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WISCONSIN NATURAL RESOURCES

August 2002 \$3.50

Year of the
Trails

CWD update
Chestnut's last stand

Pipe dreams

Look for the ghost flowers of August.

Anita Carpenter

August blossoms with a rainbow of colors. Sun yellow goldenrods and deep purple asters wave in hot summer winds. Lavender milkweeds provide sweet nectar for hungry monarch butterflies. Spikes of blood red cardinal flowers decorate wetlands while blue bottle gentians hide among towering prairie grasses.

In the shadowy understory of an oak-pine woods, a plant with no color rises from the brown, needle-strewn earth. Small clusters of white translucent Indian pipe, *Monotropa uniflora*, give a ghostly image to the scene. Other common names for this unusual plant are corpse plant, ice plant or ghost flower.



DONNA KRISCHAN

Indian pipe grows throughout North America in the rich humus of the forest floor. The flowers are tiny, only half-inch to an inch long and translucent white. Enjoy finding this flower, but don't pick it. Dried or picked Indian pipes turn into a black, gooey mass.

Although Indian pipe looks like a parasite, it belongs to the same plant family (Ericaceae) as blueberry, leatherleaf, trailing arbutus and wintergreen. Unlike the others, Indian pipe lacks chlorophyll, the green pigment necessary for the plant to photosynthesize. Photosynthesis, as all attentive science students learn, is a biochemical process in which green plants use energy from sunlight to convert water and carbon dioxide into carbohydrates and energy for their own use.

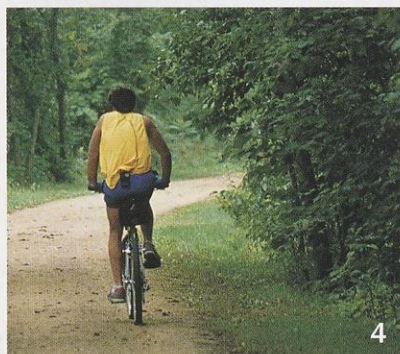
If Indian pipe is not a parasite and lacks the ability to photosynthesize, how does it obtain its nourishment?

The plant has a microscopic helper, but we must look underground to discover it. Indian pipe is a saprophyte, a plant without green color that derives its food from organic materials in the soil. Its root system is a ball of densely matted root fibers that are surrounded by a fungus. This fungus breaks down organic matter and the nutrients are absorbed by the Indian pipe's fine roots. This symbiotic relationship between a beneficial fungus and the roots of a seed-producing higher plant is termed a mycorrhiza. These same mycorrhizae relationships help beech trees, some pine trees and some orchids survive.

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WISCONSIN NATURAL RESOURCES

August 2002
Volume 26, Number 4



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USDA FOREST SERVICE



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ROBERT QUEEN, Madison, Wis.

BACK COVER: Spring Green Preserve State Natural Area, Sauk Co. (inset) Prickly pear cactus blooms on the sandy soil. For a map or more information, contact the State Natural Areas Program, Bureau of Endangered Resources, DNR, P.O. Box 7921, Madison, WI 53707.

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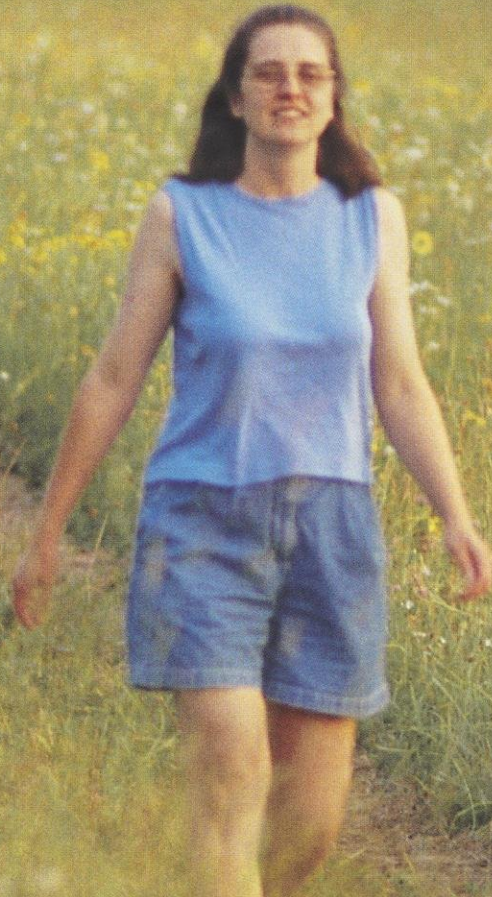
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Hit the trails!

The Year of the Trails celebrates the wonderful paths we've built
and the healthful outdoor routes we hope to form.



The road maps rarely show them. The highway riders barely see them. But across Wisconsin's landscape on hill-sides and ridges, down logging roads and farm fields lie networks of trails. By foot, wheel, snowshoe, ski, sled, horse-back, paddle power and under water, you can explore mile upon mile of Wisconsin in relative peace and quiet. Our Year of the Trails celebrates these wide-ranging opportunities. There are dandy events each week through December that you'll find posted at state parks, county offices, national forests, historic sites, campgrounds and Tourism Information Centers. Those who surf the Web can stay on track with trail events at www.wiparks.net.

Trails are arteries that become more vital and more powerful as they link to other trails to form a body of outdoor recreation.

"In a growing number of places we can provide outdoor experiences that give the hiker, biker, skier and paddler the freedom to explore an area of Wisconsin all weekend or all week without relying on paved roads that carry car traffic," said Sue Black, DNR Parks and Recreation director. "That chance to slow down the pace, to get away from the lights, away from traffic noise and back to nature is a welcome bonus to the benefits of healthy exercise."

What makes a good trail?

Linked trails call for cooperation and a collective vision to provide the self-propelled traveler with ample routes. As the Year of the Trails celebration shows, the Wisconsin Department of Natural Resources partners with county parks, city recreation departments, other state agencies, the National Park Service, friends groups, outdoor clubs, foresters, tourism councils, nature centers and private campgrounds to form webs of connecting trails.

To make the most of opportunities to expand trails, DNR recreational planners look for certain features as they plan new trail segments. The State Trails Network Plan, adopted in January 2001, outlines the characteristics

quality recreational corridors share. First, the state is quicker to consider new paths near population centers because they serve more people and are more likely to connect to a network of existing city and county trails.

Second, the state considers aging rail corridors likely to be abandoned. "The Department of Natural Resources doesn't take a position on abandoning railroad routes, but we certainly stay in contact with the railroads and the Department of Transportation," notes State Trails Coordinator Brigit Brown. Thanks to a 1983 amendment to the National Trails System Act, over 3,707 miles of potentially abandoned rail corridors have been turned into trails throughout the country. Rail corridors have proven to make terrific trails. It's easier to redevelop rail routes as trails than acquire new parcels. The land along the route is already owned. Railbeds provide a pre-made hardened surface for a trail. The railroads do a good job of cleaning away overhanging vegetation and keeping the corridor clean. Railroad grades are already engineered to have gentle slopes, and the routes often travel right through the heart of downtown communities. "They make good recreational routes and good commuting routes," Brown said.

Third, the trail plan advised looking for segments that adjoin or connect historic sites, tourist attractions, and state and county parks. "The idea is that trails can provide another way to reach these attractions and that people can link together a nice mix of experiences if they combine a bike ride with a nature walk, a picnic and a cultural outing," said Shawn Schmidt, DNR Year of the Trails Coordinator. For the same reason, we look for new segments that link to existing federal, state, county or municipal trails. We're also on the lookout for parcels to bring trail users closer to rivers, vistas, scenic landscapes, and unique geologic features like the glacial edges of the Ice Age Trail that ribbons through 1,000 miles of Wisconsin.

Other aspects of land development could provide excellent prospects for

trails. Corridors set aside for power lines, gas lines, phone lines or other utilities offer fine off-road recreation, particularly in urban areas where the routes can serve as links to other trails. As new roads are developed or reconstructed, paved shoulders or separated paths can become economical trail connectors.

Wisconsin properties also form important links to interstate trails. For instance, the North Country National Scenic Trail will become part of a 4,200-mile trail crossing seven states from Crown Point State Historic Site in New York to Lake Sakakawea State Park on the Missouri River in North Dakota. It will cross 390 miles of Wisconsin, of which 170 miles are on public lands.

A trail outside your door could take you on a nationwide journey. For instance, the Southwest Bike Path, a paved railroad spur that now runs past neighborhood backyards on Madison's west side, is the trailhead to the Badger State Trail. Upon completion the Badger trail will head south and will link to the Jane Addams Trail at the Illinois border. Continuing down to Freeport, riders will find a hub of the Grand Illinois Trail, which is part of the American Discovery Trail extending east to west across the United States coast to coast. Anyone willing to make the ride could travel the nation by trail starting from downtown Madison.

