall and spring. You get extremely exhausted. You are very hard on your family and very hard on your kids."

The punishing schedule was one reason Brown applied last year to become a law enforcement safety specialist, a position that has more regular hours and frees him from responding to complaints. He and Sandy knew he'd made the right choice when shortly afterward a lakeshore property owner Brown was investigating for a shoreland violation pulled a submachine gun on him. Brown successfully subdued the assailant without harm to either man.

ROBERT QUEEN

To be together throughout the week, Jill Schartner's family switched jobs and moved to Green County where she was stationed.

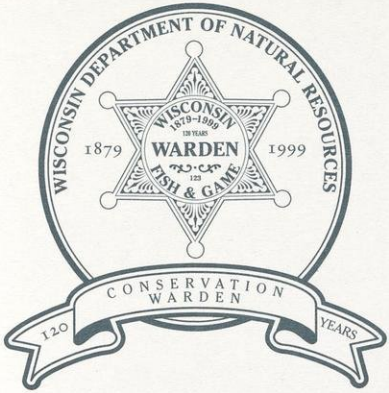
A family commitment

Tom Schartner's concern for his wife's safety triggered some sleepless nights at first. As a warden, she deals daily with people carrying hunting rifles and fishing knives. "Over the years I've learned to trust her judgment and abilities in the field," he says.

The family has been lucky in many respects. His and Jill's parents provided invaluable help in the early years of Jill's career, when Tom and their two young children were living in Door County and he was working for the family business. Jill spent her first year on the warden service moving from station to station as she was trained, and then spent the next 1½ years alone in Monroe, more than 200 miles away from the family.

When Tom and Jill tired of the long weekend commute, they flipped a coin and decided to move to Green County to be together. Tom found a middle management position with Monroe Truck Equipment that he says has worked out better than the job he left.

Jill Schartner recognizes the sacrifices that her husband —



Turn in poachers and polluters!

1-800-TIP-WDNR

FISHING • TRAPPING • HUNTING • ENVIRONMENTAL • RECREATIONAL

Call the toll-free, statewide, confidential hotline 24 hours a day

Hotline reporting information to remember!

Where	county, road/highway, lake, etc.
When	day, time
Who	description of suspect: hair, height, weight
What	what did you see, hear or suspect happened
Vehicle	type, model, color, license plate number

1-800-TIP-WDNR (1-800-847-9367)

If you're not able to report a violation immediately, write the information down as soon as possible to keep it fresh and accurate.

The more information collected, the better our chance of catching the poacher. If we all help, together we can stop natural resource violations.

and that other wardens' spouses make. "I couldn't do the job I do without the type of husband I have," she says.

Tom does the laundry, has dinner on the table if Jill gets home late from work, and helps her do the secretarial work her job requires. Office help isn't provided for field wardens who work from their homes.

"I understand Jill's job and the kids do too," Tom Schartner says. "At times, her position is very stressful. Doing little things around the house can be shared. It helps her with her career and it benefits our family."

Josh Schartner, 16, found being his mother's answering service "a big nuisance" until the family got caller identification on the telephone. Now, he and his 12-year-old sister Jessica pick up the phone only when they recognize the number.

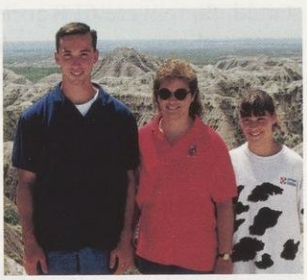
He can't screen the questions at school, however. "I don't get grief, but I get questions all the time — 'Is rabbit season open?' I say, 'Just call and talk to my mom,'" Josh says.

That lack of anonymity means wardens and their families put up with constant interruptions when they're off the clock; it often leads them to seek entertainment outside town.

"The one thing that kind of eats at you after a while is someone will come up to you in a restaurant and say, 'I don't want to bother you during your dinner' — and then they'll proceed to ask you five questions," says Mark Burmesch, a field warden who recently became a warden supervisor in Wisconsin Rapids.

Playing card games with friends, attending family events like his niece's baptism or seeing his girlfriend all become difficult to manage — or a source of some guilt if he actually does go.

As a single warden, he can't count on the same support network or help at home that married wardens get. There are a good percentage of wardens who are single. It's not that they're worried about the job being intrusive in married life, Burmesch says. It's trying to find the right person who can tolerate that kind of intrusion.



(right) **Lee, Rita and Megan Engfer had to learn to enjoy family adventures without Dad. On this one, Bill is behind the camera...Trust us.** *(below)* **Single wardens, like Mark Burmesch, find the crazy hours can curb their social life and shorten family get-togethers.**

FAMILY PHOTOS

Away from home

For many wardens' families, the biggest challenge is not so much the intrusion, but the fact that the wardens are so seldom at home. Undercover agents, particularly, may be on long assignments and may have difficulty contacting their families, says Tom Solin, who supervises three undercover conservation wardens, and was himself an undercover warden from 1986–1993.

"You don't tell your family a whole lot of what's going on," he says. "You can't give names or places, so they might not know where you're working."

In the early 1990s, DNR undercover agents, as well as agents from Minnesota and Canada, ran an elaborate operation to net commercial fishermen who were catching significantly more fish than was legal. For three years, the agents bought fish from Wisconsin, Minnesota and Chicago commercial fishermen and hauled it up to Hastings, Minn., where they ran a storefront. The agents unpacked the fish, photographed it, weighed it, recorded the information, repacked it and trucked it to their retail buyers before returning to Hastings to do the whole routine the next day.

"One of our people usually managed to get home one day a week" to see his family, Solin says. "But he was so worn out after the drive home that he slept through his day off."

Rita Engfer is accustomed to shouldering the load alone as her husband Bill has progressed through the ranks as conservation warden, safety specialist, boating administrator and recreation safety chief.

She drove herself to the hospital delivery room alone for the premature delivery of her daughter because she couldn't track down Bill through the State Patrol or DNR dispatcher, and she didn't know anyone else in Appleton.

Their son, Lee, was seven before his father was able to be there for his birthday. When a case broke and interrupted the family's plan to go to Disney World, Rita took the kids by herself.

"Eventually, you learn you are mom and dad for your kids," she says. "You just get used to doing things yourself. You can't put your life on hold."

It's a hard lesson, Engfer says, especially for the kids. But the flip side is those unusual demands create a camaraderie — within the individual families and among the families as a group. The experience helps children gain knowledge, respect and appreciation for natural resources, and also for the job their parents do.

"I think they'd have only good things to say about having a parent who was a conservation warden," Rita says of her children, Lee, 19, and Megan, 13. "While there are hurt feelings about it at the time, they only remember the good times." □

Lisa Gaumnitz writes about DNR research and law enforcement issues from her Madison office.

Those fatal moments

Ask any warden: Carelessness and a lack of proper skills training cause many of the state's worst outdoor accidents.

Bill Schwengel

Few conservation wardens get far into their careers before being called to investigate the tragic loss of a person's life, often due to a careless act while hunting, snowmobiling, boating, or riding an all-terrain vehicle (ATV).

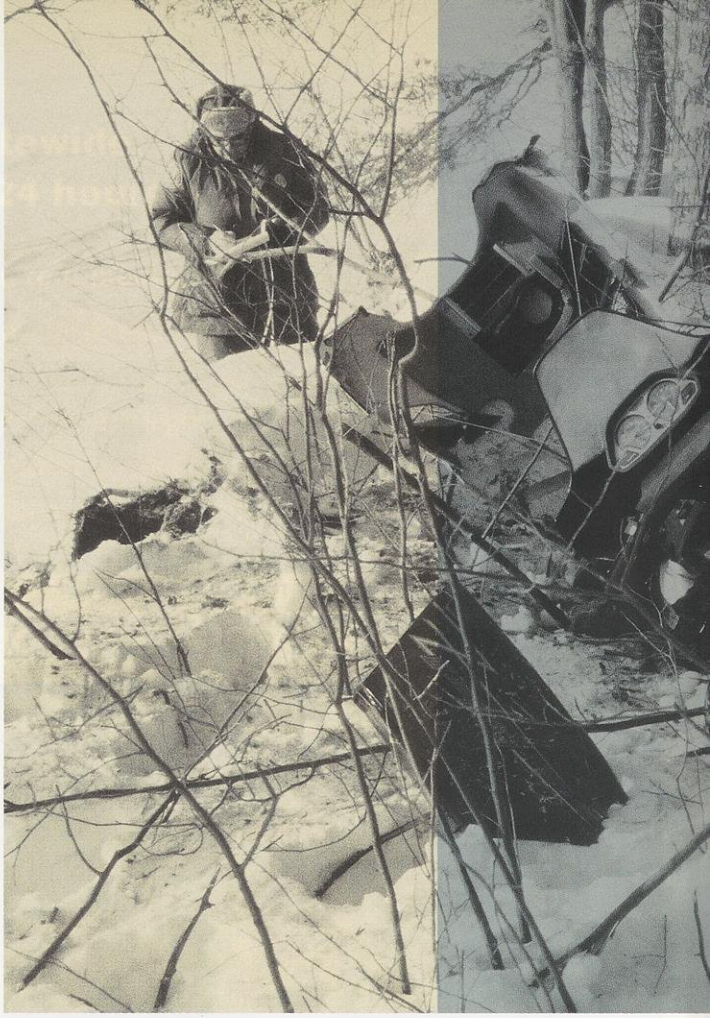
Formal accident reporting was not required until 1951. However, newspaper articles from the early 1900s show the number of hunters killed and injured was much higher in proportion to the number of deer harvested. An account from the Nov. 4, 1908 issue of the Iron River Pioneer reported: "There were no serious accidents during the past deer season although there were 44 persons killed and 57 injured. Most of these reported were self-inflicted owing to carelessness in handling firearms. That number is still too high, but with an estimated 20,000 hunters in the woods and a definite lack of snow, the record was not too bad."

Outdoor education courses help

Great strides in hunter education and law enforcement have significantly reduced hunting accidents. In 1998, two people died and 15 were injured in firearms accidents during a nine-day gun-deer season in which 670,000 hunters harvested 324,514 deer.

Snowmobile accidents were rare until the advent of modern, fast snowmobiles in the early 1970s. Death rates were high then and continue to be high in proportion to the actual number of machines registered. In the last ten years, Wisconsin snowmobile deaths have ranged from 15 in 1988–89 to 34 in 1996–97.

Wisconsin's first boating safety laws were introduced in 1919 and were intended for commercial vessels. Reporting all boating accidents did not become law until 1960. Boating fatalities, injuries and accidents have dropped even as the number of boats registered in the state has swelled to 570,000, with another 500,000-plus nonregistered boats including canoes and kayaks. In 1970, shortly before the safety education course started, there were 61.8 accidents per 100,000 registered boats. In 1998, there were 28 accidents per 100,000 registered boats.



It takes a delicate touch to investigate cases where people have been injured or killed, especially when evidence shows poor operator skills or judgment contributed to the tragedy. Every year, wardens investigate recreational accidents that cause more than 500 injuries and 50 fatalities.

The roaring popularity of ATVs too often puts these machines in the hands of operators who are too young and inexperienced to prevent accidents. In 1997, for instance, one-third of the 170 reported accidents involved operators 15 years of age or younger.

Consoling tragic losses

Although most accidents result in minor personal injury, a small number take a tragic turn, disabling victims or taking the lives of those that were enjoying themselves just seconds before. Fatal accidents receive a lot of publicity, not necessarily for the circumstances of the accident as for the heart-wrenching outcomes: Wardens follow-up when a 5-year-old drowns after his father's snowmobile plunges through thin ice; a father of two children is mistaken for a deer and shot in the predawn darkness by a teenage hunter; an expectant mother in a tree stand loses her baby when she is struck by a stray bullet from a careless hunter; a young ATV operator is struck and killed by a car on the highway a short distance from his home; and when three walleye fishermen in a 12-foot boat perish in 36-degree water after their boat capsizes on a cold March day.

JAMES C. BISHOP

LAURA ENGLAND

Lessons learned from accidents are incorporated in safety classes so students can anticipate situations that injured others.

Learning from accidents

A conservation warden's primary obligation is to protect outdoor recreationists from the negligent acts of others. Most "accidents" result from carelessness that could have been prevented with proper training, adequate supervision, or compliance with safety laws. Those who misuse firearms, recreational vehicles and vessels can be held accountable for their actions and charged in criminal court for negligent use. Sentences can involve fines, jail sentences, and license revocations.

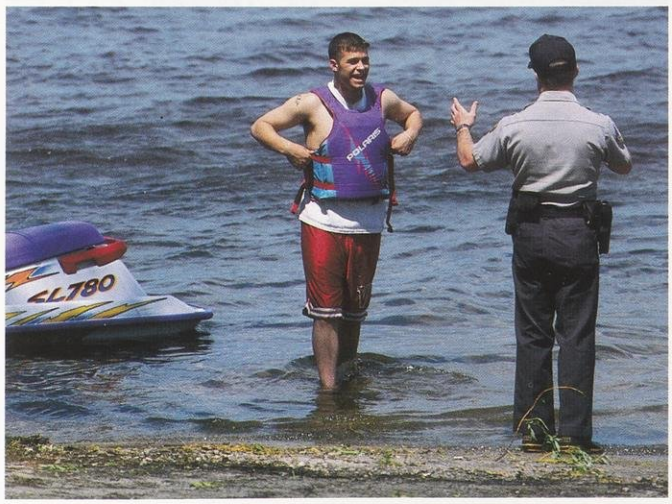
Wardens also examine cases to determine if the accident could have been prevented through additional safety education, more specific safety laws, or better product design. For example, snowmobile safety classes now stress the perils of alcohol use while snowmobiling. Instructors teach young operators how to drive defensively when encountering intoxicated operators. A second example: New legislation enacted last year requires hunters to wear caps that are at least 50 percent blaze orange color during the deer gun season. Hunter education instructors strongly advise students to wear hunter orange while game bird hunting as well. And a third example: One rifle manufacturer installed cross-bolt safety devices on lever-action models when it was shown the hammer itself did not provide an adequate safety.

Although no two accidents are identical, many are similar and provide wardens with ideas for investigating other mishaps thoroughly and objectively. Wardens rely on a variety of resources in accident investigations. Local police and sheriff departments serve as co-investigators in most cases. Medical examiners, EMTs, nurses, physicians and crime laboratory specialists help piece together the puzzle. Witnesses' accounts are analyzed to provide perspectives. District attorneys receive copies of all fatal accident reports to decide on potential court action.

No one is immune from becoming involved in an accident. Humans will err, but we can learn from our mistakes and those of others. □

Bill Schwengel is the warden supervisor for the Lower Chippewa team.

An errant personal watercraft user learns how his actions were unsafe.



ROBERT QUEEN

How do wardens help the nonhunter and nonangler?

They protect Wisconsin's water supply, make safety a priority for all outdoor endeavors, and help put healthier fish on the table. How's that for a start?

Steve Dewald

Conservation Wardens Mike Young and Mark Beilfuss watched sadly as urban development encroached upon the rural landscape and waterfronts they patrol. So when Young learned from a property owner that his pristine footage along the Wolf River in Outagamie County was available for sale, Young and Beilfuss went to work.

The wardens brought the parcel to the attention of DNR real estate buyers, contacted Town of Ellington officials and local legislators, talked to local hunting, fishing, and bird-watching groups, and provided boat tours to interested parties. They removed a roadblock to the sale by finding a nonprofit group — the local Whitetails Unlimited chapter — that was willing to lease a building on the property for educational purposes.

"After being on this river 15 years as a warden, you develop a love and respect for the resource," Beilfuss says. "It brings you back to, 'What can you do to maintain it so future generations can enjoy it?'"

Adds Young, "When you see a big piece of property that's going up for sale, you know it's likely to go to a developer and that will have an effect on the environment, the water quality, the basic aesthetic value of the river. If we're able to get it preserved in a wild state, it benefits everybody."

Their efforts — and those of other Department of Natural Resources staff, including Mike Penning and Kay Brockman Mederas, interested public and private citizens — succeeded in preserving the former hunting property. The public now owns 486 acres of largely wild land with 2.7 miles of pristine river frontage that is fast becoming a favorite of bird watchers, walkers and other outdoor enthusiasts.

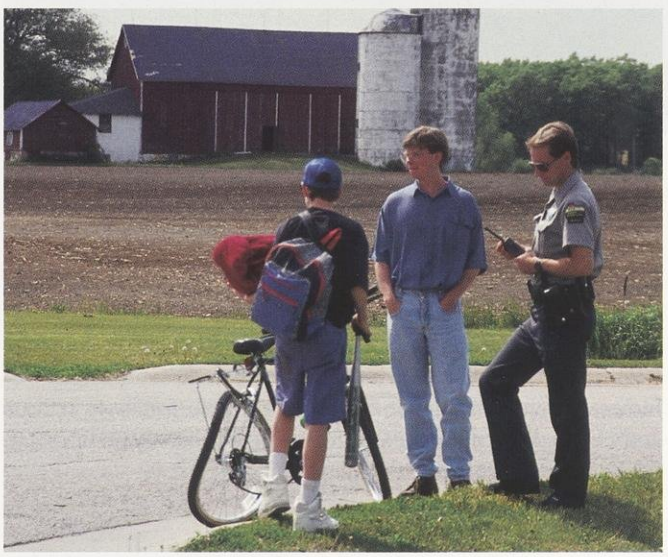
Among their unseen duties, wardens collect evidence at spill sites.

JIM HORNE

First responders

Whether you're bird-watching, bike-riding, or enjoying a cool glass of water from the tap, you're probably not pondering the contribution wardens make to society. Yet the work wardens

Wardens investigate accidents, theft and other crimes on state properties, trails and adjoining lands. Even cases of roadside dumping can end up on the warden's "to do" list.



JEAN B. MEYER

BUREAU OF LAW ENFORCEMENT

ROBERT QUEEN

Wardens at school presentations and outdoor clinics encourage children to enjoy the outdoors and respect other users.

do every day affects the quality of your outdoor experiences — and even the quality of your home life.

Wardens serve as a first line of defense on environmental emergencies; they're DNR's "first responders" to oil and chemical spills, which can contaminate surface waters and groundwater. Wardens see that spills are contained, and they work with DNR environmental specialists to oversee the clean-up of contaminated soils. Environmental wardens also investigate the illegal dumping of chemicals and waste products.