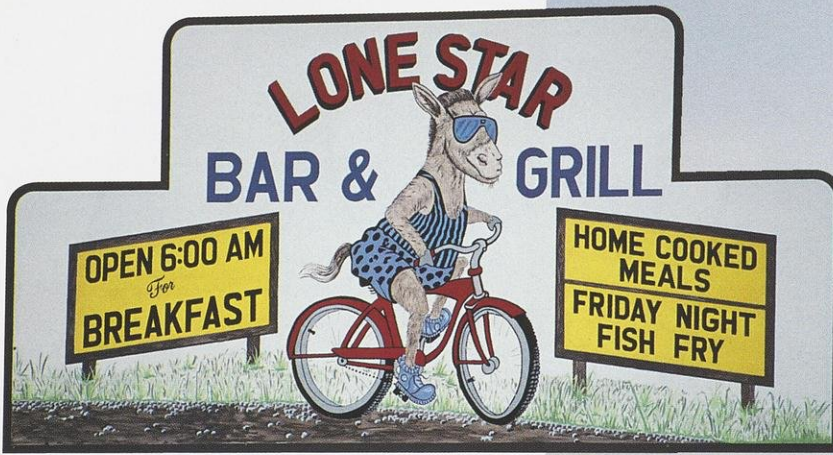
We'll also look for ways to form water trails. Rivers were our historic highways for commerce and recreation. The State Historical Society is also exploring how sunken boats and other underwater archaeology sites can be protected, marked and managed to encourage underwater maritime trails.

Although canoe and kayak travel remains tremendously popular, the provision of lodging, bathrooms, picnic areas, campsites and livery services at regular intervals along waterways has not been as well coordinated in recreational

Trails provide safe corridors in town and country for exercise, solitude, nature observation and momentary escape from daily pressures. They are good for the head and the body.

ROBERT QUEEN

DNR FILE PHOTO



State trail tally

Designated Use	State Trail Miles
Hiking	1,738
Snowmobile	1,051
Mountain bike	1,028
Cross-country skiing	671
Touring bike	634
Horse	608
ATV	456
Snowshoe	232
Nature	135
Dogsled	125
Inline skating	76
Motorcycle	41

Note: Thousands of miles in county trails, city trails, commercial logging roads and private trails are not included in this total.



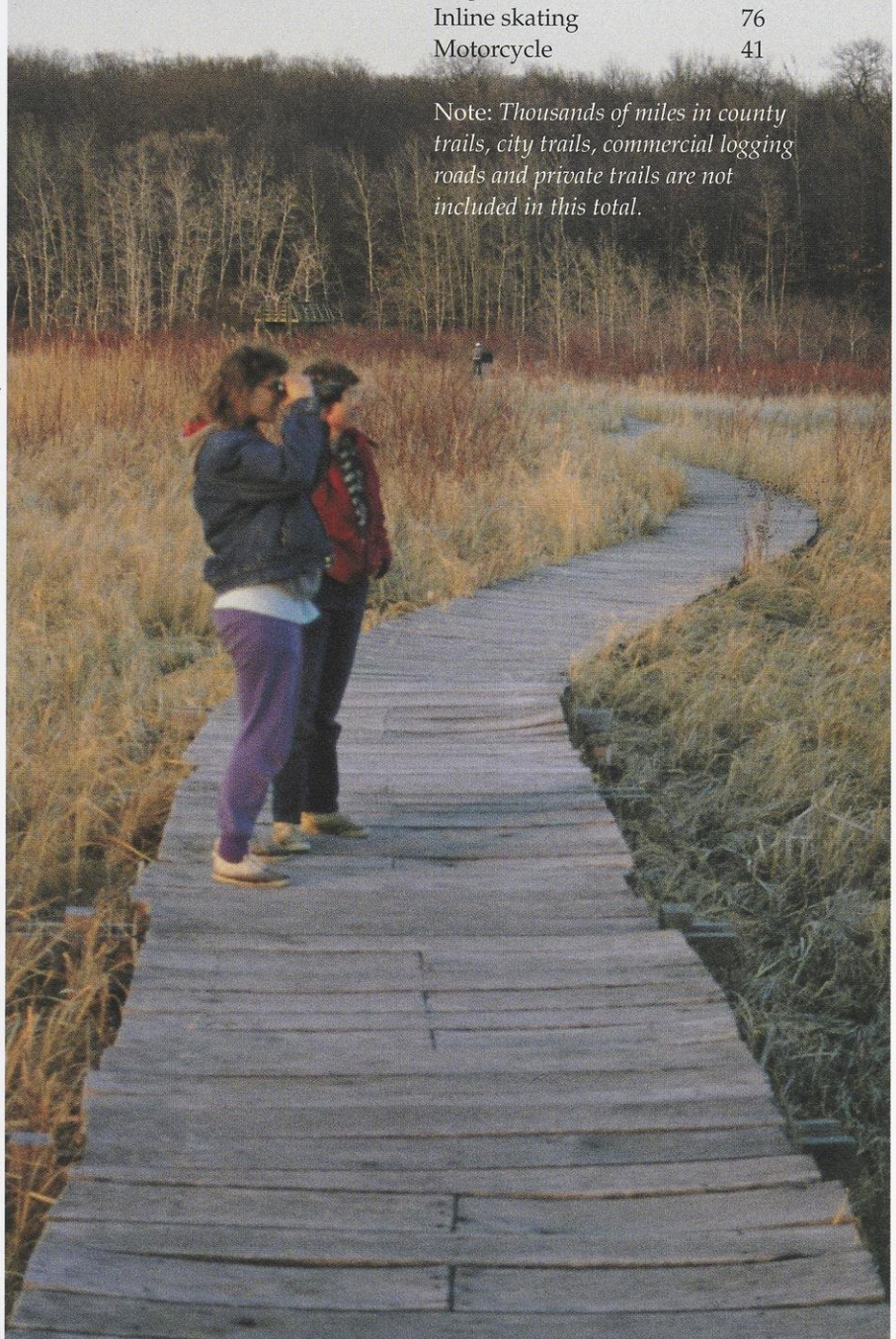
ROBERT QUEEN

(top) Trailside communities can make opportunities to attract new customers to local businesses.
(above) Information kiosks that provide trail details can also apprise visitors of food, lodging, community services and entertainment within walking distance.
(right) Trails add quality places that visitors and residents can enjoy and explore.

plans. Schmidt observed that paddlers, bikers, and hikers are out for an experience as much as for exercise, which means their travel plans may well include camping, lodging, meals, and the opportunity to enjoy evening entertainment. Communities along wet or dry recreational corridors have the chance to cater to the needs of the trail traveler by offering car shuttles and making it easy to find overnight accommodations, restaurants and community attractions.

Walking to health and happiness

For those who need a little incentive to celebrate the Year of the Trails every day, here's a message: Any time is a



ROBERT QUEEN

good time to start regular exercise, and the benefits are long lasting.

As recounted in *Healthy People 2000*, a national fitness report from the U.S. Public Health Service, physically fit people remain a very small minority of the U.S. population. Fewer than 10 percent of the nation's adults exercise for

more than 20 minutes, three days a week. We're not talking about heart-racing aerobics, running marathons or swimming mighty rivers, just getting your heart rate to a modest 60 percent of its capacity.

The good news is that it is well within each of our abilities to vastly improve our health. The Public Health Service reported, "low to moderate aerobic exercise such as walking and bicycling yields substantial health benefits... [that] may be *just* as beneficial to your overall health as the breathless exercise we thought we had to endure for fitness."

Public bike trails are an excellent choice for exercise because they have very mild slopes, and they pass by beautiful, tranquil places with quiet, relaxing atmospheres.

The U.S. Dept. of Transportation's case study on the benefits of biking and walking classifies the bottom 20 percent of people on the fitness scale as "low-fit." This group is more than twice as likely to die from cancer, heart disease and all other causes. Just training for moderate fitness by walking a trail at a reasonable pace for two miles in less than 30 minutes only three times a week can offer major health benefits, including weight loss, an increase in bone density, and prevention of problems from heart disease, high blood pressure, arthritis, stroke, diabetes and high cholesterol. It may just get you that promotion, too: Regular exercise has been linked to greater productivity, reduced absenteeism, fewer workplace injuries, lower turnover, a more positive outlook to handle work stresses, and reduced tension and anxiety.

BILL MOORMAN

Linked trails give users the chance to take a modest walk, a weekend excursion, hike 1,000 miles of geologic history or take a cross-country adventure off the beaten path.

The could-be trails

Trails enthusiasts are optimistic people, and they envision even greater opportunity for future routes. As segments become available, perhaps the Department of Natural Resources can help buy them, or provide personnel and funding to help develop the new trails. Partners could equally develop, maintain and operate trails as cooperative ventures. Here are samples from the wish list of potential trail segments in each region of Wisconsin drawn from the State Trail Plan:

Northeastern Wisconsin

— Trail Segment 3 would run east and west about 22 miles in Oconto County connecting Stiles Junction to Gillett. This link would connect Oconto, Stiles Junction and Oconto Falls to the Nicolet State Trail. Between Oconto and Stiles Junction, the trail would run parallel to the Oconto River, popular for fishing and float trips. Users could take a float trip, then hike or bike back on the trail to retrieve vehicles. Part of the trail may be formed adjacent to roads scheduled to be widened and upgraded.



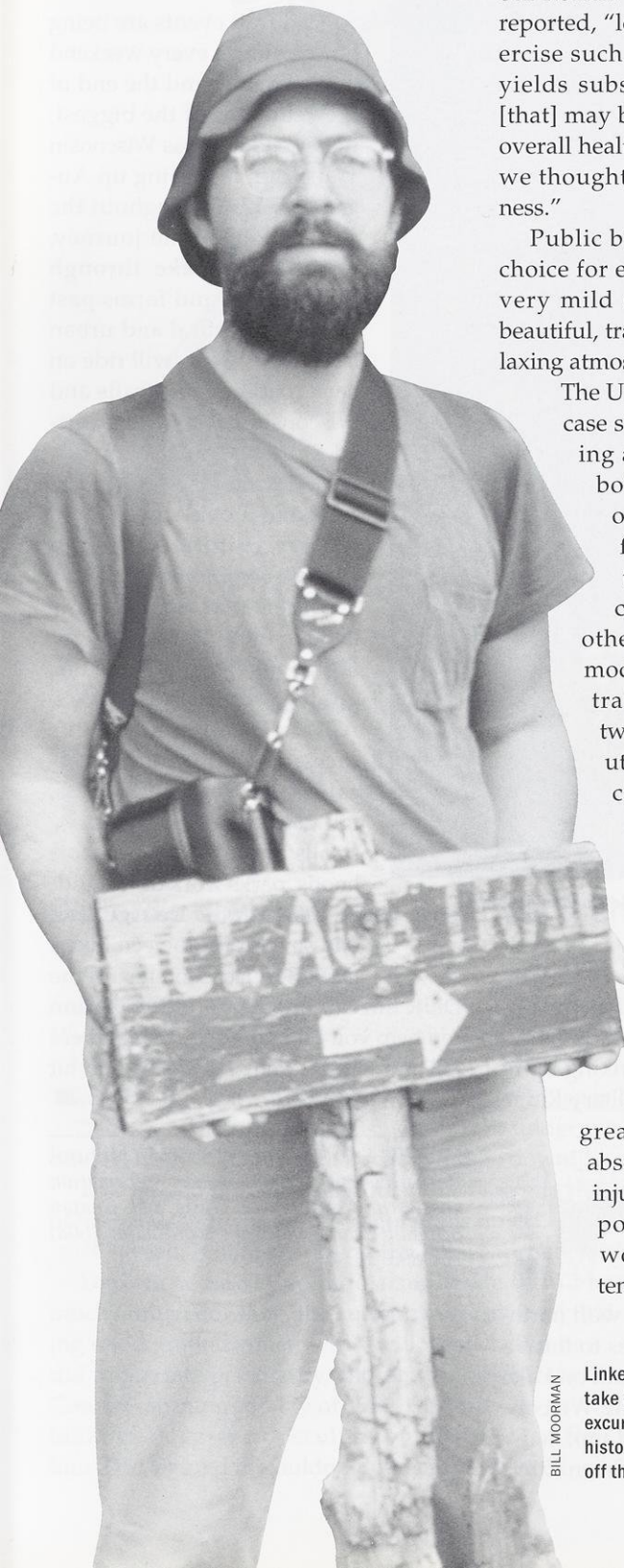
Northern Wisconsin

One of the most ambitious proposals, Segment 17, might run 135 miles north to south from Washburn to Abbotsford alongside active railways. The trail would link to the Tri-County Trail in Ashland, North Country National Scenic Trail, Copper Falls State Park, and the Tuscobia State Trail. This trail corridor would run from the Bayfield Peninsula through forested lands in Ashland and Price counties and the Chequamegon National Forest, crossing many streams and adjacent to some of northern Wisconsin's most distinctive bog, lake and forest landscapes.



Southern Wisconsin

One neat could-be route, Segment 29, would follow rail and road for 53 miles from Madison to Reedsburg. It could provide unique opportunities to travel from the capital city across Lake Wisconsin on the Merrimac Ferry, onto





Trail surrounding the Stevens Point area, down to the Wisconsin Dells spreading westward along the edges of the lower Wisconsin River.



Combine your pleasures. Trails give you a chance to hike and horseback ride. You can also paddle and pedal to work different muscles.


(BOTH PHOTOS/ ROBERT QUEEN)

Join the fun any week until year's end

Special trail events are being hosted almost every weekend between now and the end of the year. One of the biggest, the Friends Across Wisconsin Trail Tour, is coming up August 13–17. Throughout the five-day, 300-mile journey, riders will snake through forests, hills and farms past picturesque rural and urban landscapes. They will ride on back roads, public trails and Wisconsin's famous converted Rails-to-Trails segments. Each day on the tour is guaranteed to provide a variety of scenery, cultural sights and friendly communities.

Other Year of the Trails events include candlelight night hikes, beach walks, guided prairie nature walks, ATV rallies, mountain bike races, fall color tours, educational interpretive walks, fall wildflower tours, history strolls through old neighborhoods, parks work days, guided hikes on the Ice Age Trail and several Halloween hikes.

DNR Service Centers and the

DNR Bureau of Parks and Recreation can help you find your way to join these fall and winter events. Come on and hit the trail with us. 

Devil's Lake State Park providing a link to the 400 Trail, the Elroy-Sparta Trail, the Great River and La Crosse River trail corridors. This trail segment could also connect with the Ice Age State Scenic Trail at Lodi, Merrimac and Devil's Lake.

Southeast Wisconsin

— Segment 6 is currently a mix of rails, roadways and utility corridors, but it has the potential to be one of the great coastal routes. It would follow the Lake Michigan shore from Green Bay past natural areas and dunes, through coastal port towns and



harbors that would give riders the option of continuing south towards Chicago or swinging west and linking up to the Glacial Drumlin and Military Ridge trails.

Central Wisconsin —

Segment 18 currently serves as a road and utility corridor between Tomahawk and Wisconsin Dells. One day it could link with northern and south central routes to form a continuous trail from Ashland on Lake Superior all the way to the Wisconsin/Illinois line. This would link many of the northern trails to the Green Circle



David L. Sperling edits Wisconsin Natural Resources magazine. For more information about the Year of the Trails, ask Shawn Schmidt, Year of the Trails coordinator, (608) 264-8957.



The celebrated water witch of Door County

Clifford's dowsing days were less than divine.

Story by Dave Crehore

Illustrations by Tom Lowes

"Great Godamighty," Clifford said, in a tense whisper.

"Great Godamighty there's water right under me here I can feel it dammit look at the willow rod go down!"

Dad tapped the cold ashes out of his pipe into the palm of his hand. "You think you've got it this time?" he said.

"Oh yeah," Clifford said, raptly. "Oh yeah, here it is!"

Dad turned away to hide a smile. He didn't have much faith in dowsing, the ancient, magical art of finding underground water with a willow stick. But he did appreciate peculiarity, and on this quiet Door County morning in May of 1956, Clifford was exhibiting a degree of peculiarity unusual even for him. Dad figured it wouldn't do to break the spell.

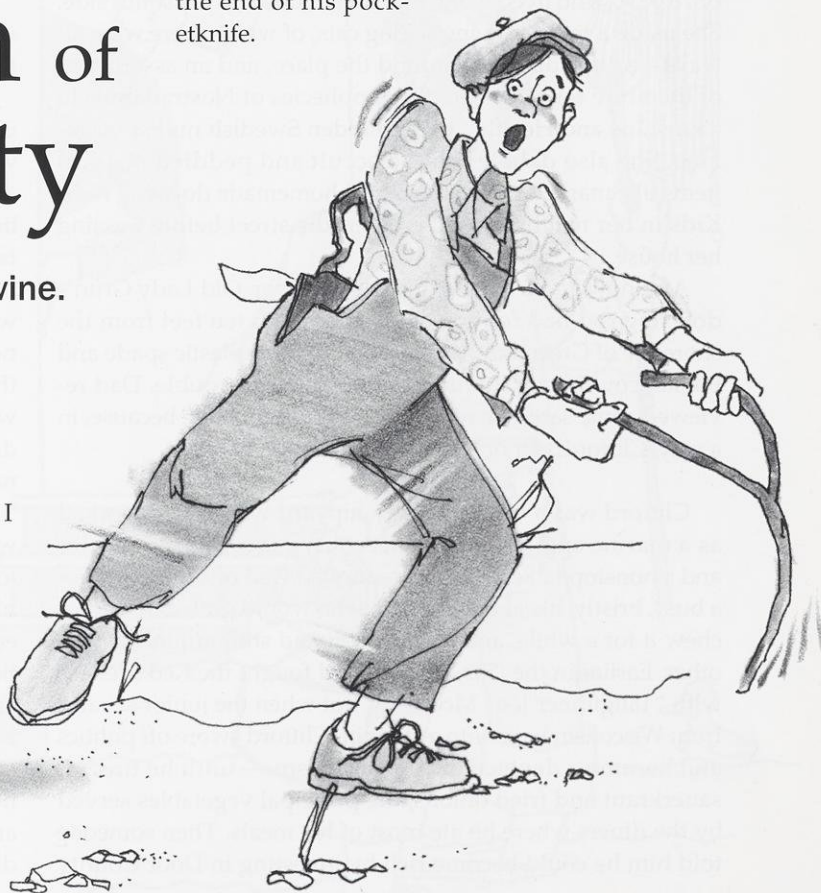
Clifford stood bolt upright, rigid and trembling with a wide-eyed smile on his face. Clearly he believed he was having a mystical experience of some kind, and sure enough, his Y-shaped, willow dowsing rod was trembling and pointing down.