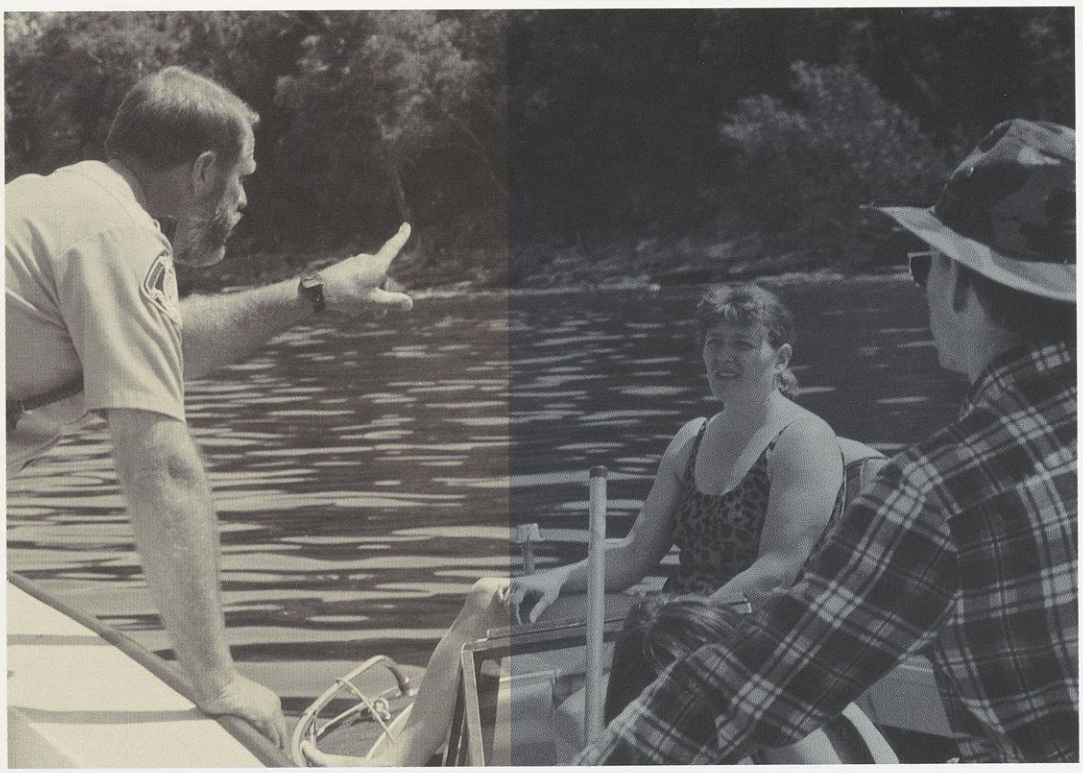
Watching the food supply

If you do not fish, but enjoy eating fish purchased from a local supermarket, wardens help ensure those fish are safe to eat. They conduct audits of wholesale fish dealers who do business in Wisconsin. Fish suppliers must report where they obtained their fish and keep records of where the fish are sold. When crosschecking these records, wardens sometimes find fishy discrepancies. In one instance, a record-check showed some suppliers were purchasing PCB-contaminated trout and salmon from Lake Michigan and falsely labeling the fish as "Norwegian salmon" that are considered to be contaminant-free. The discovery led to a multi-year investigation resulting in numerous criminal charges against individuals and corporations in Wisconsin and Illinois.

You may see car-killed deer along the roadside as you travel to favorite outdoor destinations. Conservation wardens let bids from private contractors to promptly remove the animals and assure the remains are disposed of in an environmentally sound manner. Wardens also keep your trip more visually appealing by enforcing anti-litter laws on roads, waysides and parking lots at outdoor recreation areas.

Encouraging outdoor exploration

Creating enthusiasm and respect for outdoor activities is an important goal for the warden service. Each school year wardens offer to visit every fifth-grade class in the state to discuss outdoor ethics, promote recreational safety courses, and ask for student help in protecting Wisconsin's outdoors. The hours



JEAN B. MEYER

Wardens inspect recreational craft to ensure people carry safety equipment and follow rules to protect themselves and others.

JEAN B. MEYER

Wardens uphold a wide range of laws to sustain a clean environment and equal access to healthy outdoor experiences.

conservation wardens log enforcing wildlife regulations also protect the species people like to watch. Throughout the year, wardens investigate reports of the illegal shooting of protected wildlife like songbirds, swans and bald eagles.

The long, cold nights wardens spend searching for deer poachers benefit hunters and nonhunters alike. Wardens expend as much energy protecting deer refuges from poachers as patrolling public hunting lands. Recently, wardens have put a halt to the illegal hunting of large bucks in Milwaukee suburbs that are closed to hunting, and have caught poachers in a national wildlife refuge south of La Crosse.

Promoting personal safety

Your personal safety while canoeing or cross-country skiing in Wisconsin is enhanced by the actions of local wardens. Regular patrols observe outdoor behavior and apprehend intoxicated boat and snowmobile operators, who can endanger others and themselves: Alcohol is the leading cause of death in boat and snowmobile accidents. Despite a 41 percent increase in the number of registered boats in the past 20 years, field enforcement and safety programs have helped to keep accident numbers in check, providing a safer outdoor environment for you and your family.

Your personal safety is also on the wardens' agenda. Each year wardens take part in search-and-rescue operations on land and water. In one recent situation, wardens had to rescue waterfowl hunters stranded on a small island in a severe storm. The wardens battled high waves and 60 mph winds to safely bring the people back to shore.

Wardens also apprehend convicted felons who, by law, cannot possess firearms. It's common for wardens to encounter such individuals each fall hunting season. In fact, at least 14 felons had their guns seized during the nine-day gun deer season in 1998. Wardens also provide back-up to local law enforcement officers during emergencies. This dedicated service has come at a high cost: During its 120-year history, Wisconsin's warden force has lost more officers in the line of duty than any other law enforcement agency in the state, with the exception of the Milwaukee Police Department. □

Warden Steve Dewald supervises the Mississippi River enforcement team in La Crosse.

The Green Team

Since 1985, DNR environmental wardens have brought midnight dumpers and other unscrupulous polluters to justice.

Stanley A. Schneider

As a Wisconsin conservation warden, Randy Falstad used to save fish one by one. As an environmental warden, he saves them by the thousands.

"I really always enjoyed the enforcement work as a field warden," says Falstad, a conservation warden from 1984 to 1991, and an environmental warden since 1991. "But you probably catch someone who takes one or two short walleye, or someone who overbags by a few fish, or a dozen. It really does seem that you can make a bigger difference if you're able to put a stop to the criminal aspect. Some of the cheese factories that we caught dumping whey killed off thousands and thousands of fish."

"Green work" — environmental enforcement — has been an integral part of protecting natural resources for a long time. Since the 1880s merchants were prohibited from discharging garbage, fats, tars and oils to state waters. Records from 1911 indicate wardens issued several citations for polluting Wisconsin's waters with tree bark, offal, tanning wastes and oils. In 1917, legislative intent and state statute specifically protected waters of the state from the diverse pollutants of commerce, surface mining, lumbering and shipping. We continue to rely on this same statute today.

An important addition to the enforcement arsenal was statute 23.79(3), codified in 1977, which gives wardens power to request court-ordered restitution and restoration when citations for alleged environmental violations are issued. This has proven to be a rapid, effective method to order environment cleanups.

In the early 1970s, the Department of Natural Resources formed an Office of Compliance to assist in enforcing laws limiting the kinds and quantities of wastes piped into lakes and rivers. This office effectively dealt with civil violations of pollution laws, but by the early 1980s staff needed law enforcement expertise to build cases for alleged intentional criminal violations.

The Bureau of Law Enforcement received approval to hire two full-time criminal investigators in 1985. Before the two started, only one pollution case had been prosecuted criminally. The investigators, who were also conservation wardens, were stationed in southern Wisconsin and the Milwaukee area, though their responsibilities ranged statewide.

The new "environmental wardens" set a tough standard for enforcing pollution laws. Additional environmental wardens were hired in Green Bay in 1990, in Wausau (1991)

BOTH PHOTOS BUREAU OF LAW ENFORCEMENT

To build environmental cases that stick, DNR started hiring full-time environmental investigators in 1985. These wardens are cross-trained in law enforcement and environmental sciences. They work with other DNR staff to deal with suspected polluters fairly, point out environmental violations and build a chain of evidence for those who persist in breaking pollution laws.

and Eau Claire (1993). The present-day "Green Team" consists of six field investigators and the unit's administrator.

A varied caseload

Cases come from several sources. Some are referred by DNR staff who regulate discharges, some from disgruntled past and present employees or neighboring concerned citizens; still others come from community health, fire and police departments. As the team becomes better known, the caseload is growing. The Green Team averages 75-100 investigations per year.

The nature of the work has changed in the team's short 15-year history. Initially, 70-75 percent of the cases were alleged illegal disposal of hazardous waste — so-called "midnight

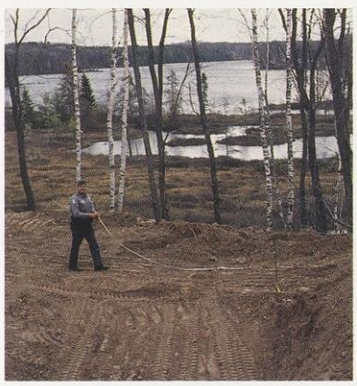
Tools and skills to measure chemical properties in water, air and waste are part of the environmental wardens' trade.

JEAN B. MEYER

dumping." The remaining 25–30 percent were water pollution cases, alleging illegal discharges without a permit. Today, about 60 percent of Green Team cases investigate hazardous waste disposal, 25 percent check out air and asbestos concerns and 15 percent track wastewater issues.

But even that breakdown varies somewhat by region. Falstad has seen a growing shift in the kinds of cases he pursues as enforcement actions deter environmental crimes in some areas while changes in state law spur activity in others. For example, when he started working as an environmental warden in Wausau, he investigated a lot of wastewater cases that often involved cheesemakers who had improperly disposed of whey and other materials in their processes. "We've really got that under control," he says. "There have been enough cases made so businesses know there's a consequence, and they're learning from their mistakes."

Now, he's spending more time investigating another kind of water pollution — storm water violations — as a result of a recent state law requiring people to get a permit and install erosion controls if they disturb five or more acres. Some property owners are not getting the permits, cutting corners, or not implementing or monitoring erosion control measures at all. That failure — intentional or not — can have tremendous environmental consequences: DNR studies have shown that a single acre under construction can send 30 tons of soil into Wisconsin waters a year, harming fish spawning and feeding habitats and triggering algal blooms.



ROBERT QUEEN

Measuring if development is set back from wetlands and shorelines as required by state law.

Sophisticated crimes

Environmental violations get more sophisticated over time and are much more secretive in nature. Many involve falsifying records as wastes are transported or discharged. We rarely see the classic midnight dumping case anymore — like the one Falstad recalls in which an environmental consultant was falsely informing companies that he was properly disposing of their hazardous waste at an approved landfill. In fact he was taking the barrels to a salvage yard.

Now we're more likely to see pipes sticking out the side of a building, pipes being buried and direct discharge in a secluded location. We also investigate many cases of illegal removal and disposal of asbestos, and surreptitious types of wastewater discharges — firms that dump their wastes down floor drains, falsify their wastewater records or exceed their permits.

In these white-collar crimes in which the "victim" is often the environment, our investigators often deal with company owners and defendants who may be leading citizens in their communities. We see people from all walks of life, from men and women in the boardroom to a person who lived in a chicken coop!

DNR FILE PHOTO

The Green Team helps discover tire piles and illegal dumps as well as oversee site cleanup.

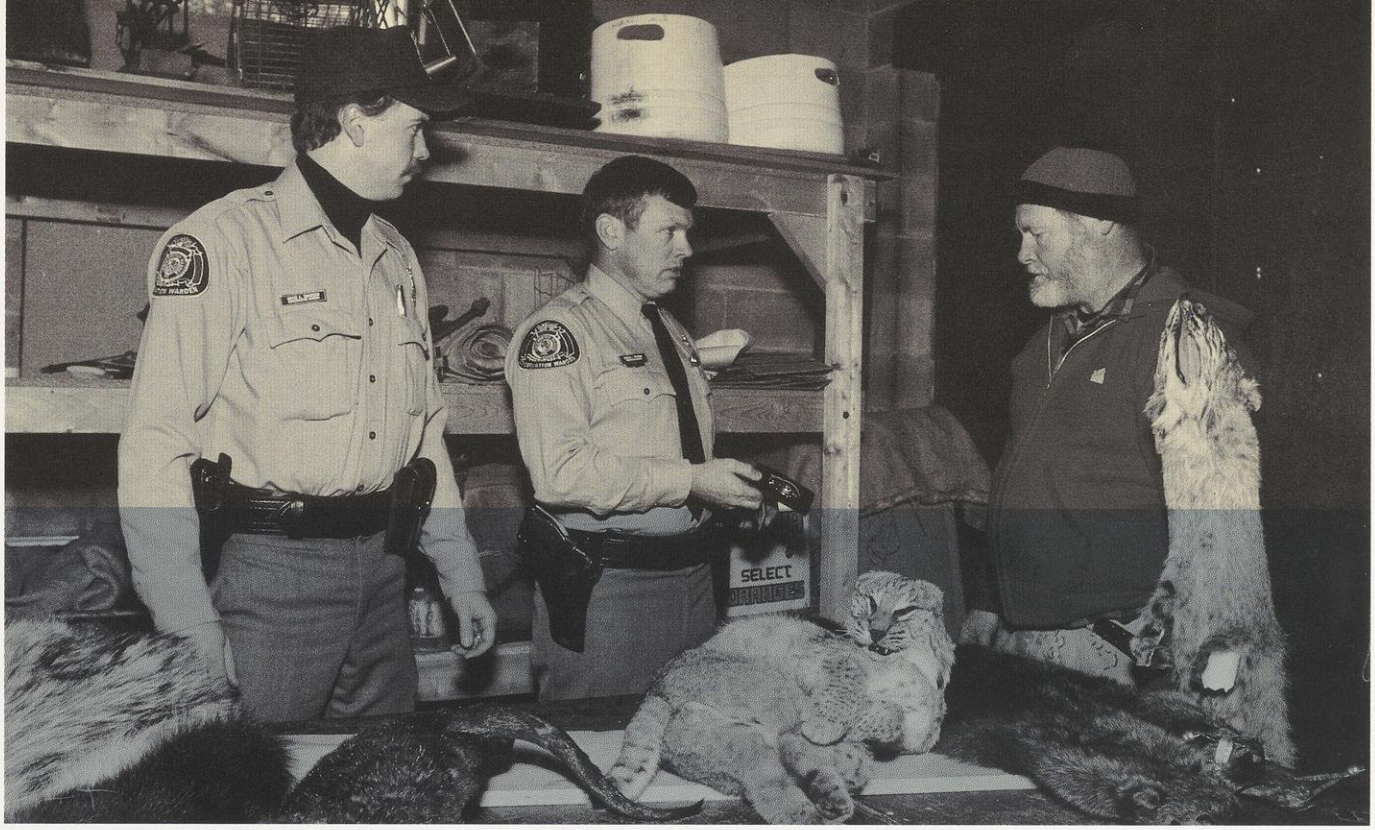
Diligence and accurate records

Investigating environmental crimes is complex, demanding work that requires meticulous follow-through on leads and extremely good reporting skills. Public relation skills are at a premium. The investigators are among the most highly trained conservation wardens in the department.

The careful work pays off. Many crimes are deterred and our environmental investigations result in 15–20 criminal or civil referrals each year to the Department of Justice for action. Court settlements annually bring in $500,000 or more in fines and forfeitures that go into the state's school fund. Violators may pay for restoration and cleanup, or do jail time when warranted. In 1997, our biggest year for settling criminal cases, convicted polluters paid more than $2 million in fines into the school fund.

Our work is coupled with DNR efforts to advise companies on how to prevent pollution and design manufacturing systems to minimize or avoid regulation. The two strategies of a helping hand and vigilant enforcement help companies stay on track to include the environment and public welfare in their bottom line. □

Stanley A. Schneider administers the Environmental Criminal Investigation Unit for DNR's Bureau of Law Enforcement.



BUREAU OF LAW ENFORCEMENT

Special Ops was part of an international case to stem illegal fur trading from Canada and U.S. suppliers to worldwide clients.

Special Operations net results

To catch the "big fish" wardens send in Special Ops.

Patrick Lisi

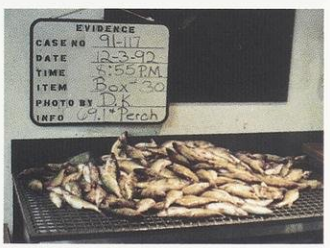
Field wardens work in uniform and in plain clothes to catch poachers before an unlawful activity affects a wildlife population. When poachers illegally harvest then sell the fish or game, the case is turned over to the Special Operations Team for investigation.

The team monitors a variety of commercial wildlife activities. If illegal activity reaches a level that begins placing wildlife resources at risk, a "project investigation" is designed to nab the violators.

"A lengthy project can produce spin-offs that take the team in several directions," says Warden Tom Solin, who heads the team.

Devoting lots of time to complex cases

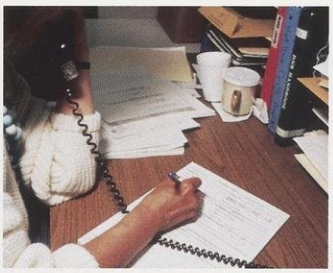
Such was the latest full-scale project that Special Operations dove into, known as the Can-Am Investigation. It started in 1990 as part of a multi-state and provincial plan to stop illegal commercial sales of fish and game. Wisconsin's task in this covert investigation was to substantiate allegations from citizens and commercial fishers that certain companies were regularly netting more than their quotas of yellow perch from



Phony businesses that buy, sell and transport wild goods may need to be established to halt the illegal catch, marketing and profiteering from fish and game.

BOTH PHOTOS BUREAU OF LAW ENFORCEMENT

Lake Michigan waters in Wisconsin.



DNR PHOTO

Special Ops set up an undercover wholesale fish business to purchase over-quota quantities of yellow perch from suspects. After three years of gathering evidence to make the case, the team made the big catch: seven federal search warrants were issued for selling fish across state lines. Dozens of state search warrants, inspection warrants, federal grand jury subpoenas, record reviews, forensic analyses and witnesses substantiated that 402,270 pounds of yellow perch were illegally harvested from 1990 to 1993. The case resulted in fines, prison terms, revocations of commercial fishing licenses, equipment seizures and confiscations.