Suddenly he relaxed. The connection with the infinite had apparently been broken. Clifford turned to Dad with a delighted grin.

"By God Dave this dowsing stick works just like Old Lady Grun said it would — have faith and you can find water anywhere she said and dammit there it is." With the heel of his boot, he kicked a hole in the sand to mark the spot. Water began obligingly to well up in the hole.

"Hot damn Dave look at that I know a good deal when I see one this rod was the best five bucks I ever spent doggone it I didn't even hafta dig boy you got to get up pretty early in the morning to fool me I'll tell you by God I really think I'm born to this dowsing business dammit the feeling comes right up that stick and into my arms," Clifford said.

Dad sat down on an old oil drum that was part of the flotsam on Clifford's narrow strip of Door County shoreline and refilled his pipe with Edgeworth. He struck a match on the drum, lit the pipe and gently tamped the tobacco with the end of his pocketknife.





Dad had never met Old Lady Grun, but he knew her by reputation. She was Manitowoc's "cat woman," a faded crone of 70 or so who lived alone in a small house on the south side. She made a meager living selling cats, of which there were always a couple of dozen around the place, and an assortment of literature ranging from the *Prophecies of Nostradamus* to "Sunshine and Health," the forbidden Swedish nudist magazine. She also dabbled in the occult and peddled magical items like marked poker decks and homemade dowsing rods. Kids in her neighborhood crossed the street before passing her house.

And now, in the hands of a true believer, Old Lady Grun's dowsing rod had found water on a beach ten feet from the shoreline of Green Bay, where a child with a plastic spade and bucket could have found it with much less trouble. Dad reviewed some sarcastic remarks and rejected them, because, in a way, Clifford's Door County venture was his fault.

Clifford was a welder at the shipyard where Dad worked as a marine engineer. Wiry, nervous, a confirmed bachelor and a nonstop talker, Clifford reminded Dad of a fox terrier — a busy, bristly, likeable little man who would grab a new idea, chew it for a while, and then bury it and sniff around for another. Earlier in the '50s, Clifford had fought the Red Menace with "Tailgunner Joe" McCarthy, but when the junior senator from Wisconsin went into a tailspin, Clifford swore off politics and became a devotee of vegetarianism — until he tired of sauerkraut and fried onions, the principal vegetables served by the diners where he ate most of his meals. Then someone told him he could become rich by investing in Door County

real estate, and that passion preoccupied him until he bought the dowsing rod. During a lunch break at the shipyard a couple of weeks earlier, when Clifford was still shopping for Door County land, Dad had given him an ad torn from the *Manitowoc Herald-Times*.

"You're always talking about buying some land in Door County, Cliff," Dad said. "Well, here you go — Irregular parcel with 200 feet of Green Bay shoreline, highway access, \$1,000 or best offer, contact Sligh Realty, Sturgeon Bay."

"Jeez thanks Dave that's just what I've been looking for and it's really cheap too just five bucks a front foot dammit I'll go up there Saturday and look it over," Clifford said.

The parcel was irregular, all right — 200 feet long but only 20 feet from front to back, bounded by the Green Bay shore on one side and a county highway on the other, and covered with stones, sand, little trees and old gull nests. And it didn't take long for the real estate agent to realize that Clifford was even more irregular than the parcel. The following weekend Clifford signed the papers and became a Door County land baron.

"Dammit Dave," Clifford said, as he and Dad walked back to the road, "buying this land was just like haggling over an old Ford. Sligh he started out at a thousand and I shook my head and walked away so he came down to \$900 but I kept walking away and he kept coming down till we finally settled on \$500 I think I could have got him down to \$400 but there was only so far I could walk 'cause we drove up there in his car."

"Well," Dad said, "there's water, I guess, but there isn't room to build anything here, y'know — you've only got about a tenth of an acre. Looks like you paid \$500 for a gull sanctuary."

"I suppose so Dave but dammit the way to get rich up here isn't to buy land, it's to sell it, so I'll just hang on to this and we'll see what happens," Clifford said.

Dad tamped his pipe again. Like most men his age, he had been tried in the furnace of the Great Depression, which taught him to spend his money on things he had to have right now. If a few dollars were left at the end of the month, they were parked in an insured savings account at the First National, where he could get his hands on them, and that was that. In Dad's experience, investment was a sucker game in which people who wore suits took money from people who didn't. He hated to see a friend get involved, especially one as naïve as Clifford.

But a more immediate problem awaited Dad later that day when he got home from Door County. The stench that billowed out of the house when he opened the back door told him all he needed to know. Pipe smoking had taken the fine edge off Dad's sense of smell, but the odor of a backed up septic tank was unmistakable. And right behind the stench came an eruption of profanity. Mother was down in the basement, battling the stink and swearing.

Dad was astounded. In 15 years of married life he had only heard her swear once before, when she woke up one morning and found a bat clinging to the bedroom wall. But this was a different sort of swearing altogether, continuous, biting and

fluent. He had no idea any woman could swear as well as she was swearing now, with a fine rhythm and in complete sentences. Dad kicked off his shoes, put on a pair of five-buckle galoshes, grabbed a mop and joined her in the basement.

About two hours later, when the worst of the sewage had been bailed out and the windows were open to ventilate the house, Mom explained what had happened.

The fine spring day had fired her with domestic energy. She did two big loads of laundry in the Maytag wringer washer, discharging about 100 gallons of soapy water down the floor drain. She waited for our cranky old water heater to recover from the strain, and did a sinkful of dishes and washed her hair. She waited again, and took a relaxing bath. And then, overwhelmed by all that water in one day, the septic tank backed up, filling the basement to a depth of several inches. Feeling a need to do something, she tried to neutralize it with a half-gallon of Lysol, creating a sweet-sour aroma that soaked into the basement floor and lasted for years.

"Charlotte, we have to put in a new septic tank and we might as well replace the well while we're at it," Dad said. "We can't put up with this any longer. We'll just have to take the money out of savings."

The well was in a pit out in the yard. It sucked water from the glacial clay that underlay our property to a depth of about 100 feet. It produced very hard water very slowly, but at least we knew where it was. The septic tank was a mystery. We believed it to be somewhere northeast of the house, but that was just a guess.

That evening, Dad leafed through the Yellow Pages in search of well drillers and septic tank installers. He found the trades dominated by tribes of closely related Dutchmen. At lunchtime the next day, he started calling them.

The well driller was the first to show up. "Shallow wells in this clay aren't any good," he said. "To get good water you gotta go down through the clay to the limestone, enso? You oughta get good water there. But if you don't, then you gotta go down through the shale to the sandstone. One way or the other, we can get you water here, no trouble. But the important thing is to put the well as far as we can from the septic tank, enso?"

The septic tank man agreed with his cousin, the well driller. "We gotta find the old tank before we can do anything," he said. "All your drains seem to go out the northeast corner of the house, so we got to dig a pit by the foundation and find the pipe to the tank. Then we can figger out where the tank is. Can't start the well till we know."

In a few days the pit was dug. The septic tank man stood in the pit with a compass and straddled the pipe. "OK, she goes due northeast like we thought," he said. "So the tank is

on a line someplace between here and the gully over there. Once the well is in I'll dig some holes with the auger until we find the old tank. Then we can pull it out and put a new one in the same hole. 'Course we'll have to put in a new drain field too, enso?"

"Enso," Dad said.

The well driller returned for his second visit the next day. "Now we're getting someplace," he said. "We know the septic tank will be going in over there, more or less, so we can put the new well right here," he said, poking a stake with a red flag on it into the lawn close to the house. "This'll be a good place — it's a long way from the septic tank and my brother won't have no trouble getting the drilling rig in here. He can start next Monday."

On the Sunday morning before the well driller was due to arrive, Dad had to work at the shipyard. Mother and I dropped him off on our way to church and agreed to pick him up again about noon and go to the Colonial Inn for lunch.

Clifford was at loose ends that Sunday morning. Dad had told him about the well and septic tank projects, so he decided



to drive out to our place and see how they were getting along. He opened the front door — we never locked it — and hollered for Dad. Finding no one home but our beagles, he decided to have a look around anyway. He got the dowsing rod from his car and headed for the stake with the red flag on it.

"This must be where they want to put in the well let's just see if those damn fools have any idea how to find water," he said to himself. Clifford grasped the Y-end of the dowsing rod and began to walk slowly in a circle around the stake. Nothing. The rod hung lifeless in his hands. He spiraled out in wider circles. Still nothing.

"Ya ya that's just what I expected there ain't no water here the trouble with them damn Dutchmen is they got a lotta machinery and no inspiration," he muttered.

Clifford started walking toward the deep ravine that ran



along the east side of our yard. As he approached the edge the dowsing rod suddenly came alive. First it trembled slightly. Then it began to vibrate visibly, and finally it plunged downward as though it were playing a fish.

"I knew it I knew it I knew it!" Clifford exulted. He laid the rod on the ground to mark the spot, fetched the stake with the red flag, and drove it into the grass at the new location the dowsing rod had found.

The next morning, Dad got a phone call at his office.

"Mr. Crehore? This is Frank the well driller — Jim's brother," he said. "We got started drilling about an hour ago and I guess we got good news and bad news."

"Better give me the bad news first," Dad said.

"Well, the bad news is that we got to move the well-

drilling rig, and that'll cost an extra 50 bucks, but the good news is that we found the old septic tank. We started drilling and punched right through the top of the damn thing. Can't imagine why that flag was there. Made no sense at all. Anyway, we're movin' the rig right now and we'll get started again this afternoon."

"Fine," Dad said.

At lunch that day, Dad gave Clifford a stern look.

"Were you out at our place Sunday morning?" he asked. "And did you move a stake with a red flag on it?"

"Well dammit Dave as a matter of fact I was I walked around with my willow stick and damn if I didn't find a lot of water over by the gully so I just thought I'd do you a favor and..."

It was hard to interrupt Clifford, but Dad managed it.

"Well, your favor cost me 50 bucks, Cliff," Dad said. "What you found was the old septic tank."

Clifford pulled his wallet from the pocket of his leather welding apron. "Forty-eight, forty-nine, fifty," he counted.

"But dammit Dave the thing was full of water, wasn't it?"

When Dad retired in 1974 the shipyard gang threw a party for him. Clifford was a prominent guest.

"Dammit Dave now you're footloose you gotta come up to my place in Door County sometime for a weekend and bring the missus it's always so nice and cool up there," Clifford said.

"You mean to tell me you built on that little strip of land you bought?" Dad asked.

"No no I got a two-acre lot with lots of trees just north of Ephraim with a little house on it I swapped it for my land along the bay," Clifford said.

"But Cliff, that land was worthless," Dad said.

"Well, dammit it was and it wasn't," Clifford said. "You remember all them little trees that was growing on it back in 1956 well they just kept on growing for 18 years and then Sligh he decided to build a bunch of cottages right across the road from my land on the bay.

"Only trouble was you couldn't see the bay from them cottages because of my trees and the customers said they wouldn't buy unless they could watch the sunset from their front windows so Sligh he come to me and we worked out a little trade and he got my land and I got the Ephraim place," Clifford said.

"Dammit Dave it's just like Old Lady Grun said, just have faith and things will work out OK, enso?"

"Enso," Dad said.

Dave Crehore writes from Green Bay.

Shotgun camp

Just outside of Madison, a gun club aims to teach teens safe shooting skills. Could your club do it too?

Story and photos by Bill Maund

Mike, 12 years old and the shortest of nine campers, is less than five feet tall. He also carries the biggest gun. To load his dad's old 870 Remington, he rests the butt on his left thigh, reaches to grasp the gun's forearm, and chambers a 12-gauge shell with his right hand. With one motion he slides the action home and hoists 32 inches of barreled gun to his shoulder. He jiggles the gun into position and calls "pull."

The clay target flies up and away, reaches its highest apogee and begins a descending arch. Serious trap shooters break the clay as their target is on the rise, but Mike hasn't yet fired. The scorekeeper is about to call "lost" as the target nears the ground 45 yards distant. Mike fires the old full-choked pump.

"Dead bird," reports the scorekeeper.

Observers at the Hope Rod & Gun Club shake their heads in disbelief. One comments: "Mike didn't do anything right, yet he broke the bird as it became a nearly impossible target." Mike repeats this performance 18 times out of 25 attempts, and he has never shot skeet or trap before attending the club's Youth Shotgun Camp.

At 14, Ian is 6 foot 2 inches, the tallest and strongest boy in camp. He's shooting a brand new 12-gauge Browning BPS pump shotgun. He shoulders the gun easily, but is forced to cant his head off-center to sight down the gun. Nonetheless, Ian surprises himself by frequently breaking his targets. Staff evaluating his performance believe his misses are caused by a poor gun mount — if his firearm were lengthened with a

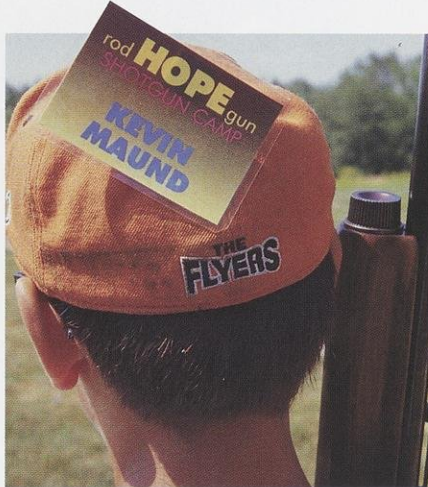
butt plate, Ian could keep his head straight and eyes parallel to the ground — and by treating the shotgun like a rifle, he keeps the gun immobile instead of swinging through a moving target.

The staff work on this common fault with all the kids during camp.

Mike, in the middle, and Ian, to the right of him, worked on their trap shooting skills at the weeklong neighborhood camp.



Hope Rod & Gun Club is one of a dozen small community gun clubs surrounding Madison. Such shooting ranges grew on untillable farmland following WWII as places where guys could go to shoot trap and tell adventure stories. Many of Hope's members also belong to the local American Legion Post, which sponsors hunter education classes and



Name tags helped staff and participants unify into a working camp right away on Monday morning.

Getting on target

The Hope Rod & Gun Club program was developed after observing an intersession shotgun program at the Sauk-Prairie Trap & Skeet Club, visiting the Winnequah Gun Club's rifle program, following teaching models from the Wisconsin Rifle & Pistol Association's Youth Small Bore program, and reviewing a host of excellent materials from the National Rifle Association, the National Shooting Sports Foundation, the University of Wisconsin Extension's Youth Development Program, 4-H, and the American Legion's Youth Shooting Program.

Visit our magazine website, www.wnrmag.com, or write us at *Wisconsin Natural Resources* magazine, P.O. Box 7921, Madison, WI 53707, if your club would like Mr. Maund's four-page summary of a sample course outline and contacts for further information.

encouraged members to organize a Youth Shotgun Camp. Club members recognized that the days when a boy could pick up a shotgun and go plunk a few rusty cans for practice down at the local garbage dump or gravel pit are gone. The dumps became regional landfills, the open gravel pits sprouted locked gates, and housing subdivisions grew on back forties putting the squeeze on shooting ranges. Today's young people need guidance and opportunities to develop sound shooting skills and judgment.

The club developed its own week-long Youth Shotgun Camp. Nine local boys aged 13–15 enrolled: They know each other from school, sports, band and other teenage doings.

A Wisconsin Hunter Education certification was a prerequisite for enrollment. Campers provided their own shotguns, 500 rounds of ammunition, eye and ear protection, lunch, drinks and \$30 for targets. The gun club donated its facilities and staff volunteers.

Coming into camp

To acquaint parents and campers alike with the shooting range, registration was held the Sunday before camp began. Parents brought their children to the range with their cased guns, ammunition and safety gear, signed permission slips and liability waivers.

At 9 a.m. Monday morning, the staff distributed name tags, made introductions, proposed camp schedules and delivered a no-nonsense lecture on gun safety and range protocols. The kids listened politely, although it was clear they wanted no lecturing.

As the boys made ready to shoot, it became apparent that the safety protocols taught in the DNR Hunter Education classes had been learned well. Each boy checked to assure his gun was unloaded, the action was open, and each kept the gun muzzle pointed in a safe direction. Their decorum was serious



Knowledge of firearm safety, actions open and displayed, muzzles pointing in a safe direction is second nature to the boys and testament to their hunter safety training.

and focused. All the boys passed the safety test with honors.

Next, staff tested the campers' shooting abilities. The group moved to skeet station 7 and placed their unloaded guns on a moveable rack. Station 7, a low house, throws a fixed target going straight away about waist height.

The boys were coached individually. "Plant your lead foot in the direction of where you want to break the target," they were advised. "Hold the gun just below the flight path of the bird."

"Keep your head on the gunstock, wood to wood!"

"Get ahead of the bird."

"Keep the gun moving."

These instructions were repeated with each shooter, until each boy broke at least two low-house targets.

The rotation was repeated with a skeet station 7 high-house target that was "incoming" toward the shooter. Again, each shooter was coached until at least two targets were broken sequentially.

Although the program ran on time, kids waiting their turn had little patience and wandered back to the clubhouse. The idea of learn-

ing from others' mistakes had no appeal for them.

"I heard it already," complained one of the more listless boys.

Todd Bender's 45-minute video, *A Consistent Approach to Skeet*, a "must study" for aspiring skeet shoot-

ers, held the kids' interest for about five minutes before horseplay began.

By the second day, the staff felt the kids had lost interest. A grandpa instructor worried: "We wonder if the 50-year generation gap between staff and students is a barrier that's too great to create a positive shooting attitude and a lasting learning experience." But parents' reports that the campers

into the shooting box. They continue their routine while loading the gun, visualizing the target's flight path and determining where to break the bird. Once prepared, all that remains is to call "pull" and carry out the mental plan. High scores depend on taking a consistent approach to the target.