Help for the field wardens

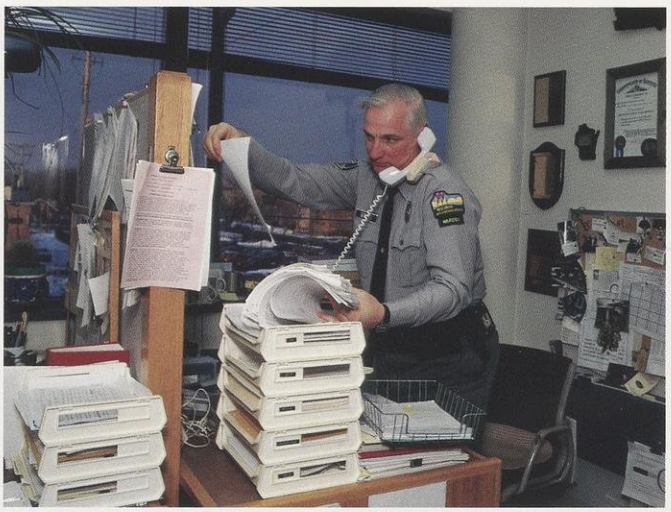
To put this kind of burden on the shoulders of local conservation wardens would be unimaginable, and the Special Operations team carries these duties so local wardens can concentrate on enforcing local issues.

"Investigations might involve commercial fishermen or trappers who sell their illegal harvest, but not always," says Solin. The team also investigates habitual offenders, or those whose hunting and fishing privileges have been revoked from previous violations.

Solin says the unit more typically acts as covert observers for field wardens. One such case in 1991 involved a group of six anglers from Indiana staying at a lakeside resort near Cable. The group was rumored to be keeping too many largemouth bass. The local warden asked for help from Special Operations. That evening, team members began counting skins and carcasses left in trash containers outside the suspects' cabin. Posing as casual vacationers, the team kept track of violations as they observed the anglers fishing. Special Ops verified these anglers had overbagged by nearly 125 bass. The fillets were individually wrapped in freezer paper, indicating they might be bound for a restaurant or fish market.

Special Operations gets involved in regional cases, but the farthest a team member has worked was Alaska. The agent posed as a big game hunter in a guided camp offering its international clientele hunts from an airplane for bighorn sheep and bear. Hunting from an airplane is illegal. When violators were arrested at the airport after the hunt, our agent was also placed under arrest by authorities so the perpetrators would not know his identity. The camp owner went to prison and paid fines of several hundred thousand dollars.

Team members occasionally train with units in other states to share techniques for solving difficult cases. The wardens learn restrictions, game limits, special laws in neighboring states and review aspects of the Lacey Act, which governs interstate transport of fish and game.



BUREAU OF LAW ENFORCEMENT

A 24-hour confidential hotline gives the caring public a way to immediately contact wardens when violations are observed. Outdoor users, observant neighbors and employees are all-important sources.

Not coercing crime

Following lengthy investigations, defendants often ask the judge to dismiss the case on grounds of entrapment. Just because a Special Ops agent uses a fictitious name or sets up a bogus company to catch the violator does not mean undercover tactics are unfair. Certain criminals would be very hard to bring to justice if not for these techniques. The courts support our efforts, and from the inception of Wisconsin's Special Operations team in 1947, the unit has been very successful with covert operations and court convictions.

Team members are fully aware that the idea to commit an offense must originate in the mind of the accused person. Law enforcement officers are not allowed to encourage anyone to commit an offense through persistent emotional appeals. Our officers maintain a high level of professionalism whether interacting with perpetrators, district attorneys or judges.

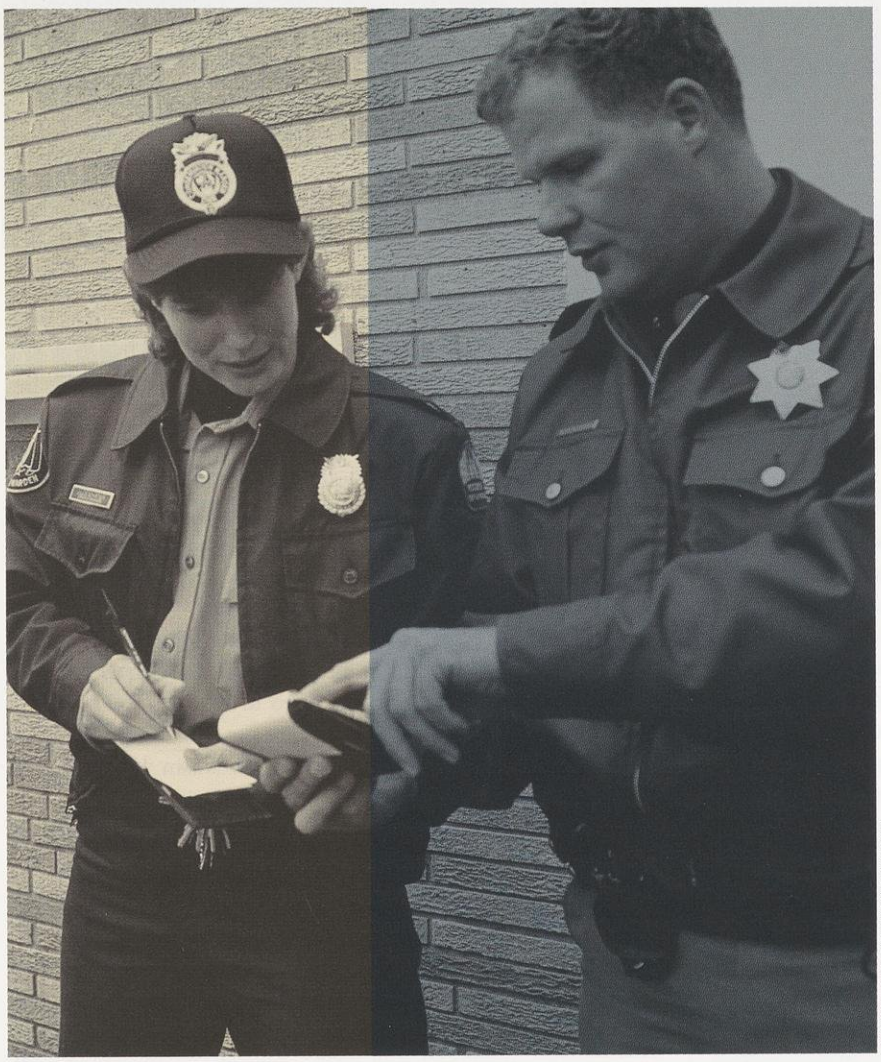
The Special Operations team is very small, and it takes on only a small number of cases each year. A big operation like Can-Am, or Operation Mesabi Fur, (in which an undercover wholesale fur company was established), requires a full commitment from the whole team for months. It takes a toll on team members' families and friends when the special investigators are far from home for days or weeks at a time. Special Ops wardens must conceal the nature of their work from neighbors, and avoid being photographed with other department employees. Words must be chosen carefully when speaking on the telephone from home or from the office.

Special investigators are a special breed, willing to commit a tremendous amount of time and energy to a case. The burnout rate is high, the stress substantial — but the work brings extraordinary satisfaction as solid cases are made and officers expose the underbelly of illegal actions to the light of day. □

Warden Patrick Lisi is stationed in Appleton.

Call for back-up

Wardens provide and receive help from local police and sheriffs.



BUREAU OF LAW ENFORCEMENT

County sheriffs and wardens exchange notes so they can mutually search for suspects, property or infractions in performing their daily duties. Back-up help extends the hours that the public is served.

Richard Wallin

When warden recruits finish their first round of training, they can't wait to get out in the field. Typically they have two or three short-term assignments at posts scattered across the state. Training in different regions helps the new warden experience different resource problems, cultures and perspectives.

At each station, the trainee meets officers from other law enforcement agencies, but there isn't much time to build working relationships. Even so, the introductions lay the base for future contacts that will prove invaluable throughout a warden's career.

As a warden trainee, I soon learned how valuable such relationships could be. In October 1978, I was stationed in Vernon County, a mostly rural county in southwestern Wisconsin. When working deer shiners, I was surprised to learn that the Vernon County Sheriff's Department had no car on the road after midnight on weekdays or after 2 a.m. on weekends. If something happened that needed an immediate response, a deputy had to be called. In those days, most wardens had no direct radio contact with the sheriffs' departments and had to go through the State Patrol for all radio traffic.

Many times I would be looking for a person or vehicle involved in an alleged violation and would find that local officers who heard the radio traffic aided in the search. Sometimes the local officers found the potential violators first, stopped them and held them until I arrived.

Officers in other agencies provided a wealth of information. Vernon County Deputy Roger Jones, the night dispatcher in the Sheriff's Department, told me that officers in the hilly county used landmarks to quickly communicate reference points by radio. Vernon County is full of winding roads and it's easy to lose your way, especially in the dark or fog. Directions were faster if the dispatcher could give them by using the closest landmark as a starting point. Jones would drill me about the names and locations of these reference points, and after a couple of weeks, I knew where all of the landmarks were.

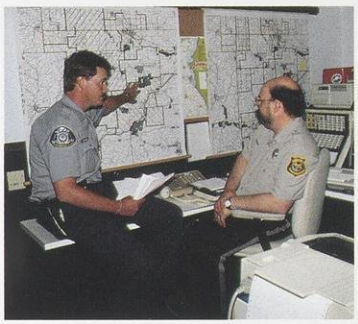
It was only natural that I wanted to return the favors: I helped the officers search for fugitives in a wooded area; apprehended a person wanted for two murders; arrested armed burglars; and searched for elderly or ill people who had wandered away from their homes.

Providing and receiving assistance

Law enforcement officers are usually in short supply in rural areas, so it's not unusual for wardens to help serve a search warrant. This is especially true when a lengthy, complicated investigation leads to simultaneous searches or multiple arrests. Thus I have helped bust numerous indoor and outdoor marijuana-growing operations, including one in which hundreds of pounds were seized. I also helped bust one of the

ROBERT QUEEN

Cooperation extends between federal and state agencies as well. The U.S. Fish and Wildlife Service frequently works cases with conservation wardens.



BUREAU OF LAW ENFORCEMENT

Local officers work with wardens to learn the territory and communicate quickly.

largest methamphetamine labs in Wisconsin.

An exciting incident occurred on a stakeout with county officers. Two armed crooks burglarized the building they were watching, and the officers nabbed the thieves on the spot. Many officers work a whole career without catching a burglar in the act.

Providing back-up to the sheriff once landed me in federal court as a witness in a civil suit against the sheriff. The suit was dismissed by the federal magistrate as "one of the most flagrant, frivolous suits ever to come into that court."

I spend an average of 40 to 50 hours annually helping officers from other agencies, but it pays off. A few years ago, I was discussing the situation with an administrator who came on a ride-along. The administrator thought this part of the warden's workload could be greatly reduced. I defended the assistance as an efficient use of time, believing that wardens received more help than they gave, because other law enforcement services are bigger.

The discussion moved on, but a few minutes later we got a radio call from a police investigator who had received information about an illegal deer harvest while working on a case. We were about 40 miles away, working on another complaint. The investigator said he would follow up and leave me a report in my mailbox. The statement the investigator obtained helped me file charges on two illegal deer harvests. The information officers share trims hours from investigations and provides better service with fewer individuals.

Safety is the strongest reason officers of all agencies work together. When you need a back-up in a dangerous situation, you really don't care which squad provides help as long as it's there immediately. □

Warden Richard Wallin works in Vernon County.

A helping hand

Volunteers annually teach 50,000 novices how to safely hunt, boat, snowmobile and use ATVs.

David Crehore

"The only gift is a portion of yourself," said Ralph Waldo Emerson in 1844, and who would argue? The greatest gift is "free" time.

All around Wisconsin, more than 7,000 volunteer safety instructors pass along the traditions, skills and good habits that help young people become safe hunters, boaters, snowmobilers and ATV riders. It costs the volunteers many hours, but they don't mind. Along with the DNR's warden service, they know that the future of outdoor recreation depends on education.

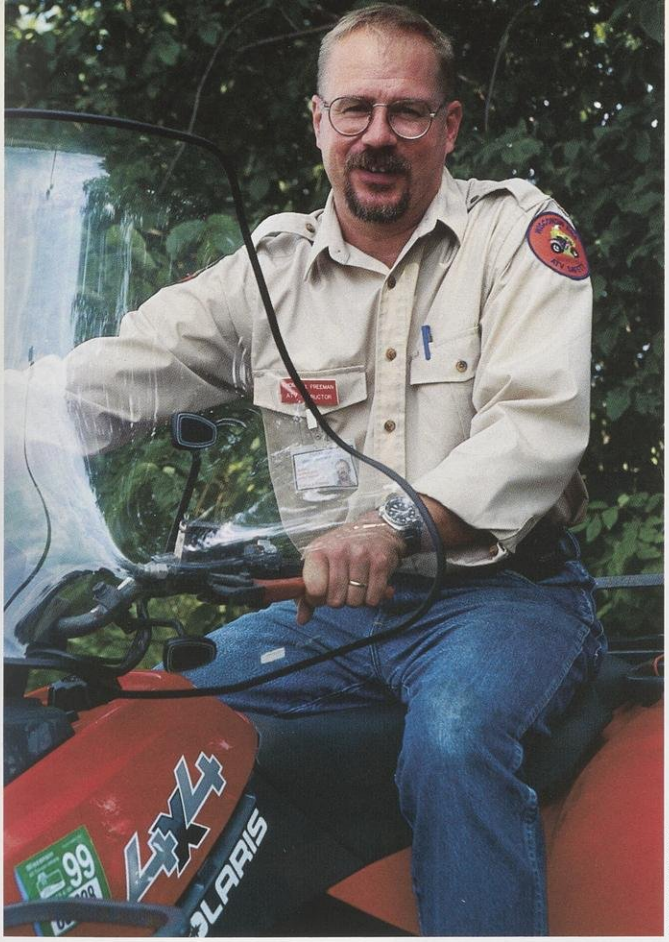
Recreational safety education in Wisconsin began in 1967 when the legislature authorized a gun safety and hunter education program. At first, the courses were voluntary, but the law required them to be offered in every county. Conservation wardens taught a lot of the classes, but there weren't enough wardens to meet the demand, and before long a cadre of volunteer hunter education instructors backed them up.

Fern and Roger Bessac have taught safe hunting practices to more than 1,500 Columbia County students.

Team teaching

The Bessacs of Portage, for instance. Roger Bessac, a welder, answered the call at the get-go in 1967. Later, his wife Fern, a nurse's aide, joined him — she's been teaching since 1976. Together they've taught the basic hunter education course to more than 1,500 people in the Columbia County area. The Bessacs hold most of their classes at local schools and at the Rio Rod and Gun Club.

In 1987, Warden Bill Schwengel asked the Bessacs to offer a class for the local Amish community. Hunter education had just become mandatory. The Amish students attended rural schools and traveled by horse and buggy; it was difficult for



DAVE CREHORE

Experienced ATV trail rider Tom Freeman teaches safety. "I saw a need for the class, a need to get involved myself."

him. Afterward she told Fern "that is one of the best classes I've ever taken. I was really afraid of guns before, and you took that away."

Sharing safety and experience

Tom Freeman of Fort Atkinson is a relative newcomer to safety education. He's been certified to teach the ATV Safety Course for the last two years, and helped with an ATV program for a couple of years before that.

Tom, his wife and brother had been trail-riding an ATV for about five years, and it was clear to them that a lot of people looked down on ATVers. Tom knew why. "The lack of any licensing means that people don't read the rule book," Tom says. "I don't think they intentionally violate laws, ride the roads, and speed, but it's a lack of awareness. They fail to realize that their actions set a bad example for the sport. I saw a need for the class, a need to get involved myself."

Tom teaches two ATV safety courses a year in Jefferson County, trains other instructors and helps out with a hunter education course. He believes that education creates peer pressure to be courteous and safe. It's cheaper, too. "A $147 citation is an expensive way to find out you can't ride on the roads," he says. □

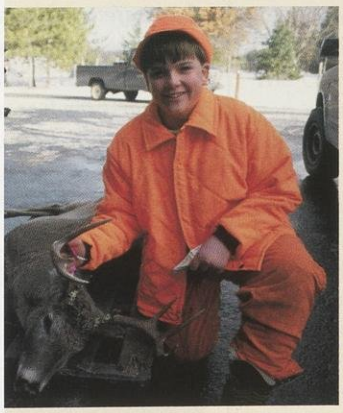
David Crehore is DNR's regional information officer stationed in Green Bay.

them to attend classes in town. Fern and Roger said they would give it a try, although it meant holding classes in log cabins, one-room schoolhouses and woodsheds.

They had to improvise a little. "We couldn't use slides and videos because the buildings had no electricity. So we looked back at how things were when we were in school," Roger said. "We found out we could tell stories, so we did that." Occasionally, tests were given in German and the shooting range was the pasture behind the school. The Bessacs were farm kids, and that helped them relate to the Amish. Sometimes the students had useful advice. "Make sure you're on the right side of the fence so the bull doesn't come after you," was a warning the Bessacs appreciated.

Roger is retired now and believes everyone should volunteer to do something. Hunter education is what he does because he enjoys the by-play among students, parents and teachers. Fern remembers a mother who drove her son to class and listened in while waiting for

Learn at your own pace



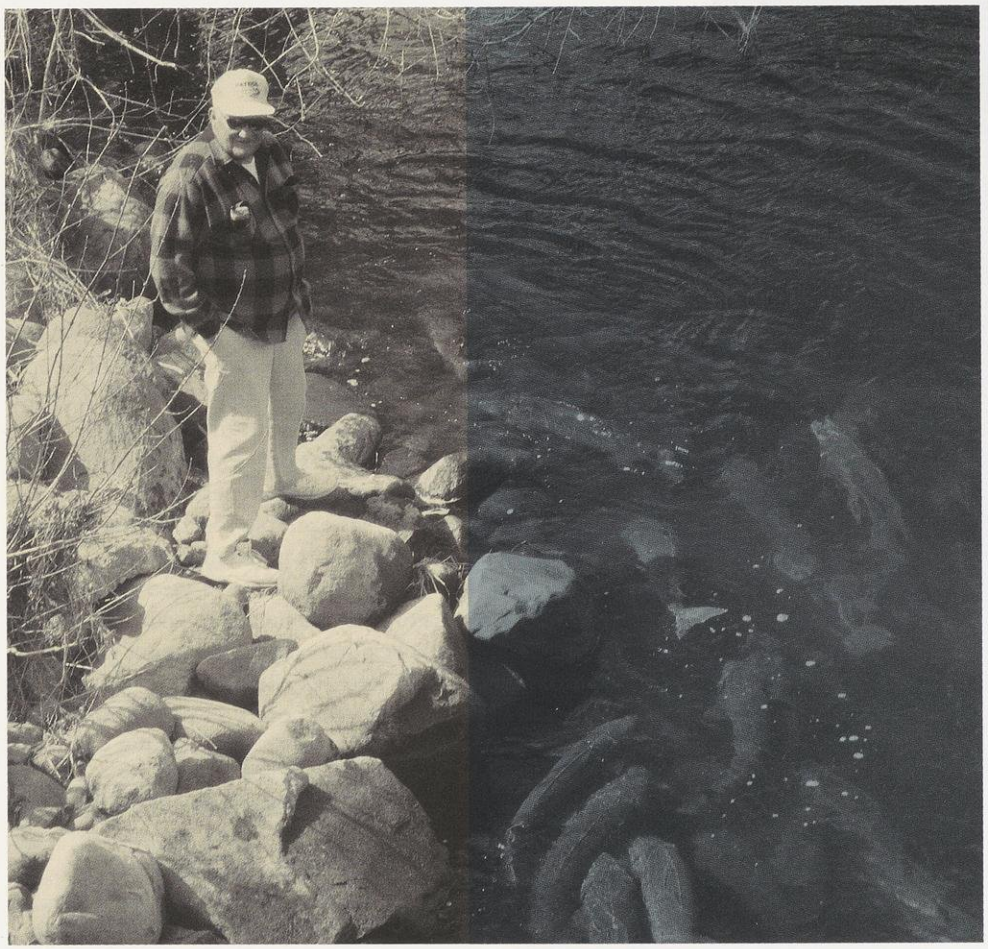
ROBERT QUEEN

Youths get special classes and hunts. Adults can learn hunter safety at home via CD-ROM.

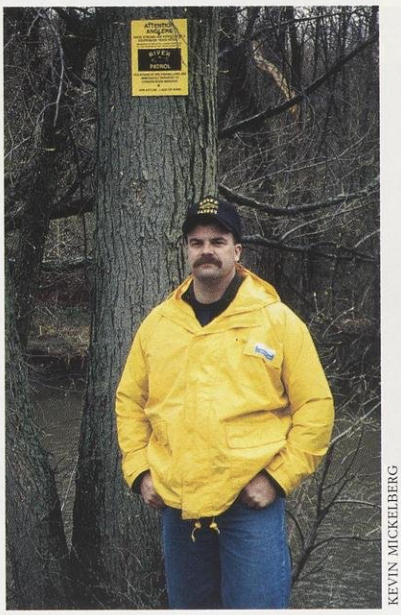
For those who haven't made room in a busy schedule for a hunter safety course, a computer can lead you down the straight and narrow anytime you have the time. A new CD-ROM from the Department of Natural Resources gives adults the option of taking a hunter education course from home. International hunter education officials say the CD-ROM course is the first of its kind in the world.

Adults 18 and over can check out a CD-ROM from one of the DNR Service Centers participating in the program. They can take the CD-ROM course at their own pace. A $10 deposit is required and will go either toward the hunter's certification fee, or to replace the disk if it is lost.

To graduate and receive a hunter education certificate, adult participants must attend a Field Session Day. Volunteer hunter education instructors will lead the students through the field course, where they'll learn how to handle firearms safely and pick up safe hunting tips. A written and field test based on the CD-ROM course material will be given at the end of the day. The graduates are certified to hunt in other states, too. — *Lisa Gaumnitz*



DENNIS JONES



KEVIN MICKELBERG

River patrols enlist volunteers to protect sturgeon, trout and other spawning fish that enter tributary streams and rivers.

Partners in crime-busting and conservation

From tracking walleye poachers to planting prairies, wardens get a lot of help from everyday people who care about protecting Wisconsin's natural resources.

Editor's note: The eyes, ears and spirit of the warden service extend far beyond the men and women who suit up in gray. Outdoor safety instructors, sporting groups, law enforcement dispatchers and vocational education teachers all help instill outdoor values, ethics and safe enjoyment afield. Building partnerships has always been an important part of being a warden, but new wardens are increasingly being trained in how to work with groups to solve natural resource problems. Here are some examples of these partnerships.

They never lose the urge

One of the most spectacular aquatic migrations in the nation happens every spring in northeastern Wisconsin, when walleyes run from Lake Winnebago into the Fox and Wolf rivers. Some fish swim as far as 100 miles to spawn in flooded grass marshes. Strong year classes of fish coupled with efforts by conservation groups and government to restore habitat helped these spawning populations grow to more than a million fish in the 1990s — a big change from the low productivity that plagued the Winnebago system in the late 1980s.

The Lake Winnebago fishery has an open season year round, and the news that fishing was on the rebound increased the number of anglers trying their luck during the spring spawning run.

Are you game to join the wardens?

The **Wisconsin Conservation Warden Association (WCWA)** promotes awareness and understanding of conservation and environmental issues. WCWA supports natural resource education, recognizes warden professionalism and fosters good relations between wardens and the communities they serve. Please contact us for information about the following:

(Check all that apply)

- ☐ More about the WCWA
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Wisconsin Conservation Warden Association

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In 1996 conservation wardens documented many cases of overbagging during the peak of the run. The limited number of wardens couldn't possibly check all the anglers. Moreover, boat-by-boat checking was not gathering the information needed to enforce fishing laws. Surveillance showed that anglers rarely had more than their daily bag limit on board, but would give fish to other boats or leave with a bag limit and return later to continue fishing, a practice known as "double tripping." So wardens began to fish covertly among the crowd and document violations. This change in tactics was effective, but needed to be expanded to really work.

DNR wardens and representatives from Walleyes For Tomorrow (WFT) talked about how they could solve the staffing shortage. One idea that surfaced was enlisting help from retired wardens. These seasoned officers had years of experience detecting violations, they were available, and they were very eager to protect the walleye fishery.

WFT's executive board agreed to pay for the retired wardens' food, personal mileage and any incidental costs. The retirees would stay at a state-owned bunkhouse on the Wolf River Bottoms Wildlife Area and they would bring their own boats and fishing equipment.

At the same time, WFT developed a "report card" that anglers could easily complete to record observations about violations. The back of the card listed the names and phone numbers of the wardens stationed along the river. Anglers were encouraged to contact the wardens if they witnessed foul play.

To launch the efforts, WFT publicized the retired warden patrol and the report card to its members, and informed the public through numerous articles in the local papers.

The program began in April 1997 and ran about two weeks. It's also ran in 1998 and 1999.

It's hard to judge by looking at citations alone how effectively the campaign snared violators. The spring of 1997 was cold, lasted longer and walleyes did not return from the spawning flats in large schools as they had in 1996. While anglers caught limits of fish in 1997, it often took them several hours to do so; in 1996 many anglers caught a five-walleye limit in 30 minutes.

"Double tripping" still occurred in 1997, but was less evident than the previous year. Two retired wardens gathered enough information to issue a citation to one outfit that the DNR had been attempting to apprehend for several years. And having retired wardens on the water surely deterred anglers from breaking the law. As one of the retirees overheard an angler say: "You don't know which one of these old _____ is a warden!"

It was easy to build a core of regular volunteers among the retired wardens. They got to go on a great fishing trip with paid room and board, see old friends again, and bust some "bad guys." You can take the warden out of the field but you'll never get the field out of the warden. — *Carl J. Mesman, warden supervisor, Wautoma*

Sturgeon Patrol provides 'round the clock "baby-sitting" during the spawning season.

DENNIS JONES

A patrol like their own

As a growing number of people choose personal watercraft (PWC) to jet across the water, conflicts arise with other boaters and people on shore.

In the Green Bay area, PWC complaints, arrests and accidents have increased significantly in the past five years. To address the problem, wardens and local patrols have stepped-up on-water enforcement in areas with high weekend boat traffic. Staff from the DNR, the Brown County Sheriff's Dept., and the U.S. Coast Guard work on our team.

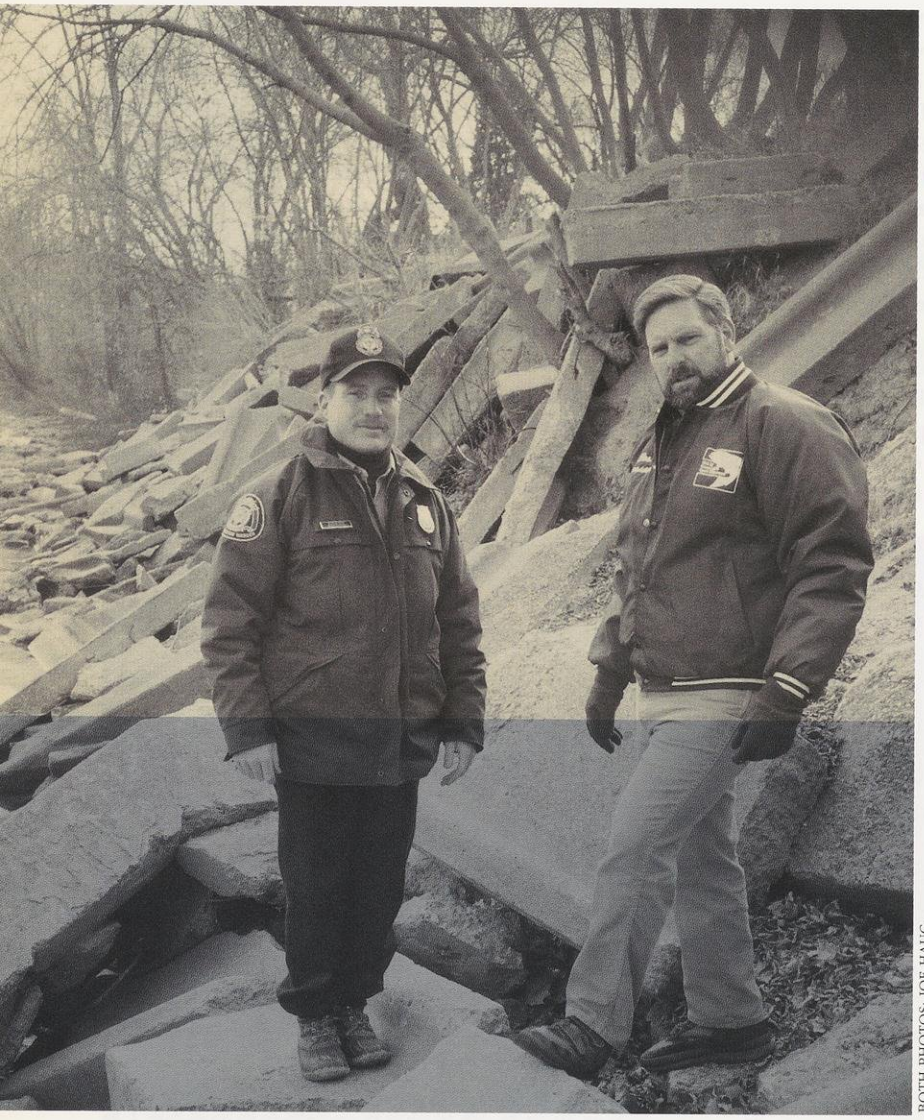
We discovered that enforcement alone did not correct on-water behavior or safety. Whenever our patrol boats showed up at a launch, PWC riders would move toward shore and get lost in the crowd of other boaters.

In 1997, I contacted Simonar Sports, a watercraft dealership. The company gladly loaned us SeaDoos to train officers and start a safety education program. The machines allowed us to blend in with PWC riders, so that we could signal to wardens in support patrol boats to cite riders when we observed illegal behavior. Public reaction to the water bike patrols was overwhelmingly positive. Both boaters and other PWC operators said they were glad to see us, including some PWC operators who were issued citations. I guess it legitimized their activity.

Last year the partnership expanded to include another dealership, Ken's Sports, Inc./Kawasaki PWC. Patrols are supplemented with TV presentations and five PWC safety classes in the region. Since then, three other DNR regions have started similar partnerships with area PWC dealers. These programs make PWC dealers important partners in publicizing safety classes, training new users, showing respect for other lake users and promoting safe, responsible use of these fast, maneuverable craft. — *Roger Hanson, Brown County warden.*

Win-win partnerships

Fishing sites along the lower Menominee River between Marinette, Wis. and Menominee, Mich. were littered with fish-



Warden Steve Daye *(left)* and John Nelio of the Marinette-Menominee Chapter of the Great Lakes Sport Fisherman spearheaded a program to reduce littering, reuse containers and visit sports/bait shops in towns along the lower Menominee River.

BOTH PHOTOS: JOE HAUG

ing line, plastic bait containers, beverage containers and fast-food wrappers. Cans usually disappeared and were recycled, but fishing line was entangling waterfowl that frequent the river.

Wardens couldn't keep up with litter patrols and the $147.50 citations to litterers caught in the act were not a big deterrent in a litter-strewn area. I thought of ways to place a value on fishing trash. I considered working with local bait shops to place a deposit on line and containers. That would raise retail costs in town and locals noted that much of the trash came from anglers who were outside of the local area.

By returning bait containers and fishing line to participating businesses, suitable containers could be reused and the people bringing them in would be potential customers. Those returning items would receive a raffle ticket to win prizes. Local businesses acted as collection points and put up prizes purchased by the Marinette-Menominee Chapter of the Great Lakes Sport Fisherman

Participating businesses got ad space on posters that were hung up along the project area along the Lower Menominee River and the west shore of Green Bay from Cedar River, Mich. to the mouth of the Peshtigo River up to the Peshtigo Dam.

I constructed canisters for each business to dispense and collect the raffle tickets for the monthly drawings. Prizes ranged from bait to gift certificates, clothing, tackle boxes, fishing rods, nets and lures. The grand prize was a half-day guided fishing trip.

In 1997, the program ran from July–October involving five businesses; 562 items were returned from the lower Menominee River. In 1998, the program expanded from April to October and included the west shore of Green Bay and the Peshtigo River. Nine businesses participated and 2,274 items were returned.

The partnership of the two communities, the sportfishing group, local businesses, anglers, boaters and visitors kept the shoreline cleaner and reduced the incidences of entangled waterfowl. Moreover, participating businesses are associated with a community service and have a means to draw-in new customers. The Great Lakes Sport Fishermen were lauded for sponsoring an effective program. The public had a cleaner place to fish and the environment is less littered. — *Steve Daye, Marinette County warden*

Wired wardens

As lawbreakers' tools get more high-tech, so do the wardens'.

Randy Stark

On October 13, 2005, conservation warden Ryan Bond receives a complaint that a bear has been illegally shot on county forestland in Marinette County. Shortly after arriving at the scene, Warden Bond assesses the evidence and determines the violator, in a portable tree stand that was left at the scene, shot the bear. In addition, he finds blood and bear hair on the shoulder of the road next to some tire tracks. Bond photographs the tracks with a digital camera and collects blood and hair samples. He uses a metal detector to locate two .30-06 shell casings and a bullet.

Bond lifts several fingerprints from the tree stand using magnetic fingerprint powder. After firing up the laptop computer in his truck, he sends the prints through the Automated Fingerprint Identification System (AFIS). In minutes, AFIS searches millions of fingerprints and returns a hit indicating the print belongs to Robert Punser.

Bond then checks Punser's name in a database containing information on prior warden contacts and citizen complaints. He learns Punser was previously arrested

ROBERT QUEEN

Computers and cell phones link field wardens with statewide and nationwide networks of information.

ROBERT QUEEN

for hunting after hours while he was in the company of Harry Haug and was using a .30-06. Armed with this information, Warden Bond obtains a search warrant using the cellular phone, laptop computer and printer in his truck.

Before leaving the scene, Bond sets up a video surveillance camera to monitor the area in case the perpetrator returns for the tree stand.

Wardens serve the warrant and locate a .30-06 rifle on the premises. Ballistics tests confirm Punser's gun fired the shells and bullet found at the scene. Despite Punser's efforts to wash out his truckbed, wardens use a chemical that detects blood to gather a sample that is matched with the blood found at the scene by DNA analysis. Wardens also verify that the wear pattern on the left rear tire of Punser's truck matches the enlarged digital photos of vehicle tracks taken at the scene.

When confronted with the evidence, Punser decides to cooperate. He confesses and implicates his companion in crime, Harry Haug.

Testing new tools

Much of the technology mentioned in this scenario exists today and is used on a limited basis by Wisconsin conservation wardens, but will be more widespread in the near future.

"We're continually testing and adopting new equipment and investigative techniques," says Tom Harelson, chief warden. "It's a race to stay ahead of workload and stay ahead of the poachers."

High-tech techniques

DNR PHOTO

Taking the animal's temperature, and collecting hair and tissue samples can help track who or what illegally killed an albino deer.

Conservation wardens are increasingly finding their evidence at the bottom of a test tube or spread across a slide.

Laboratory testing helped Dane County conservation warden John Welke build a case going to federal court this fall against a Portage man who allegedly poached a buck and cooked up an elaborate alibi. The investigation indicates the man may have shot a buck in Columbia County, where his hunting license was revoked, and hauled the animal up to Michigan's Upper Peninsula. There, the man and his companion allegedly tied a Michigan hunting tag on the deer's antlers and shot the deer with an arrow to make it look like it had been killed with a bow and arrow. Then the companion videotaped the nearby woods, to "prove" that the buck was killed in Michigan.

Welke called in scientists from University of Wisconsin's Geology and Geophysics Department, who found clues in the rock formations shown in the video. Rocks in the Upper Peninsula are much older than in Columbia County; the levels of the element strontium differ significantly in the two sets of rocks, and in the plants and bone matter of the animals that eat them, the experts said. They analyzed samples from the antlers of deer from Columbia County, from the Upper Peninsula, and from the buck the Portage man shot. The isotope levels suggest that the buck came from Columbia County, not the Upper Peninsula, Welke says.

"The forensic evidence, the videotape, and the fact that his hunting companion cooperated with us and gave us a statement, are all important parts of the case," Welke says.