Shooting discipline, however, was lost on these boys. It frustrated staff that students showing the poorest physical form and mental preparation appeared to break the most targets. For example, Adam liked to hold his grandfather's 20-gauge pump at port arms, and searched randomly for the bird. As he called to release the target, he was "stargazing" away from the known target path. His gun pointed away from the target path, too. Coaching couldn't convince Adam that following the bird as it leaves the trap house with the gun aligned to intercept the target can break more birds. Yet Adam's keen eye-hand coordination and youthful reflexes enabled him to locate the target, reposition his shotgun, and break the bird fairly often, just not consistently.

"Unbelievable breaks," the instructors commented with envy.

The volunteer staff, all retired and 60+, were spellbound by the youths' natural abilities long lost to the adults with age. It's no wonder that the shooting techniques the "old guys" perfected to compensate for the aging process were pretty much ignored by the kids. Of course the boys didn't realize what it takes to break 25 straight targets, nor did they realize that skeet and trap shooters aim to break 100 straight targets and for really serious competitors, the quest is 400 straight breaks.

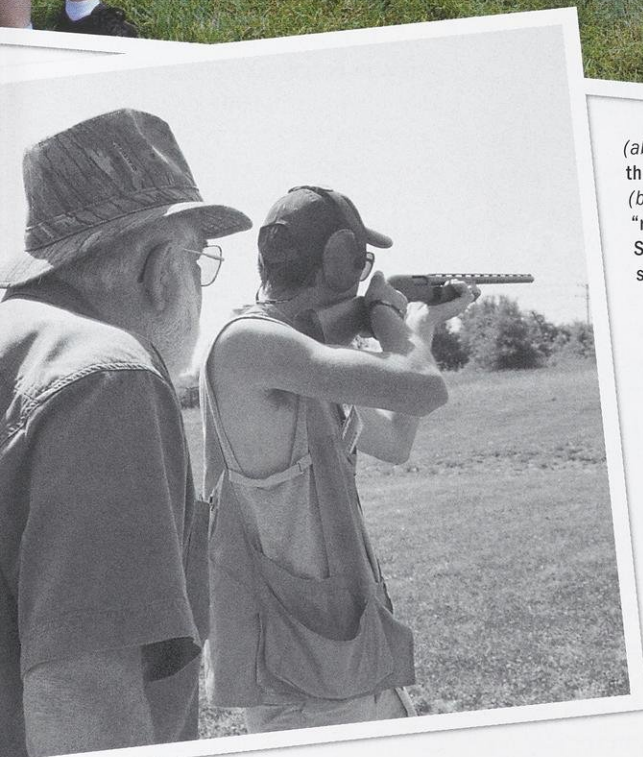
"The boys just like to hear the gun go bang, nothing more, nothing less," sighed a grandpa instructor. "It's amazing birds get broken."

The campers seemed to resent shooting practice rounds. They wanted to compete for scores and keep a running tally of their performance. They needed to know their position within their peer group moment-by-moment to affirm their abilities and their position within their society.



(above) The campers bored quickly when they were not on the line.

(below) All campers had a tendency to "rifle" their shotguns causing misses. Staff constantly reminded them that shotguns handle differently than rifles.



"babbled about their hits and misses at home each evening" partially dispelled the staff's concerns.

Be the bird

All sports train athletes in mental preparation and pre-visualization techniques. The start point for many recreational shotgun shooters is stepping

This attitude was a bit tough for the staff who were used to a different learning style in their formative years of the 1930s, 40s and 50s. In those days, it was enough to master a skill, take a test and then try and perform capably and consistently time after time.

By the third day of camp, the boys prevailed on staff to shoot regulation skeet and trap, and they insisted on keeping score. But the kids didn't realize the game was about to become more challenging. To increase their chances

The trap oscillator was activated to throw varied targets that adults would engage during registered competition. The skeet machines released a complete round of competition targets, including doubles and station 8 crossing targets, like the boys wanted.

Scores were recorded, as the boys demanded.

Our transitional adults quickly learned the difference between a gun going "bang" and a "dead bird." The

help," one volunteer whispered. "Now we're coaching."

By day five, Hope's Youth Shotgun Camp had become a homogeneous shooting team. Parents shared the excitement by stopping by to see the final shoot. The boys competed for "top gun" awards. Prizes — shooting bags donated by a target supplier — waited for the high scorers in skeet and trap. Every shooter broke more than half of the targets. The top gun, Ryan, broke 18 targets in both trap and skeet. All the other scores were clustered close by.

In just five days of training, the boys moved from breaking only one out of 10 easy targets to breaking five out of 10 more difficult trap and skeet shots. As for staff, the four of us were darn pleased with our protégés' rapid improvement. We hope the kids are on their way to a lifetime of enjoying safe recreational shooting.

We noticed that girls came to watch their brothers shoot, so we asked them if they'd consider attending camp themselves. Several said they'd come, but they didn't want to cope with the testosterone-laden attitudes of their brothers. We think a separate session for girls might well attract them to join.

If the Hope Rod & Gun Club can muster enough volunteers, we'll aim for similar camps for new shooters next year. We'll also try and interest enough help to run a weekly summer youth trap and skeet league for our "graduates".

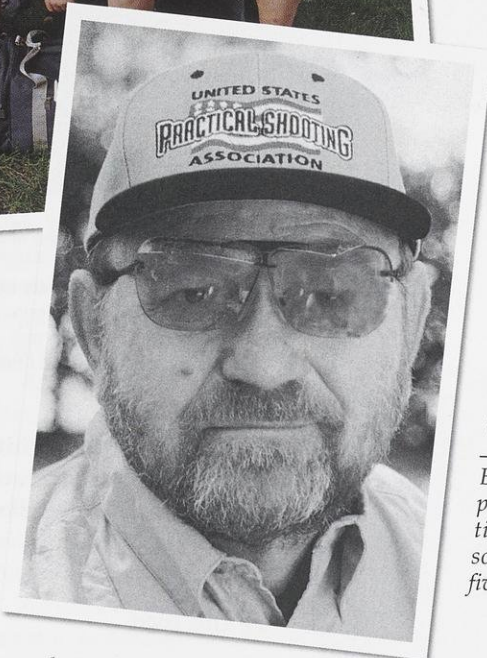
The boys insisted: "Next year, we'll have a 'kids vs. grandpas' shoot-off."

"We don't think so," the smiling grandpas replied.

Bill Maund is a retired public television producer, a former Range Master and a nationally ranked pistol shooter from Madison. He's also a grandpa of five from ages five to 13.



(above) The week went fast for campers and staff alike. (right) Bill Maund got interested in recreational shooting as a 35-year-old New Yorker. He has since become a certified instructor and nationally ranked competitive pistol shooter.



of breaking targets, the trap oscillator had been locked to throw the same targets straight away every time. Fast, angling targets that skeet stations can throw were considered too difficult for new shotgun shooters. The teen-aged boys, staff discovered, wanted to do "adult stuff." By mid-week, our five-day youth camp had evolved from teaching kids to shoot into a competitive learning environment for young adults.

scorekeeper reported miss after miss as the kids attempted to nail the targets.

Suddenly, our shooting tips were taken more seriously. Staff filled requests for advice. "We no longer just

Shipshape



A guide to reducing pollutants for
marinas, boaters and other coastal customers

Marina operators and boaters navigate to keep coasts clean

Recreational boating, and marinas that provide services for boaters, are important parts of most coastal communities. Marinas are the on ramp to coastal and inland water pursuits: a search for natural beauty, swimming, fishing and tranquility.

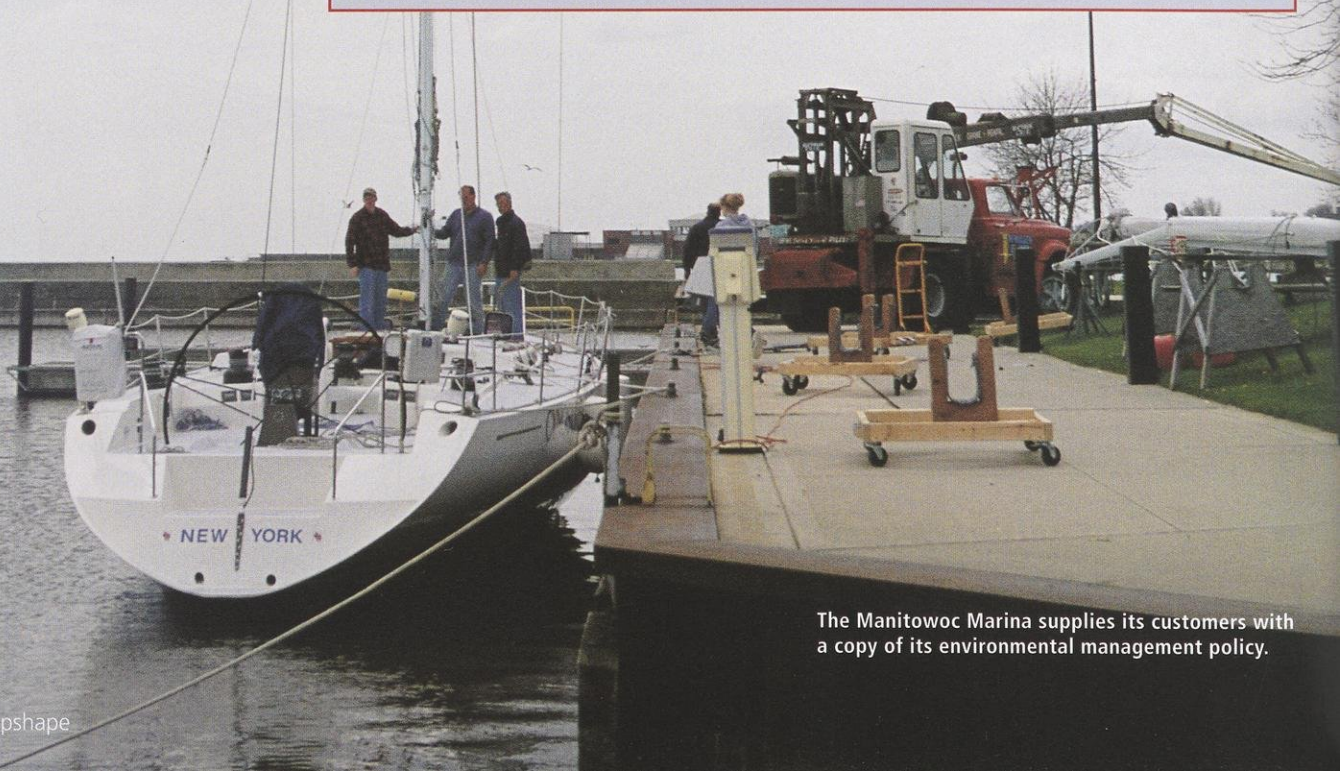
Yet, enjoying these pursuits also may lead to their decline.