Dodge County Conservation Warden Heather Gottschalk has similarly used new forensic technology to bolster cases. In one case, an angler claimed that the walleye in his pail was from the Wolf River, where the season was still open, instead of from Beaver Dam Lake, where he had been fishing when Gottschalk approached him. The warden turned to UW-Madison's Zoology Department for help in determining the fish's origin. There, experts explained that each waterbody has measurable levels of nitrogen and other elements that are as unique as a human signature or fingerprint. Fish and other aquatic life carry the same "signature" in their tissues, which would not change unless there was a catastrophic event like a major spill into the waterbody or the fish was removed from one waterbody and stocked in another. Even if fish are stocked elsewhere, it can take several years to change the chemical levels locked in their tissues, the UW experts said.

So Gottschalk brought the experts several walleyes from the Wolf River system and three from Beaver Dam Lake, which the experts ground and analyzed to note the specific levels of carbon from those two waters. The experts also analyzed samples from the walleye the angler caught.

The result clearly showed two things: the carbon levels in Wolf River fish are a great deal different than those in Beaver Dam Lake, and that the walleye the angler caught had signature chemical levels identical to the one found in walleyes taken from Beaver Dam Lake. That information helped win the case, Gottschalk says.

"Any time I can use lab work, I will," she says. "It's one more piece of evidence to support my case and make it even stronger.

"Violators have become very good at coming up with false stories. They can give me all the stories they want, but they can't ignore the facts of the analysis." — *Lisa Gaumnitz*

ROBERT QUEEN

This mechanized, remote-controlled deer is used when the public reports concerns about road hunting or hunting too close to homes and development.

BUREAU OF LAW ENFORCEMENT

Submersible equipment can photograph underwater nets, traps and search for evidence of underwater accidents.

to observe illegal baits or traps from remote locations; and portable two-way radios to monitor police scanners or post scouts during poaching.

"Every day it seems like when we find one way to combat illegal hunting or fishing, the poachers find another way to basically continue their illegal activity," says John Welke, a Dane County conservation warden. "With the accessibility of the technology and the discretionary income, unethical hunters are taking the time to research these issues and use the technology to enhance their abilities."

Technology will never replace the need for outdoor savvy, community contacts and knowledge of human nature, Harelson says, but the effective use of technology will make once-unsolvable cases easier to unravel. "And it will help increase efficiency in both the work the wardens do and in their ability to catch and bring poachers to justice."

One tool that may help is a voice stress analyzer. The equipment, now being tested by a few wardens, compares a person's voice patterns with normal voice patterns as he or she is being interviewed about a natural resource violation. When the stress analyzer reveals an abnormal pattern, "we use it as an indicator that it's an area we'd better look into more deeply," Harelson says.

Keeping up with the crooks

Sophisticated lawbreakers now use tripwires and surveillance devices to detect when wardens are present; night vision optics to see game and wardens after dark; global positioning units to pinpoint traps and nets; and infrared detection to note warm-blooded animals at night. Poachers also use laser-sights to hunt illegally at night; wireless cameras and hearing devices

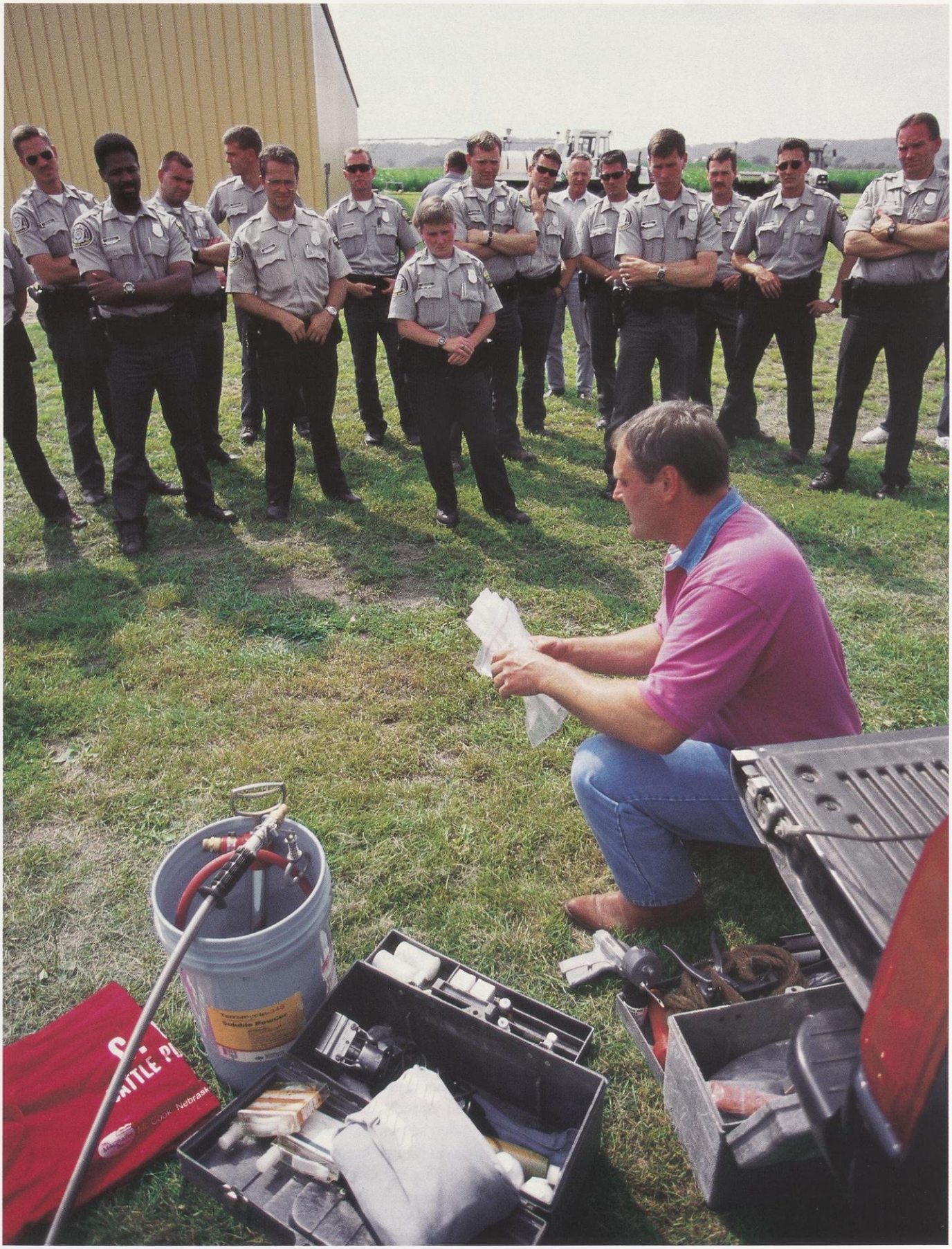
Quick link to information networks

The warden service is responding. By early 2000, the DNR plans to equip all field wardens with powerful laptop computers capable of transmitting data by wireless means. Wardens can then access a vast network of information including DNR licenses and registrations, criminal history records, driver's license and vehicle registrations, nationwide criminal histories and fingerprint databases managed by the FBI.

By using the computer to collate information from several sources and to analyze shreds of evidence, wardens should be able to quickly follow leads, identify potential suspects, and link cases. Officer and public safety will also improve — with a computer, wardens can do a quick background check on a suspect's previous criminal or civil records, and from this information gauge how to approach each individual.

Rapidly changing technology is a certainty. How the warden service harnesses that technology and applies the information it furnishes will partly determine the success of the service in the 21st century. □

Warden Randy Stark leads the law enforcement team in DNR's 12-county South Central Region.



ROBERT QUEEN

Warden wannabes

If you aim to be a warden, many paths can help you set your sights on the job.

Patrick Harkins

How can I become a game warden?

I wish I had one answer for the thousands who ask this question every year. The truth is, the warden service needs people with diverse skills and backgrounds that share two important attributes — love of the outdoors and respect for natural resources.

Some people choose the career at a very young age. Eight-year-old Thomas Harelson lived next to Chauncey Weitz, the game warden in Black River Falls. Harelson was so influenced by Weitz that he told his parents he wanted to be a game warden. Little did Harelson know that he would later serve nine years as a field warden, three years as a warden supervisor, and 11 as a regional warden before becoming chief warden for Wisconsin in 1997.

DNR PHOTO FILE

Warden trainees meet with farmers and other client groups to understand their livelihood and become knowledgeable about many types of outdoor recreation, like duck hunting.

Whether you are a high school or college student, or well into your 30s and looking for a career change, seek out education and experiences that stress the job's fundamentals: working with the public, gaining knowledge of the outdoors, understanding many kinds of outdoor recreation, staying in decent physical shape, studying resource laws, and learning law enforcement techniques.

Develop "people" skills

"We provide candidates with the training they need to be wardens, but they've got to come to us with excellent people skills or they won't make the cut," says Harelson. "We also want people who have law enforcement experience and a college degree in some natural resource or law enforcement area. We're getting so many candidates who have these qualifications that it's raising the bar."

Many of these skills or experiences can be gained simultaneously. Become active in diverse outdoor activities: Try different types of fishing rather than just going to the same trout stream. Take a trapper education course or attend a turkey hunting clinic. Get involved in sports clubs or the Conservation Congress. Attend demonstrations of outdoor activities to meet the people who train dogs, hunt bear, and the like. Also consider attending some of the annual trips sponsored by the Natural Resources Foundation (see the April issue of *Wisconsin Natural Resources* for a list) to learn about DNR research and field work.

Do a variety of outdoor activities

Learn about boating and outdoor pursuits like bicycling, canoeing and camping. As a warden you will be called upon to work with hunters, anglers, boaters, trappers, snowmobilers, skiers, bicyclists and others. It helps considerably if you can find common ground with these diverse audiences.

STEVE SISBACH

Wardens learn the intricacies of shoreland protection and shoreline laws.

Students should look for summer jobs related to outdoor activities. DNR hires many summer helpers in the state parks system. Your college internship office can help you explore positions with resource managers, outdoor recreation firms or law enforcement agencies.

Consider getting a broad background in natural resource management. Colleges like the University of Wisconsin-Stevens Point offer degrees in biological sciences and resource management. Learning a foreign language may help you communicate more effectively with members of the public.

Seek certification as a law enforcement officer through a university or a technical college. The training is a minimum entry requirement for a warden position and the contacts you make might help you learn about job vacancies in the law enforcement field.

Stay out of trouble with the law. Dedication to a law enforcement career implies respect for the law and DNR does extensive background checks. A speeding ticket won't disqualify you, but a pattern of violations and citations for drunken driving won't help. Certain offenses, such as domestic violence and felony convictions, disqualify you from service.

DNR receives a large number of qualified applicants for each opening in the warden service. Those people with the best well-rounded backgrounds are selected to be Wisconsin conservation wardens, and begin their careers with a year of training.

Recruit training

Warden recruits spend 14 weeks at the State Patrol Academy at Fort McCoy in classroom and field sessions to learn natural resource laws, special investigative techniques, firearms handling and more. They meet representatives from dozens of conservation, agricultural, environmental, and other groups that can help with particular enforcement problems. Then, for most of the rest of the year, the recruits work at different field stations, learning under veteran wardens and attending training sessions on enforcing waterfowl, bear, trapping, and other regulations. At the end of their training, the new wardens receive their permanent assignments.

"Wardens are expected to enforce a vast array of resource protection, environmental and recreational safety laws," says Jerry Meronk, who has trained warden recruits for seven years and spent 20 years as a field warden. "Today's professional wardens need a solid background to understand what's going on when they see it, and to better understand different user groups. Given a frame of reference from the warden's past experiences and skills learned in warden training sessions, outstanding cases are made."

A warden's training continues throughout his or her career. The public expects a game warden to be knowledgeable about outdoor activities, law, science and psychology (to name a few), so it's important that a warden be willing to learn new skills. Public speaking, for instance. When I was a boy, game warden Larry Miller gave a talk to my Scout troop in Rhinelander. That was what planted the seed for me for what I view as the best job in the world. □

Patrick Harkins began as a conservation warden in 1974 and is now training director for the DNR's Bureau of Law Enforcement.

A typical year

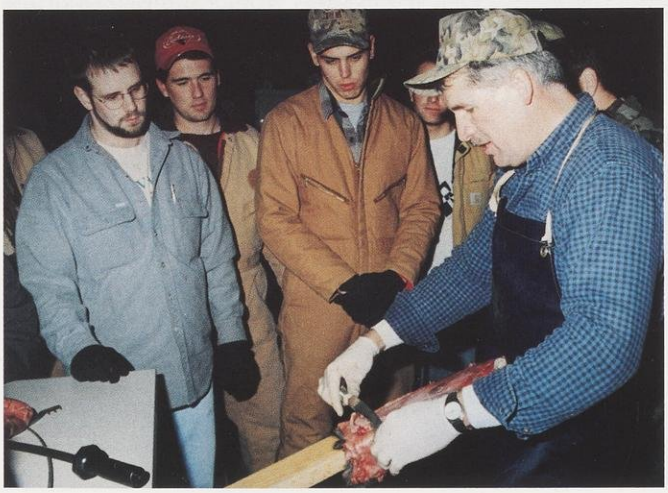
JEAN B. MEYER

Talk shows and personal appearances reinforce conservation messages.

Here's a sampling of the warden service's activities in 1997:

- Issued or processed 20,881 natural resource citations and criminal complaints, which resulted in $4,411,388 in penalties.
- Answered 165,000 telephone calls and investigated 14,331 complaints and notices of violations of hunting, fishing, boating, snowmobiling, habitat and other laws.
- Rescued people or property in 112 incidents.
- Handled 462 incidents of non-DNR related crimes committed in the warden's presence.
- Investigated 1,629 violations of environmental regulations — everything from burning tires to asbestos violations to hazardous waste dumping.
- Responded to 603 toxic and hazardous materials spills.
- Investigated 1,042 violations of water and shoreline regulations.
- Investigated 564 hunting, snowmobile, boating and all-terrain vehicle accidents.
- Gave 2,003 talks to fifth-grade classes, and made 3,732 other presentations to schools and youth groups, civic organizations and sports clubs — in total, to more than 100,000 people.
- Prepared 2,002 newspaper articles, spoke on 709 radio shows and appeared on 210 television programs. — *Lisa Gaumnitz*

Hands-on experience from Wisconsin Trappers Association President Rick Tischaefer shares the challenges of trapping mammals and preparing fur for market.



ELGIN HUNTER

Project Team: Warden Information and Education Committee, Lisa Gaumnitz, David L. Sperling

Editor: Maureen Mecozzi

Graphic Design: Moonlit Ink

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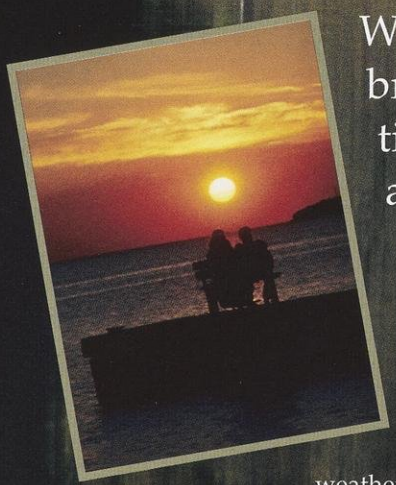
Indian summer

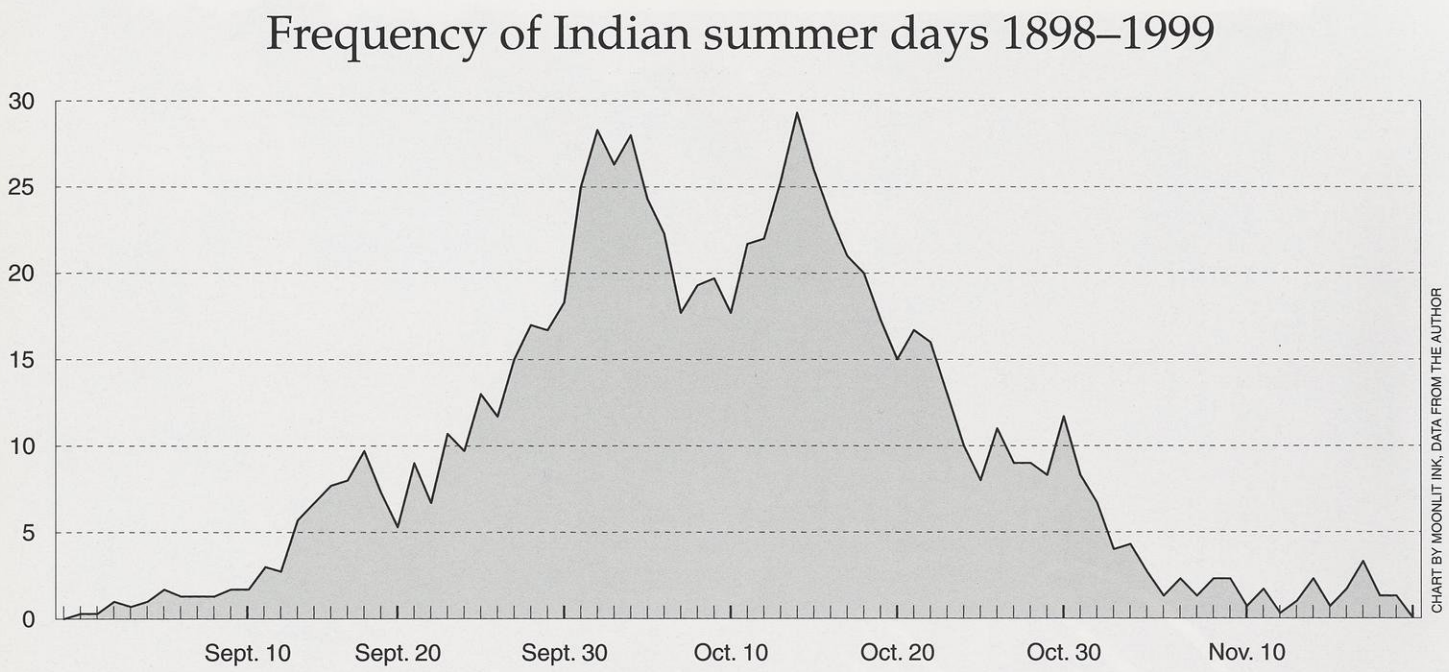


Onboard or on shore, Indian summer days invite us to get outdoors and relax.

When summer blows one last warm breath across an autumn day, it's time to finish those outdoor chores and have a little fun before winter comes to stay.

Dick Kalnicky

Some of the most interesting weather of the year occurs in autumn when the forces of nature give Wisconsin several abrupt and sometimes unpleasant transitions from summer to winter. Several of these transitions feature sharply cooler weather leading to the first freezing temperatures and the end of the growing season. But that doesn't mean all pleasant weather has departed until next spring. In most years, the first frost is followed by one or more intervals of mild, dry, pleasant weather. This welcome temporary warmth provides both opportunity and a reason for outdoor recreation while wearing summer clothing — a last chance to do this before the long Wisconsin winter sets in.



During the last hundred years, Indian summer days peaked the first few days of October and mid-October. Make your plans to play hooky now!

"Indian summer" is the commonly used meteorological term for abnormally warm weather in mid- or late autumn with generally clear skies, sunny or hazy days, and cool nights. According to the *Glossary of Meteorology*, at least one killing frost and usually a substantial period of normally cool weather must precede the warm spell in the northeastern United States in order for it to be considered a true "Indian summer." The glossary also states that while Indian summer does not occur every year, some years may have two or three such periods.

The term "Indian summer" is most often heard in the northeastern United States, but its usage extends throughout English-speaking countries. It dates back at least 200 years, but the origin is not certain; the most probable suggestions relate it to the way the American Indians availed themselves of the extra opportunity to increase their winter stores. According to New England Native American folklore, Indian summer is sent on a southwest wind from the spirit Countantowit.

European folklore has Indian summer equivalents: "Old wives' summer" in central Europe, probably from the widespread existence of "old wives' tales" concerning this striking feature of autumn weather; "halcyon days" also in central Europe, based on a period of fine weather described in Greek mythology; and "all-hallown summer," "St. Luke's summer," and "St. Martin's summer" in England, depending on the autumn time when the weather occurs.

Indian summer is an example of a weather "singularity" — a characteristic meteorological condition that recurs on or near a specific calendar date. The concept originated in folklore: agricultural societies noted that certain animals and plants responded in set ways associated with weather that recurred on nearly the same date each year. These collective observations were eventually collected and written in guides like the Farmer's Almanac that provided calendars of favorable planting and harvesting dates.

I was fortunate to experience many wonderful Indian summers while growing up on a dairy farm in western Wisconsin. I remember jumping in piles of leaves on a hillside near a little country school I attended. I also recall walks on the family farm through the hills and valleys of birch, maple, and oak with their vibrant shades of gold, orange, and crimson.

One of the most notable Indian summers on record occurred only two and one-half months after I was born. I'm sure it left a favorable impression, for as long as I can remember Indian summer has been one of my favorite times of the year.

Summer's last simmer

When does Indian summer occur in Wisconsin? How often can we expect one? To answer these questions and to learn other facts about Indian summers in Wisconsin, I examined daily weather records for the last 100 years (1898–1997) for three representative locations: Medford in northwestern Wisconsin, New London in east central Wisconsin, and Madison in southern Wisconsin.

Weather textbooks do not contain precise criteria for what qualifies as an Indian summer day, so I defined what I think is appropriate. An Indian summer day in Wisconsin meets all of the following criteria:

- It occurs after the first frost — the first date in autumn in which the minimum temperature was 32° F or lower.
- It's warm enough to enjoy outdoor activities in summer clothes — the maximum daily temperature must be 65° F or higher.
- The minimum daily temperature is above freezing — 33° F or higher.
- The weather is dry — there is no measurable precipitation.

WISCONSIN DEPT. OF TOURISM *(INSET)* GREGORY SCOTT

September 28 is the median date of the first frost in Wisconsin for all 118 cooperative weather stations during the last 30 years and for Medford, New London, and Madison combined for the last 100 years. First frosts have occurred as early as August 30 in Medford (1915 and 1931), September 10 in New London (1917), and September 12 at Truax Field in Madison (1955). First frosts have occurred as late as October 19 in Medford (1938), October 24 in New London (1911), and November 12 when the weather station was on Bascom Hill in Madison (1946). However, about two-thirds of first frosts occurred in the three weeks between September 20 and October 11.

Given this wide variation in first frost dates, Indian summer days in the last 100 years have occurred as early as August 31 and as late as November 19. However, Indian summer is most frequent from the end of September through the first three weeks of October. My data showed October 14 to have the greatest frequency of Indian summer weather, with peak frequencies during the first few days of October as well as mid-October. During these peaks, Indian summer weather occurs 25 percent of the time or more frequently.

Indian summer, on the average, occurs earlier in northern Wisconsin than in areas further south. At Medford, the peak frequency occurred on October 2; in New London there were two peaks — on October 4 and 14; in Madison on October 14.

An average year, if one ever occurs, provides a given Wisconsin locale with eight Indian summer days and a 90 percent chance of having at least one Indian summer day. Extremes can provide more than 30 Indian summer days in a fall season (Madison had 32 in 1963 when the first frost occurred on September 14, about three weeks earlier than normal). As you would expect, the later the date of the first frost, the smaller the number of Indian summer days on the average. Who said you could have your cake and eat it too?

The typical Indian summer day has a high temperature of 72° F and a low temperature of 45° F. Although this may seem cool when compared to typical summer highs, these temperatures are fully 6 to 10 degrees warmer than the autumn norms. Besides, when you're outdoors during the day, 72° F with low humidity can be more comfortable than 80° F with high humidity.

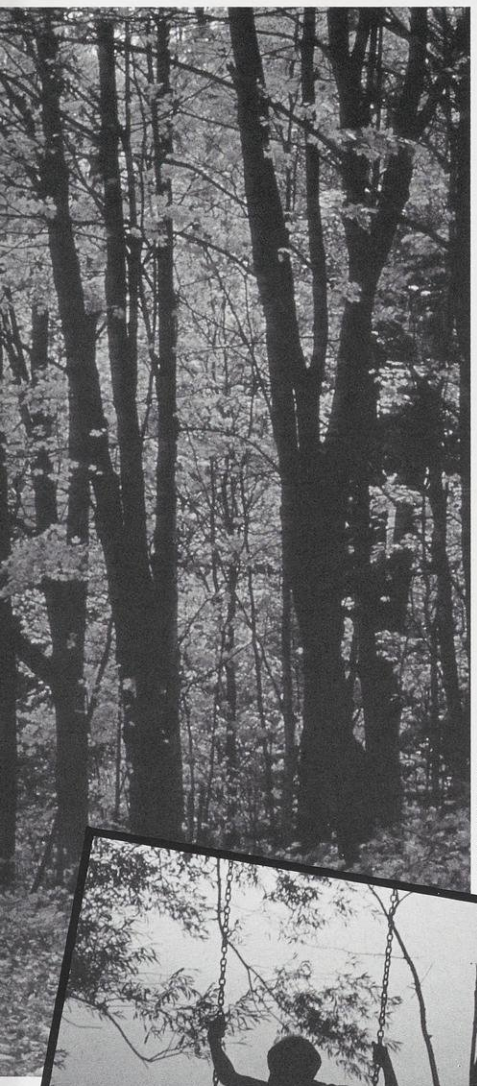
Slow down, get off the beaten track and feel the countryside. The colors, odors and sounds make an Indian summer outing extremely peaceful. It's a perfect time to cast a line, get some exercise and soak up some warmth before winter.

Occasionally autumn weather patterns get stuck and Wisconsin can sustain a prolonged Indian summer weather pattern for a spell of five days or longer. The chart in the next column identifies the most recent of these statewide Indian summer spells. The longest lasted 11 days in 1947.

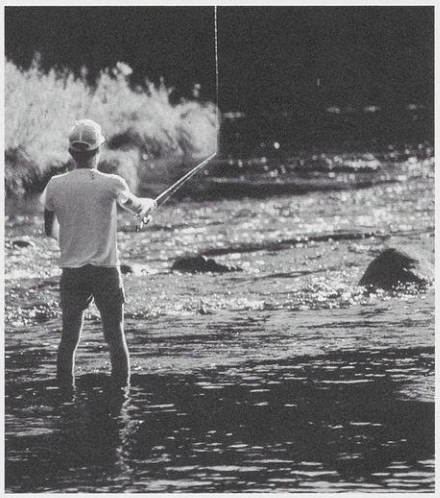
Notable Recent Indian Summers
(spells of 5 days or more — statewide)

October 12–22, 1947
October 13–18, 1953
September 23–28, 1956
October 16–22, 1956
October 5–9, 1961
October 12–16, 1968
October 4–8, 1975
September 30–October 4, 1976
October 24–28, 1989

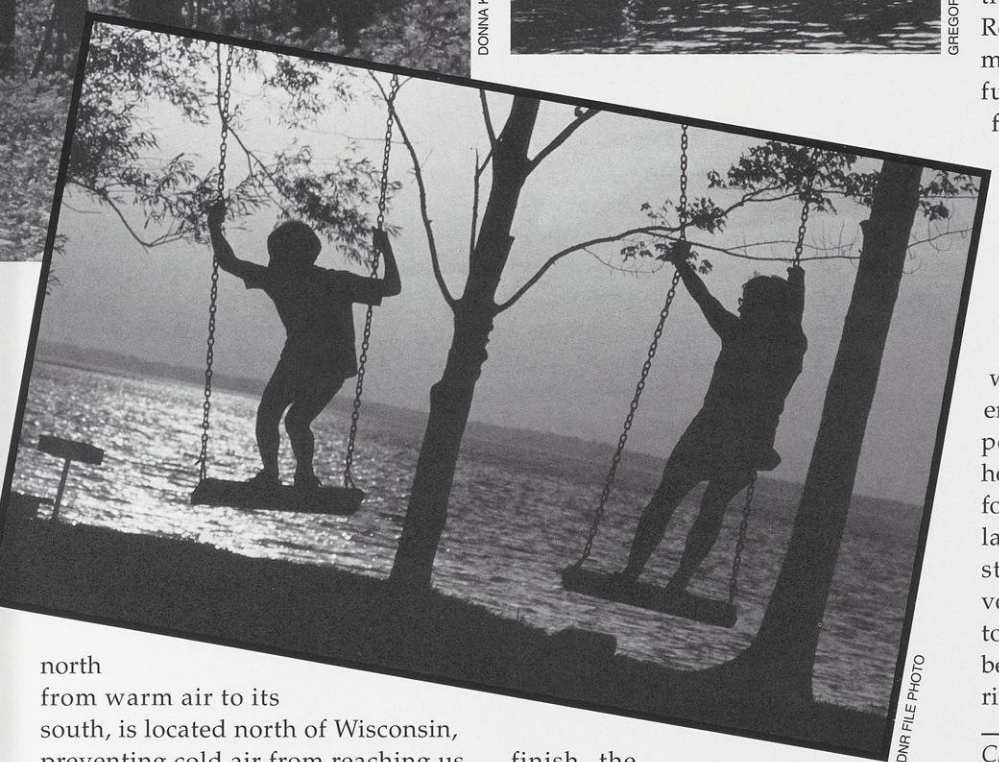
A typical Indian summer weather map shows warm high pressure at the surface in the vicinity of Wisconsin. Higher up in the atmosphere, the jet stream, which divides cold air to its



DONNA KRISCHAN



GREGORY SCOTT



DNR FILE PHOTO

north from warm air to its south, is located north of Wisconsin, preventing cold air from reaching us. This allows Wisconsin to bask in a mild dry air mass usually of Pacific Ocean or southwest United States origin. At the surface, the wind flow is usually from the west or south. Indian summer persists until a cold front passes while the jet stream drops south of Wisconsin, which allows a cold Canadian air mass to take charge, lowering temperatures to below Indian summer levels.

Spending those halcyon days

Wisconsin farmers take advantage of Indian summer weather to harvest crops and tackle other farm chores before the onslaught of winter. It's a good time to cut and bale the last crop of hay, finish the corn silage, and complete potato and apple harvests. Cranberry, soybean and field corn harvests usually make great progress on these days. Farmers also begin fall tillage and plowing in the warmth of Indian summer.

Those of us who "farm" on a much smaller scale have plenty to do during Indian summer. Planting winter hardy bulbs such as daffodils and tulips, digging out and storing frost sensitive bulbs and tubers such as gladiolas, calla lilies and begonias, and raking the first of several waves of leaves are typical Indian summer gardening chores. It's also time to harvest late potatoes, carrots, Brussels sprouts, late cabbage, and the last tomatoes of the season — assuming the frost preceding Indian summer was not too severe and you protected the tender tomatoes from a freeze. Hardy mums usually provide spectacular displays that make Indian summer gardening even more enjoyable.

Don't let chores consume all your Indian summer hours. Whether by coincidence or grand design, Indian summer usually falls near the foliage peak, at the end of September to the first week of October in northern Wisconsin, and mid-October in southern Wisconsin. Hit the trail and wander The Great River Road, a Rustic Road, or just about any meandering country route to see colorful views. Or enjoy the hunting and fishing seasons of Indian summer including bowhunting for whitetailed deer, gunning for gray and fox squirrel, crow, ruffed grouse (northern and western zones), cottontail rabbit (northern zone), and angling for lake sturgeon or walleyes.

Indian summer won't wait for weekends over weekdays. With an average of only eight Indian summer days per autumn, you may need to play hooky to visit your favorite golf course for a final round, get the boat out on the lake one more time, spend a day at a state park or walk through your favorite arboretum. You owe it to yourself to get out there in a T-shirt and shorts before the first snowflakes of winter arrive in just a few weeks. □

Climatologist Dick Kalnicky oversees grants and contracts to cleanup contaminated lands for DNR's Bureau of Remediation and Redevelopment.

the learning trees

School forests serve as outdoor classrooms, research labs, wild repositories and springboards for future caring adults.

EILEEN POTTS DAWSON

Eileen Potts Dawson

Sometime in the late 1600s or very early 1700s, a white oak acorn rolled to a secluded resting spot in the southern Wisconsin grasslands and took root. The little oak survived life on a savanna, prairie fires, and the onslaught of settlers' wagon wheels. As it grew, its spreading roots threw up annual shoots into the prairie that grew into "grubs," huge entwined underground anchors that bedeviled farmers and supplied the young trees which eventually became a forest.

The first European settlers to own the land where the acorn lodged were the Stewarts, beginning in 1845. This crowded stand of white and bur oaks on sandy, steep and rocky hillsides proved too overwhelming for the farmer's plow. About 300 forested acres remained and flourished as the surrounding land was tilled to farms. Today, that same gnarled and knobby white oak is known and loved by thousands of school children as the Grandfather Tree, and it's a living monument to tenacity in the Madison School Forest.

From 1950–58, Donald Stewart cut nearly 650,000 board feet of lumber from the forest and sold most of the white oak to the Frank J. Hess and Sons Cooperage in Madison. They made and repaired beer and whiskey barrels that were shipped all over the country. Hess and Sons was the last operating cooperage in the United States, closing in 1973. Other lumber from the forest went to a furniture factory in Green Bay.

When Stewart considered selling the land, an interested buyer wanted to clear-cut the woods to make charcoal. Fortunately, Stewart turned him down. He was approached by Bill Roys and Joseph "Bud" Jackson, who proposed using the hilly land southwest of Madison in the Verona countryside as a school forest. Stewart agreed. He sold 160 acres for $20,000. Roys was an executive of the General Casualty Insurance Company. He had quarterbacked the World Championship football team

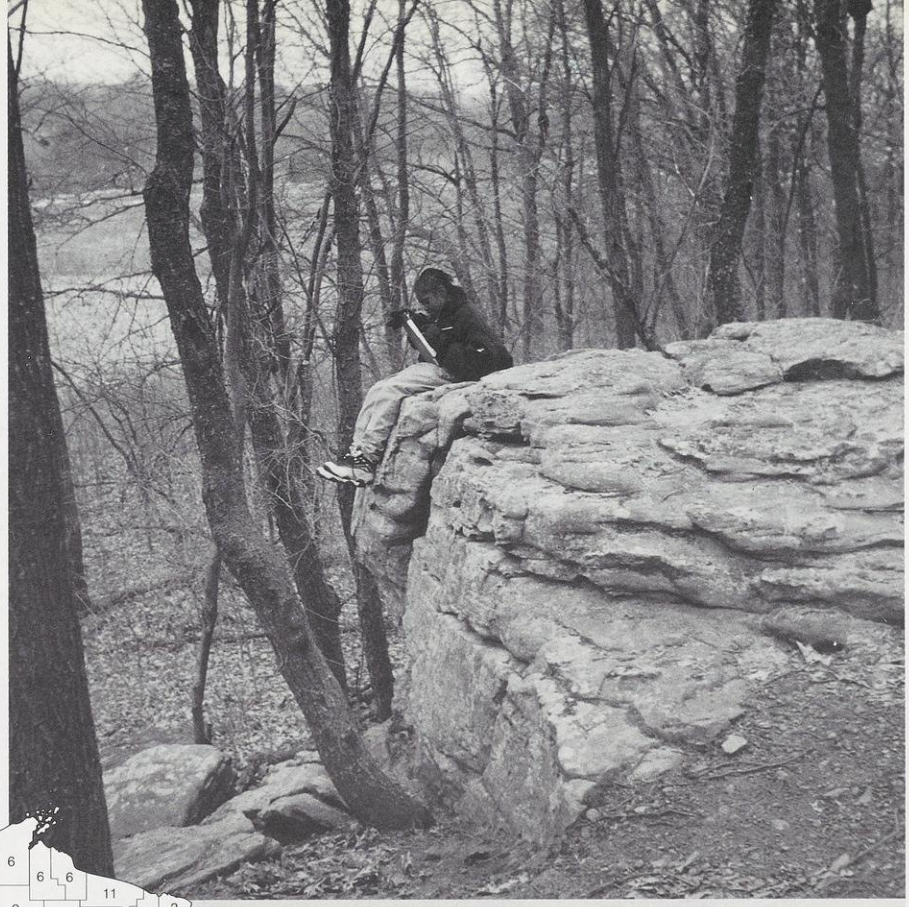
Exploring school forests at an early age builds awareness and appreciation for wild things and wild communities.

from Madison Central High School in 1897. Jackson was a good friend of Roys who had been an athletic trainer at the high school. They shared a love of the outdoors and a belief that students needed the natural environment for real life experiences.