Since marinas are on the water's edge, the waters around them can become contaminated with pollutants from activities that take place there.

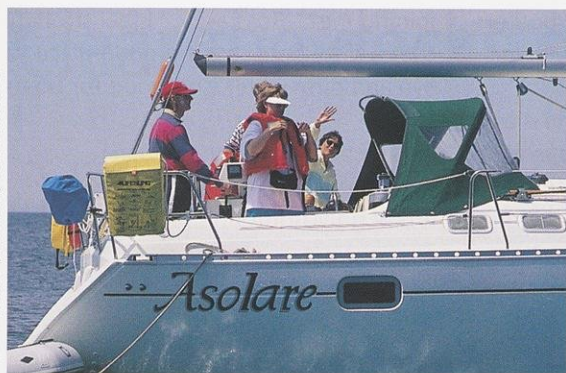
Maintaining, storing and operating boats can pollute waterways, shoreland and even the air. Litter, sewage, dust from hull maintenance, solvents from engine repair, petroleum from fueling, fish waste and paint chips can all be released into the water or carried there by stormwater.

Sometimes the amount of pollution is so small, it isn't noticed — a small drop in a big lake. But small drops add up and potential pollution grows as more marinas are built and more boaters look for places to dock.

According to U.S. Census Bureau statistics, between 1992 and 1997 marina numbers grew 26 percent nationwide. In Wisconsin, many marinas boast 80 to 100 percent summer occupancy. Developers of a proposed Pewaukee Lake marina have a waiting list.



The Manitowoc Marina supplies its customers with a copy of its environmental management policy.



Boating is a popular way to see the Apostle Islands and enjoy Lake Superior.



The Kewaunee Marina provides patrons with a shower, restrooms and more.

The U.S. Coast Guard also reported a 14 percent increase in registered boats between 1990 and 1999. Wisconsin had 543,034 registered vessels in 1997, one of the top ten states.

And although greatly reduced from its early 20th century peak, both Lake Michigan and Lake Superior support commercial fisheries. Add to that a rise in charter businesses and cruise lines that offer Wisconsin excursions.

Steve LaValley, a DNR hazardous waste specialist in Superior, says he's seen more tour boat companies coming to the Great Lakes and their business depends on clean water.

"The VISTA Fleet in the Superior Harbor — while moored in Duluth — is still interested in environmental protection here," LaValley says. "Their business depends on the quality of the water, shoreland and life here."

LaValley adds that there are many boat maintenance operations springing up in coastal and inland communities. Additional pollution concerns come up during discussions of growing personal watercraft use, ferry operations, fishing tournaments and the debate over switching from two-stroke engines to four-stroke engines.

Boating also means business innovation. Last spring, state Commerce Department officials were approached to issue a permit for a first-of-its-kind floating filling station. The station, if approved, would operate on Nagawicka, Okauchee and Pine lakes in Waukesha County. The 20-foot barge with 500-gallon fuel tank would serve boaters on the lakes.

Coastal Planning and Design, Inc., located in Green Bay, designs marinas, harbors and water related facilities. Their clients include Bailey's Harbor Marina, Sister Bay Marina, Kewaunee Inner Harbor Marina and Sturgeon Bay Marina. The company also offers stormwater protection and erosion control plans, WPDES permit monitoring and more.

"Environmentally conscious planning is important simply because it's the right thing to do," says Joe Mills, a company environmental planner.

A recent Wisconsin DNR survey found that 95 percent of boaters agree, and are concerned about the marine environment.

As a result, Wisconsin is looking to states like Maryland for examples of how marinas, boaters and others can control pollution in their daily operations. A driving force behind the Maryland Clean Marina Initiative was protecting the Chesapeake Bay. Maryland's efforts follow a push by the federal government to control marine pollution.

When Congress passed the Coastal Zone Act Reauthorization Amendments of 1990 (CZARA), it required EPA to describe ways to control pollution from non-point sources, including marinas and recreational boating.

One stipulation, though, was that measures be economically achievable and not impose unnecessary financial hardship on marinas and boaters. In 1996, EPA published its economic analysis in a "Clean Marinas — Clear Value" report. Neil Ross, a marina consultant, authored the report.

Ross surveyed 25 public and private marinas and boatyards across the country. Many had stormwater discharge permits and other permit requisites to improve water quality and reduce runoff.

"The majority of marinas made environmental changes voluntarily because they wanted to improve their services to boaters, and to stay ahead of regulations," Ross says. "Not one regretted making environmental changes and many realized that these improvements weren't going to put them out of business."

Ross says some of the marinas he surveyed had active public education programs. Most had free pumpout stations and promoted their use.

About 90 percent implemented steps to stabilize shorelines, control stormwater, manage liquid wastes and contain petroleum products. Over 70 percent had improved their fuel docks and boat cleaning practices. Several had fish cleaning stations.

Others switched from traditional sanders to vacuum or dustless sanders.

"We found that using dustless sanders was not only better for the environment but for the employees who didn't get as dusty," Ross says. Marinas also saved cleanup costs by using vacuum sanders.

To counter costs, some marinas add a 1–2½ percent environmental surcharge to sales, slip charges and service work.

"Most customers are accustomed to paying for environmental protection," Ross says. "They pay when they recycle batteries and when they buy cleaner electricity."

Marina operators believe that visible

efforts to operate clean marinas also increase customer confidence that management would also give extra care to their boats.

Many marina operators say one of

their goals is to create smarter boaters who enjoy recreating, but do so with minimal impacts on the environment.

"Why did I adopt cleaner marinas as a mission? Why are many marina operators

joining me?" Ross asks. "I feel strongly that a dirty house isn't a good place to live and dirty water isn't good for boating."



Hazardous hitchhikers: Battling aquatic invasive species

Exotic — also known as invasive — species are hampering boating, swimming and other water recreation in Wisconsin waterways.

Some exotics also reduce diversity or native species abundance and disrupt ecological stability of aquatic and land ecosystems. Eurasian water milfoil, for example, can clog boating lanes, reduce fish populations and crowd out native plants.

Add to that the serious economic toll on commercial and aquatic resources.

Our best line of defense is early detection and quick response, explains Ron Martin who coordinates aquatic exotics issues for the Wisconsin DNR.

People spread invasive species through ship ballast water, recreational boating (on trailers and boats or in live wells and bait buckets), sport fish stocking and accidental releases associated with industries.

Aquatic invasive offenders in Wisconsin include zebra mussel, Eurasian water milfoil, purple loosestrife, sea lamprey, ruffe, round goby, rusty crayfish, white perch, flowering rush, curly-leaf pondweed, spiny water flea, common carp, rainbow smelt, fishhook water flea and alewife.

In response to the invasive species onslaught, Wisconsin Gov. Scott McCallum formed a Governor's Task Force on Invasive Species in May 2001 and the DNR formed a team to inventory invasive species that are, or have the potential, to become harmful in Wisconsin.

More recently, McCallum allocated \$300,000 in fiscal years 2002 and 2003 to combat aquatic invasives. As of the start of the 2002 fishing season, it also is illegal to launch a boat in navigable waters if it has aquatic plants attached, or if a law enforcement officer has reason to believe that a zebra mussel may be attached.

Fines for violating these laws are \$50 first offense and \$100 second offense. The intent is to inform boaters of the regulations and instruct them on how to clean their equipment properly, not to issue tickets, Martin says.

Last spring, the DNR also launched efforts to inspect boats at landings and to educate boaters so that they don't unwittingly transport invasive species on their boat, boat trailer, or in live wells, bilge water or transom wells.

The DNR further spreads the word about invasives with species watch identification cards, brochures, displays at state parks, sport shows and lake conventions, and signs at boat landings. Recent public service announcements have targeted eastern Wisconsin from Racine to Green Bay, Madison and upstate areas.