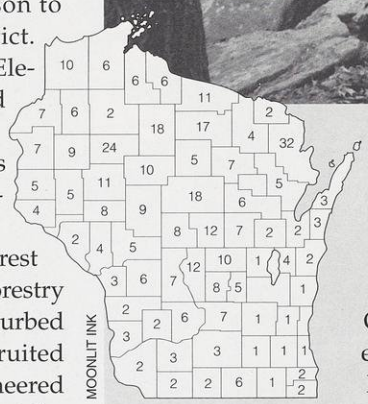
When Donald Stewart sold them the land for the Madison School District, he placed a deed restriction limiting its use for school forestland in perpetuity. During the next two years, 80 adjoining acres were purchased from the Malloy family who had owned the land since 1867, and soon after another 60 acres were purchased from the Andreas family in Belleville. A one-acre rocky outcropping on the Lamberty farm was purchased and later called "Paul's Rock," in honor of Paul Olson, who had persuaded his friend Bud Jackson to buy the land for the school district. Olson, the principal of Midvale Elementary School in Madison, had started a work-learn program for middle school boys in the mid-50s when he stumbled across the 160-acre Stewart parcel.

Olson had the vision for the forest plan, dividing the parcels into a forestry demonstration area and an undisturbed natural area for study. Olson recruited Dr. James Zimmerman, who pioneered the ecology/teaching program at the forest. Zimmerman was a dedicated naturalist, teacher and botanist who was committed to teaching people to care about the outdoors, and to appreciate and conserve the plants and wildlife near their home environment. He was joined at the forest by Virginia Kline, who became one of the first guides/naturalists and the first coordinator of the forest's Outdoor Education Program from the early 1960s through early 1970s. Kline, Zimmerman, Olive Thomson, Ronnie Saeman and others formed a core group of naturalists who taught children to become keen observers, to "read the landscape," and to understand their relationship to the natural world. (Kline later returned to grad school, earned a Ph.D. in Botany and became the UW Arboretum Ecologist from 1976–1997.)

In 1963, Zimmerman and Olson authored the "Madison School Forest



EILEEN POTTS DAWSON



MOONLIT INK

School forests provide equal opportunity to explore natural history, human history, or get a sense of landscape and development. The U.S. school forest program began in Wisconsin. This map shows active school forests in each county as tallied in 1993.

A growing tradition

Our nation's school forest tradition began appropriately enough in Forest County, Wisconsin in 1928. Dean Harry Russell of the UW-Madison College of Agriculture, who had seen children planting trees on public lands in Australia as a school project, introduced the concept. Russell thought the idea could help recover acres of abandoned lands in the northern Wisconsin cutover. He found kindred spirits in Wakelin "Ranger Mac" McNeel and Fred Trenk, a UW-Extension forester. McNeel was a state 4-H leader who believed that sound attitudes about the outdoors would be born of experiences and good habits acquired by training. He encouraged students and teachers to reclaim logged burned-over lands with tree seedlings and planting spuds.

Russell spearheaded legislation to allow school districts to own land for forestry purposes. By spring of 1928, three school forests were dedicated in Laona, Crandon and Wabeno. Legislation in 1935 mandated the teaching of conservation education in all Wisconsin high schools, vocational schools and colleges. In 1949, the legislature directed the state to provide a free tree to each fourth grade student on Arbor Day. The tradition continues today as school and community forests are located in every county in Wisconsin.

In 1928, those Forest County children understood what needed to be done to correct the mistakes of past overharvests. Programs in today's school forests want to keep that ethic alive. In these small parcels, we echo the words of our environmental grandfather, Aldo Leopold. "Like winds and sunsets, wild things were taken for granted until progress began to do away with them. Now we face the question whether a still higher 'standard of living' is worth its cost in things natural, wild, and free."

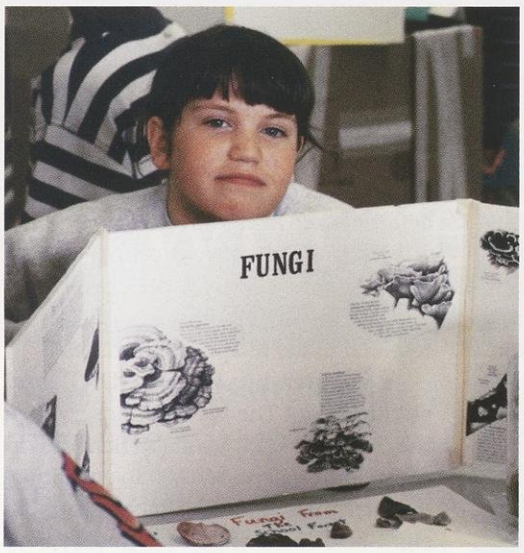
Guidebook," which is still used today. It includes the history of the land, a detailed reference to the plants, animals, and birds found at the forest, and a field guide with sketches of plants and animal tracks. A fourth grade teacher, David Spitzer, and his students at Lincoln Elementary School published a newer guide by kids for kids in 1997.

In 1996–97, nearly 120 acres of the school forest were sampled by DNR biologist Rich Henderson. He is mapping the forest, recording the types and numbers of trees, shrubs and plants in each designated quadrat, repeating similar surveys taken on the same plots by renowned botanist Grant Cottam 50 years earlier.

Significant changes had occurred in the intervening years. At the time of Cottam's study, the site was a closed canopy "xeric" (dry or lightly shaded) woodland dominated by white oak, as it had been for the previous 90 years. From 1946 to 1996, tree composition changed as heavy shade-producing trees like red maple gained a foothold. The shade-intolerant oaks lost ground. For every "mesic" (medium moisture or heavily shaded) tree that took hold, more than two xeric species declined by 80 percent or disappeared. Today the oaks comprise less than 70 percent of the school forest because they don't regenerate well in the heavy shade of mature oaks and successful "mesic" species. A management committee of school district personnel, naturalists, environmentalists and DNR experts is using controlled burns and selective cutting to maintain the oaks, remove competing species and plant seedlings grown from the school forest's acorns.

More than 40 species of nesting birds live in this oak forest, including the threatened Cerulean warbler. Many more migratory species stop over spring and fall. The forest is so ecologically significant that 166 acres have been dedicated as a State Natural Area.

As rapid development continues in the county, the Madison School Forest becomes more important than ever as a special place of natural beauty, biologi-



EILEEN POTTS DAWSON

Class projects range from a day's exploration to a whole year of study. Here students learn the important role that forest fungi play in decaying and releasing forest nutrients.

ROBERT QUEEN

cal diversity and an important educational environment. More than 5,000 public school students visit the forest annually and another 3,000 children in youth groups learn about nature here first-hand. The YMCA makes extensive use of the campground facilities by running a summer day camp here. Scouting troops stay here, too.

The naturalist program begun by Kline and Zimmerman continues to link the schools to this gem of a teaching lab. On the trails, naturalists supplement their teaching with stories, games, and a knapsack of hands-on artifacts such as deer skulls, feathers, galls, and other found objects. The naturalists and teachers who engage these students feel strongly that a lifetime interest in the natural world will result from these early journeys to the Madison School Forest.

David Spitzer brought his Lincoln Elementary students here six or more times per school year to integrate outdoor experiences with science, math and language arts classes. His students also conducted service projects like erecting bird boxes, trail posts and writing the guidebook to give something back to the forest.

Naturalist Jan Ross pulls a partial deer jaw out of her knapsack to encourage discussion of anatomy, function, habitat and forest ecology. Trained personnel help teachers develop lesson plans for their days afield.
(below) David Spitzer's fourth graders took on service projects in addition to drawing science, math, reading and writing lessons from their school forest visits.

EILEEN POTTS DAWSON

EILEEN POTTS DAWSON

School forests need partners

School districts statewide are challenged to continue funding a wide range of programs like outdoor education. Transportation costs to send each class once per year to the forest were eliminated in the current budget discussions by the Madison Board of Education. If parents and students have to pay the way to their outdoor classroom, some will need help. Such concerns have led several districts, including Madison, to develop a "friends group" for the school forest. Naturalists, schoolteachers and caring citizens joined together to raise money and awareness to maintain and expand the environmental education programs, purchase adjacent land to provide a buffer from development, and support research in the forest communities.

In partnership with the DNR, and mentors from The Nature Conservancy, the Friends of the Madison School Forest recently raised $40,000 to contribute toward purchasing 20 acres plus an eight-acre easement of oak and hickory woods at the forest's northern edge; the parcel was slated for subdivision into homes. Development at the forest's edge and accompanying new roads, cut trees and clearings erode the overall health of the forest and change its animal life.

A seasonal newsletter, The Leaflet, keeps members and property neighbors up-to-date on developments. A companion website includes information about the forest, shares the new guidebook and links to other sites. Visit the site at http://www.madison.k12.wi.us/forest/edschfor.htm. □

Author, painter and forest advocate Eileen Potts Dawson lives in Madison. DNR Biologist Rich Henderson and Rick Kalvelage, environmental education coordinator for the Madison Metropolitan School District, assisted with this story.

A wet report card

New reports annually evaluate the quality of drinking water and describe how customers can tap into information about their public water supply.

Megan Matthews

Public water utilities will send customers annual progress reports listing the quality of community drinking water, steps to treat the water and challenges in maintaining a safe supply.

What could be more basic than water? Clean, pure and only one ingredient. You'd think that a health report on water would be the shortest story ever told.

Not so.

Though Wisconsin's residents and visitors expect the water provided by water utilities to remain safe, all of the public systems require attention. Utilities check for natural contaminants, look for leaks in water mains and pipes, constantly sample water quality, and ensure that an adequate supply is on hand for changing demand. Overall customers can feel good about the water they drink from Wisconsin's public systems.

This year, water utility customers, all four million of them, will receive the first of an annual publication that gives them more information about the water they drink, water issues facing their communities, and suggestions of how citizens can become involved in keeping drinking water clean for the future. The federal Safe Drinking Water Act requires these Annual Water Quality Reports, also called Consumer Confidence Reports, for each community public system across the nation. Reports will be mailed to homes or posted in a public place by October 1999.

Don Swailes, DNR safe drinking water team leader, says the reports are a way for community water systems to routinely discuss drinking water with the public when there isn't a crisis or an emergency. These reports create an avenue for communication between the water utility and its consumers. Ideally, the reports give utility officials a chance to let customers know what is in their local water, how and why water is treated, and what is being done to maintain a safe water supply.

Reports will include:

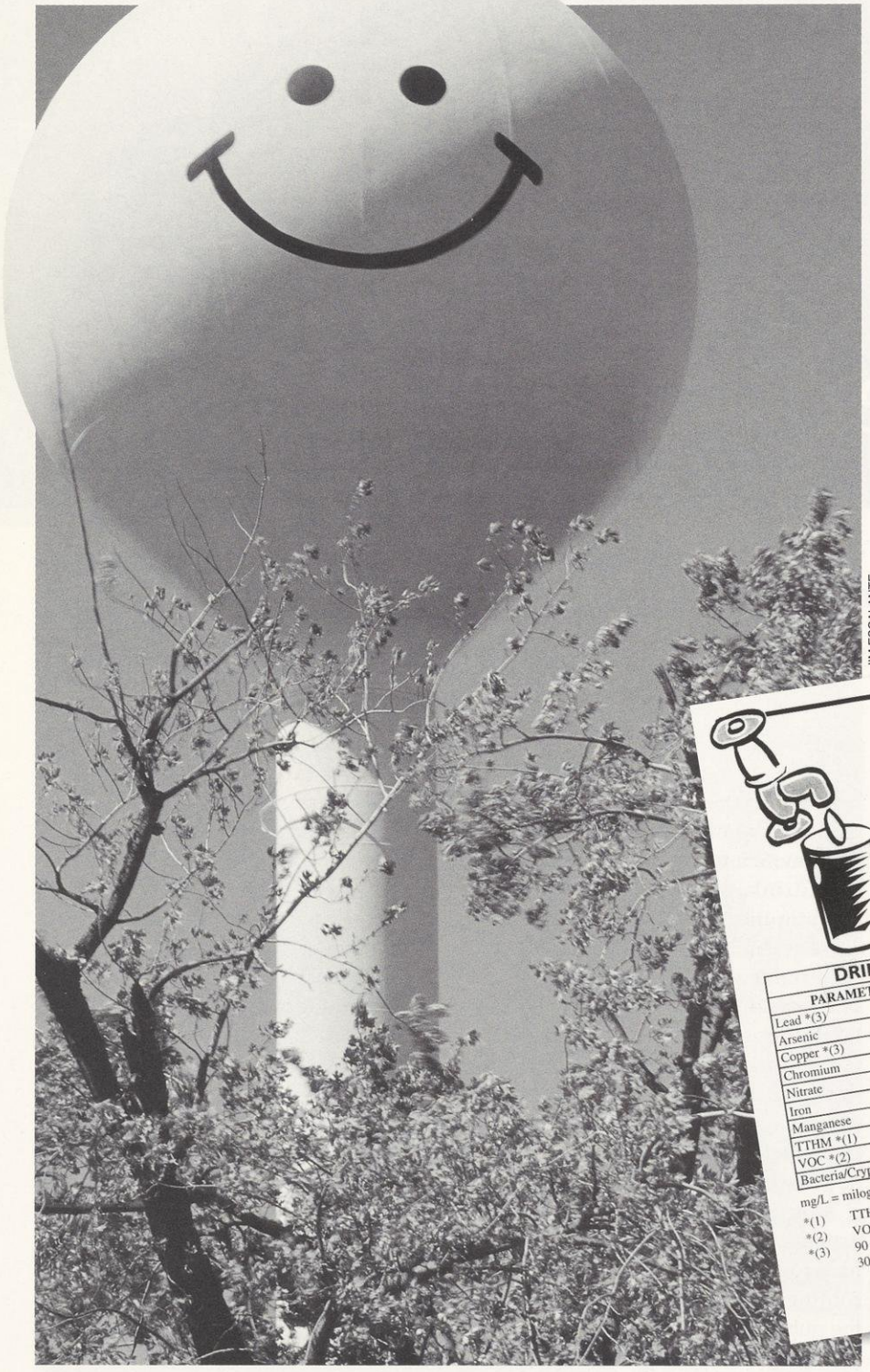
- sources of a system's drinking water (aquifer and well locations)
- methods used to treat the water
- any substances designated as contaminants that have been identified in the water
- potential health effects of any contaminants
- any special precautions consumers should take
- opportunities to be involved in decisions about drinking water, such as public meetings, etc.

Reports can also include information about equipment and improvements the utility expects to upgrade as well as future needs. Water utilities may also

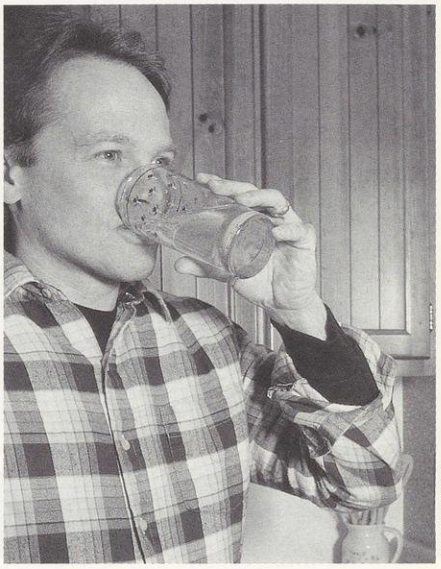
identify possible threats to the water system's safety. For instance, where aging pipes are leaking and losing water. This information will help consumers who want to get more engaged in decisions about their drinking water. It should help system managers and users take action before a problem develops.

After the initial report this October, consumers will receive them annually in July. The reports might take the form of a newsletter, a brochure in a water bill, or a simple letter from the utility. They will be mailed to customers' homes, or if a system is particularly small, they may be posted in a public place.

Wisconsin has more than 12,000 public water systems, and the Wisconsin Department of Natural Resources Bureau of Drinking Water and Groundwater assures that each of them is monitored regularly. A public water system is defined as one that regularly serves at

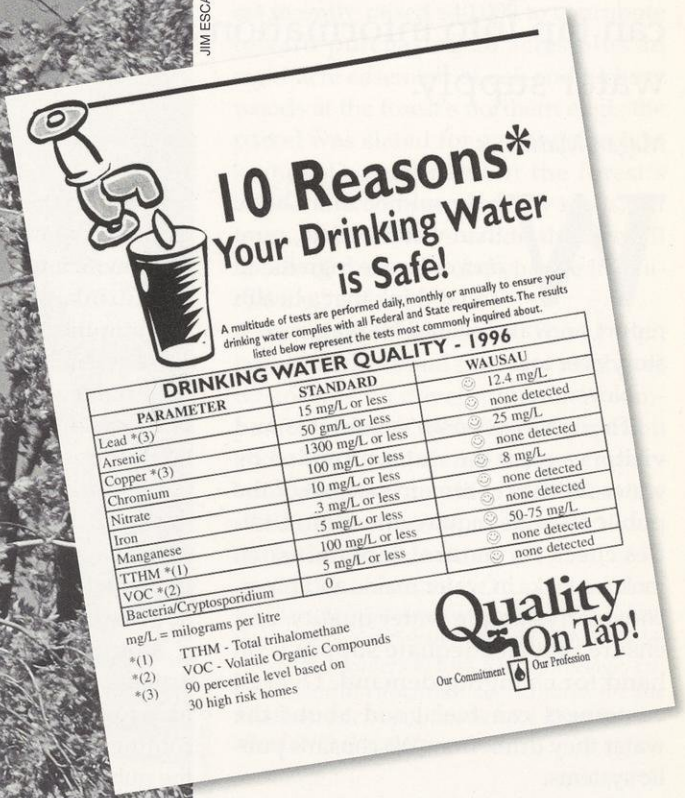


JIM ESCALANTE



JEAN B. MEYER

Monitoring results, like this easy-to-understand sheet from the Wausau utility, give customers a gauge to compare their tap water to national standards for healthy drinking water supplies.



10 Reasons* Your Drinking Water is Safe!

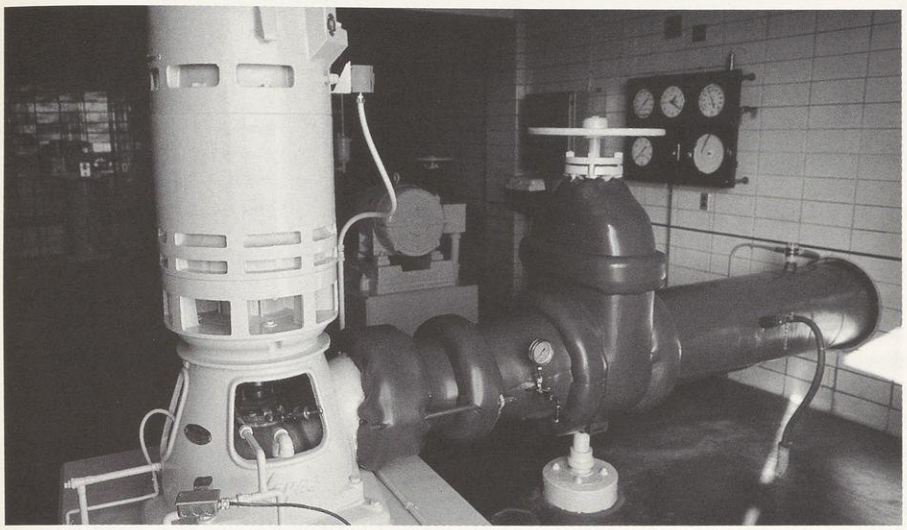
A multitude of tests are performed daily, monthly or annually to ensure your drinking water complies with all Federal and State requirements. The results listed below represent the tests most commonly inquired about.

DRINKING WATER QUALITY - 1996

PARAMETER	STANDARD	WAUSAU
Lead *(3)	15 mg/L or less	12.4 mg/L
Arsenic	50 gm/L or less	none detected
Copper *(3)	1300 mg/L or less	25 mg/L
Chromium	100 mg/L or less	none detected
Nitrate	10 mg/L or less	.8 mg/L
Iron	.3 mg/L or less	none detected
Manganese	.5 mg/L or less	none detected
TTHM *(1)	100 mg/L or less	50-75 mg/L
VOC *(2)	5 mg/L or less	none detected
Bacteria/Cryptosporidium	0	none detected

mg/L = milograms per litre
*(1) TTHM - Total trihalomethane
*(2) VOC - Volatile Organic Compounds
*(3) 90 percentile level based on 30 high risk homes

Quality On Tap!
Our Commitment Our Profession



ROBERT QUEEN

Few people ever see the massive pumps and pipes that carry treated surface water or groundwater into their homes. Wells, pumps and distribution lines need regular inspection for organisms, cracks, and leaks that can foul the water. Water mains and systems must keep pace with community expansion.

least 25 people for at least 60 days out of the year.

Public water systems are categorized by the services they provide. Some serve year-round residents, others serve a changing population. Community public water systems, approximately 1,200 in number, serve year-round residents in municipalities, mobile home parks and apartment complexes. Other systems seasonally supply drinking water to schools, parks, waysides, restaurants and the like.

All public systems are required to monitor drinking water following federal guidelines in the Safe Drinking Water Act (SDWA), which celebrates its 25th anniversary this year. The SDWA was the nation's first comprehensive drinking water law, created to set health and safety standards for all public drinking water in the United States. In 1996, the act was amended to bolster provisions giving the public more information about their drinking water supply and more say in improving drinking water quality. These Consumer Confidence Reports are one of the cornerstones of those amendments.

Reports will be compiled by the local utility with statistical information provided by the Wisconsin Department of Natural Resources from an online agency database that is devoted to public drinking water supplies.

For questions about information in the Consumer Confidence Report you receive, first contact your local drinking water utility. For more general questions, call a regional DNR office, ask to speak with a drinking water specialist, or use a Safe Drinking Water Hotline provided by the Environmental Protection Agency, by dialing 1-800-426-4791. The Environmental Protection Agency also has a website with drinking water information: http://www.epa.gov/OGWDW/ as does the Wisconsin DNR: http://www.dnr.state.wi.us/org/water/dwg/index.htm. Drink up and tap into the well of drinking water information. □

Megan Matthews writes about drinking water and groundwater issues for the Department of Natural Resources in Madison.

continued from page 2

After wintering in its chosen spot, the caterpillar awakens on a warm spring day and continues to feed. Soon it forms a cocoon and pupates. In about two weeks, an orange-yellow moth with a 1½- to 2-inch wingspan emerges. The wings lack distinctive markings but the abdomen is spotted with three longitudinal rows of small black dots. The moths are active at night throughout summer.

Fertilized female Isabella moths lay eggs in small clusters on a variety of plants including birches, elms, maples, asters, and sunflowers. The eggs hatch in four to five days and the tiny caterpillars begin feeding on their host plants. The caterpillars shed their skins or molt six times before reaching adult size. With each molt, their colors change, becoming less black and more reddish. Thus differing colors among the caterpillars merely reflect age differences, not an indication of impending harsh weather. Two generations of caterpillars are produced each year, so it's the second generation that overwinters.

DON BLEGEN

Woolly bears produce two generations each year. The caterpillars we see on roads in fall will overwinter under logs, bark or in rocky crevices.

If you try to pick up a woolly bear, it curls defensively into a tight ball with thick ¼-inch hairs sticking all over to dissuade would-be predators. With luck, the woolly bear survives its cross-country journey, finds a snug place for the winter, re-emerges in spring, and transforms into quite a different creature from the furry little beast that crossed the road last fall. □

Anita Carpenter follows the seasons from her Oshkosh home.

Readers Write

WOODLAND PARTNERS

I was delighted to see coverage in the June issue to non-industrial private woodland owners. I spent much of my career working with such owners and preparing educational materials to aid in managing their woodlands.

On the other hand, I was disappointed to find almost no references to the many organizations that provide assistance to woodland owners. Such organizations as the Wisconsin Woodland Owners Association, UW-Extension, Wisconsin Forest Productivity Council, Association of Consulting Foresters, the Wisconsin Tree Farm Committee, the Land & Water Conservation Department, the Natural Resources Conservation Service, the Farm Services Agency and other forest industry firms were omitted.

If one goal in your coverage was to provide help for woodland owners, these groups should have been listed to give readers a place to go for valuable assistance.

Jeff Martin
Retired Professor of Forestry and UW-Extension Forester
Middleton

In fact, we aimed to show non-woodland owners that they also receive benefits from public investment in private woodlands. We had not envisioned the supplement as a sourcebook for help in managing woodlots. Thanks for listing sources where woodlot owners can seek advice.

WOODLAND THEFT

Thanks for responding to my letter in the June issue. I believe you gave sound advice that will help many landowners in the majority of cases.

No amount of precaution will protect any landowner from theft. Out of your many suggestions, I believe I have done almost all of them. We have a written forestry plan for our land, and the harvest is outlined. That did not prevent a logger from taking the best trees. I hired a private forestry consultant from a list obtained from my county forester who sent me an $800 bill and then would not stand by his estimate! I allowed loggers to bid on my timber and took what I thought to be the best bid. I also had recommendations from two neighbors of a reputable firm and conducted a financial background check. I had a signed, written contract that spelled out what was to be taken, how much I would be paid, which roads would be repaired and how I would be present as logs were measured and scaled. I did more work before our timber harvest than any other business dealing I have entered into. How much more precautions should I have taken? The answer is no amount of precaution can protect someone from unethical people.

My legal battle to obtain road repair has soared. I have found that my written contract means very little. Even though I will win my case, it doesn't mean the logger has to pay. He can file bankruptcy, change the name of his company and start all over again, leaving me with nothing but legal bills. In preparing for trial I found many landowners in western Wisconsin who have had their timber stolen by the same firm. Many chose not to take them to court because the case would involve only "a few thousand dollars" and they can't afford legal bills.

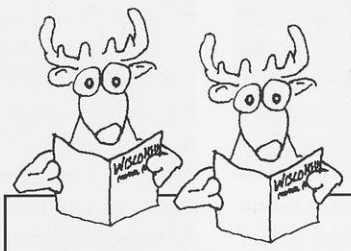
People can become victims of poor loggers regardless of actions they take beforehand. This is unfortunate because it hurts landowners, the land, the timber industry and reputable loggers who do a decent job. We will never allow anyone to harvest any more timber from our property, and we are in the process of removing our land from the Managed Forest Law because it demands more timber harvesting. This is unfortunate because I understand how a good harvest can improve the quality of your land, yet I'm not prepared mentally or financially to survive another ordeal like this one. It's most unfortunate that this same company is still logging and still stealing timber from landowners. I believe they will continue to mistreat people and the land they log, and no one, including the DNR, can stop them.

David Stutzman
Tomah

Excerpts from DNR Private Forestry Specialist Paul Pingrey's response: *The pain and stress from being robbed can be as great whether the thief used a fist or a handshake.*

Unscrupulous timber operators take advantage of governmental agencies as well. While the majority of loggers, like other businesses, are honest, I have seen incidents where failures to comply with state timber sales contracts or payment schedules have been coldly calculated and deliberate.

Periodic efforts are made to strengthen timber theft laws. About 10 years ago state statutes were changed to allow collection of double the value of stolen timber. We hoped such revisions would deter crimes and give landowners satisfaction, but recent court interpretations have shown that more work needs to be done.



WISCONSIN TRAVELER

On track with autumn color

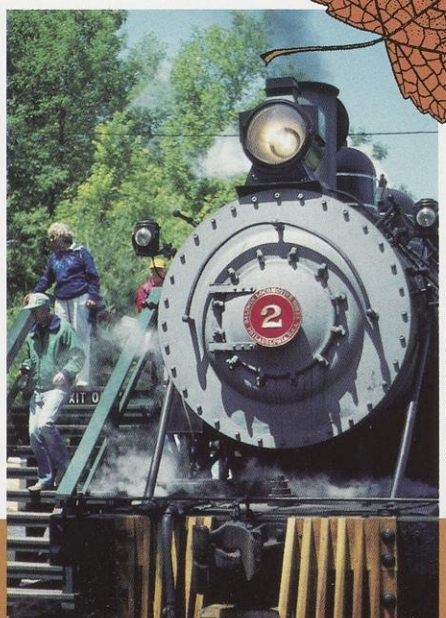
Once a mainstay of transport, the train has faded gracefully into our sepia-toned image of a slower, more genteel past…when gentlemen repaired to the library after dinner for brandy and cigars while the ladies played whist in the parlor, and the children were seen — but never, ever heard. (Those *were* the days!)

In the wake of the automobile and airplane it's easy to forget just how dynamic a change the rails wrought upon America's physical and social landscape. The great steam engines hurtling across the miles swept vitality into every corner of the country. Companies great and small laid track to scratch many a community's itch for access to modern life.

Most of the mighty lines are now gone, but in Wisconsin there are places where the rails still shine from regular use. These short lines and spurs carry railroad enthusiasts, the nostalgic and the curious on trips that move forward, but take passengers backward to the Age of Rail.

There's no better time than autumn to take an excursion on a Wisconsin train. The long, low whistle, a sharp "All aboard!" from the conductor, the "chukka-chukka, chukka-chukka" of the engine as it picks up speed — and you're off to watch the fall colors unfold at a measured pace, accompanied by the rhythm of the rails. To be assured of a seat, call ahead to reserve tickets.

Hop on the **Osceola & St. Croix Valley Railway** and you can travel along the St. Croix River bluffs, a prime fall color viewing area. The company's vintage steam and diesel engines pull passenger cars that recreate rail service in the St. Croix Valley in the 1940s and '50s. "Fall Leaf Watcher" trips depart from the historic 1916 Osceola Depot at 5 p.m. on Saturdays and Sundays through October 10. The route runs between Osceola and Dresser, Wis. and Marine, Minn. A charter service is available on Tuesdays and Thursdays. $9 for adults, $5 for children, $23 for a family of 2 adults and 2–5 children. Website: www.mtmuseum.org. 800/711-2591



WISCONSIN DEPT. OF TOURISM

The **East Troy Electric Railroad** offers a number of rail experiences this autumn. Savor the elegance and romance of dining by rail on the "Oktoberfest Dinner Train," leaving the East Troy depot at 5:30 p.m. on Saturday, October 2 ($45 per person). An "Autumn Leaves Dinner Train" is scheduled for departure at 5:30 p.m. on Saturday, October 23 ($45 per person). Through October 31, the ETE Railroad offers "Fall Fun Days" on Saturdays and Sundays, featuring an electric trolley ride through charming fall scenery to the Elegant Farmer farm for an afternoon of hay rides, apple and pumpkin picking. Round trips depart East Troy at noon, 11:20 a.m., 12:40 p.m., 2 p.m., 3:20 p.m. and 4:40 p.m. Call 414/548-3837. Website: www.easttroyrr.org.

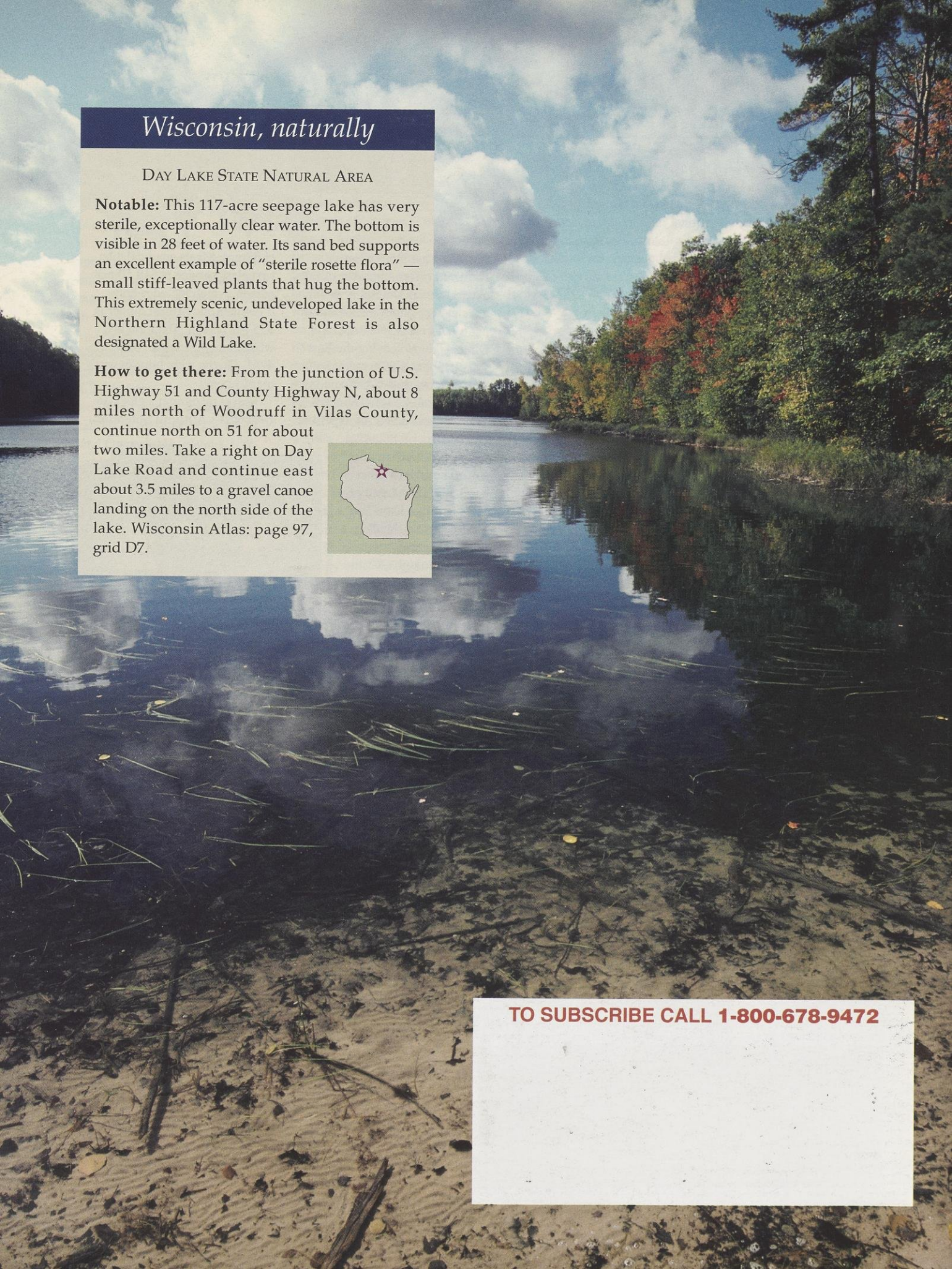
Gaze at the beautiful scenery of the Baraboo River Valley during a seven-mile, 50-minute round-trip ride on a former branch of the Chicago & North Western Railroad built in 1903. The **Mid-Continent Railway Museum** offers autumn color tours that pull out of a restored 1894 C&NW depot in North Freedom on October 1–3, 8–10, and 16–17 at 10 a.m., 11:30 a.m., 1 p.m., 2:30 p.m. and 4 p.m. Fares: $9 adults; $5.50 children 3–12; $8 seniors; $25 family (two adults and two or more children). Meals are available: first class service is $18.50 per person, which includes hors d'oeuvres and drinks; dinner is $55 per person. The train is wheelchair accessible. 608/522-4261. On the web: http://www.mcrwy.com

Revel in autumn's glory on Boscobel's **Autumn Splendor Excursion Train**, which traces the banks of the lower Wisconsin River on October 16 and 17. Six round trips each day travel from Boscobel to Woodman and one goes farther to Bridgeport. On the web: www.boscobelwisconsin.org. 608/375-6010

WISCONSIN DEPT. OF TOURISM

Try a fall color tour by trolley or train. *(above)* The East Troy Electric Railroad and Mid-continent Railway Museum *(below)* are just two of several lines that will welcome you aboard for an autumn adventure.

Round out your rail adventures with a ride on the **Appleton Trolley**. You'll feel history crackling all around you: Houdini's hometown is also the site of the world's first trolley driven by hydroelectric power. Streetcar #846 runs from 1:30 to 5 p.m. on Saturdays and Sundays through November 21. Catch the trolley at Olde Oneida St. and Edison Ave. $1.50 adults; 50 cents children under 12. 920/831-9978. On the web: http://www.focol.org/~trolley □



Wisconsin, naturally

Day Lake State Natural Area

Notable: This 117-acre seepage lake has very sterile, exceptionally clear water. The bottom is visible in 28 feet of water. Its sand bed supports an excellent example of "sterile rosette flora" — small stiff-leaved plants that hug the bottom. This extremely scenic, undeveloped lake in the Northern Highland State Forest is also designated a Wild Lake.

How to get there: From the junction of U.S. Highway 51 and County Highway N, about 8 miles north of Woodruff in Vilas County, continue north on 51 for about two miles. Take a right on Day Lake Road and continue east about 3.5 miles to a gravel canoe landing on the north side of the lake. Wisconsin Atlas: page 97, grid D7.