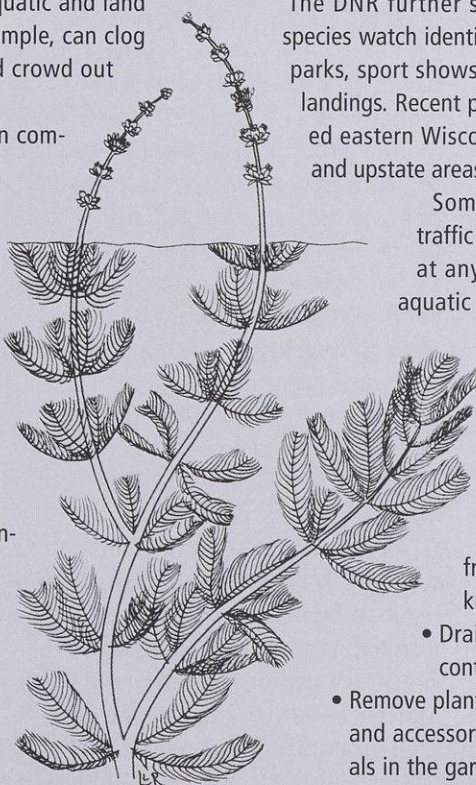
Some signs at boat landings look much like traffic signs. The red "stop" sign may be posted at any water and reminds boaters to remove aquatic plants and other potential exotic species from their boat and trailer. The yellow "caution" sign is posted at infested waters. The green "help" sign contains general information on preventing the spread of aquatic exotics.

As a boater, you can take these steps every time you remove your boat from the water, regardless of whether you know the lake is infested or not:

- Drain water from live wells, bilges and other containers before leaving the launch area.
- Remove plant parts and animals from your boat, trailer and accessory equipment. Dispose of removed materials in the garbage either at the launch area (if cans are available) or at home.
- Do not release live bait or aquarium pets into any waters.
- Wash your boat and trailer thoroughly with tap water when you get home. Flush water through your motor's cooling system, live wells and other areas that hold water, or dry your boat and equipment for five days in a sunny location before transferring it to a new water body.

If you find something that looks suspicious and might be an exotic, keep a specimen and take it to your local DNR office for verification. The DNR website lists species of concern and more: www.dnr.state.wi.us/org/water/wm/glwsp/exotics or call (608) 266-9270.

"Clean boats mean clean waters" is the cornerstone of the DNR's program to prevent aquatic exotics from spreading.



Eurasian water milfoil

Clear the decks and keep shipshape

There are many benefits to becoming a cleaner marina: protecting and improving water quality; reducing waste disposal costs; attracting boaters who keep a tidy craft; meeting stormwater and other pollution control; and building a positive reputation.

The first step is to pinpoint potential problems and review ways to minimize them. Each marina will want to tailor a plan based on the number of slips, the types of boats moored, services provided, the surrounding habitat, and the amount of runoff it faces.

EPA's "National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating," is a good starting place. It summarizes causes and consequences of non-point pollution.

The guidance recommends ways to handle mooring, storage, boat cleaning, boat maintenance, fueling, sewage, trash, stormwater runoff, shoreline stabilization and steps to educate boaters.

Design and siting

Ron Fassbender, retired DNR water specialist for northeastern Wisconsin, says a marina's impact on the environment begins long before the first boat is docked in a slip.

Marina designs and renovations affect the shoreland and aquatic environment.

"We are seeing increasing numbers of marinas because of fluctuating water levels in the Great Lakes and property owners are finding it difficult to obtain permits for docks and piers," Fassbender says. "The expense and difficulty of building and maintaining a pier has increased demand for marina slips. As more condos are built there are more boats and a need for more dock space."

Fassbender says the bulk of the marinas are expansions of existing facilities or new marinas moving into existing harbors. Rather than disturb pristine areas,

new marinas are siting in developed waterfronts. Fassbender cites Sheboygan and Sturgeon Bay as two cities where marinas may play a role in waterfront redevelopment.

His suggestion? Site a marina where land is already developed or where a brownfield is ripe for reclamation.

Habitat assessment is critical to minimize consequences for water quality, fish, wildlife and plant habitat.

Assessments consider aquatic vegetation, soil analysis, wetlands, shellfish beds, endangered and threatened species, fish spawning and propagation areas, waterfowl nesting and staging sites, wildlife corridors, cultural and historical impacts, navigational safety and public access.

He also suggests locating a marina in an area where the water is deep enough to avoid much dredging. Dredging to open boating channels requires permits from the Army Corps of Engineers. The Federal Water Pollution Control Act (Clean Water Act) regulates discharges of dredged or fill materials into navigable waters.

"Dredging is expensive and finding a dumping ground for dredged spoils is getting harder," Fassbender says.

When dredging is needed, Fassbender says two practices are most commonly required — installing a silt screen around each project to contain turbidity, and restricting when dredging can be done. Dredging in Door County is not allowed between March 15 and July 1 to protect fish spawning areas.

Locating and installing shoreside structures such as boathouses and piers may lead to erosion or sediment build-up.

Riprap placement is of prime importance to control erosion and to protect amphibians, explains Joe Mills, an environmental planner for Coastal Planning and Design, Inc. in Green Bay.

"Rough, irregular surfaces allow species to migrate to different areas fairly easily as opposed to a strictly vertical wall," Mills says. "It is vitally important for

a frog, for example, to be able to move freely from water to dry land."

Stormwater management

Stormwater is another consideration. Rain may sweep out soil, petroleum residue, litter and even pet waste at a marina.

Stormwater volume tends to increase as more impervious surfaces such as parking lots are built.

"Stormwater management plans should consider elevation heights, soil types, surface types (impervious and not), and ways to direct rainwater to an area that doesn't directly flush into a surface water," Mills says.



Erosion control measures are built into some marinas.

He cites the Sawyer Park Boat Launch in Sturgeon Bay, the new marina at Bailey's Harbor and the Neenah Waterfront Walk as examples of positive marina developments designed to manage stormwater.

Marinas should pave the minimum areas necessary. Alternatives to asphalt for parking and storage areas include crushed seashells and porous pavement. Grass strips and other plants slow stormwater flow, stabilize shoreline, provide flood protection and create a park-like appearance. Stormwater may be directed to a planted area, such as a rain garden, rather than to a sewer pipe or the lake.

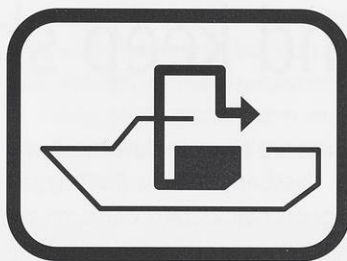
It is also important to limit or eliminate using hazardous chemicals at marinas that could be washed from lawns. Use bi-

COASTAL PLANNING AND DESIGN, INC.

ological controls, hand-pull weeds or use nonchemical alternatives.

Boat maintenance and repair

Steve LaValley, a DNR hazardous waste specialist in Superior, says hull maintenance is a particular environmental concern at marinas. Cleaning, sanding and restoring boats produces paint chips and



This symbol indicates the presence of a pumpout or portable toilet dump station.



ROBERT QUEEN

Some marinas offer used motor oil collection services. The oil may then be recycled off-site.

dust that can contain metals, which are toxic to marine life even in small concentrations.

New formulations of boat paints and careful application can greatly reduce pollution. Some marinas require boaters to do large maintenance projects on shore where vessels can be serviced with equipment that has pollution controls.

Boat repair shops are investing in closed-loop hull-blasting systems that reuse plastic pellets, dustless sanders, scrapers with vacuums to capture dust, and tarps to catch debris. High volume, low pressure (HVLV) paint equipment can reduce emissions and improve application.

Petroleum control

Marinas also can install equipment, train staff and make plans to minimize fuel spills and react quickly if spills happen by deploying booms and other sorbent materials.

Automatic shutoff nozzles on fuel pump hoses at fueling stations can prevent spills from overfilling tanks. Collars of absorbent material on gas nozzles can

minimize drips and small spills. Fuel/air separators on fuel tank vents will further prevent overflows by allowing air to leave the tank, but prevent fuel from being discharged from vents if the tank is overfilled.

Waste containment and control

Marinas also can provide customers with a convenient and affordable way to dispose of sanitary waste.

In 1992 Congress passed the Clean Vessel Act to reduce pollution from sewage discharges and established a five-year grant program to fund pumpout stations. Congress has extended the grant program through 2003, providing \$50 million for alternatives to dumping sewage overboard.

At some marinas, dock staff pump out tanks for customers. Other marinas have separate dumping stations for portable toilets or use a pumpout machine with special hose.

Most marinas provide conve-

nient, sealed trash receptacles in adequate numbers. Monofilament fish line isn't routinely recycled, but it could be and shouldn't be neglected.

Boaters also use a lot of lead-acid batteries to start their engines and run accessories. These should be stored indoors or under a cover and on an impervious surface. Old batteries should be recycled.

Poorly managed fish waste can degrade, use dissolved oxygen, produce really foul odors and create water quality problems. To mitigate this problem, a marina can offer fish cleaning areas with running water to collect fish wastes for composting, grinding or disposal.

Extra precautions are necessary for storing, handling and disposing of hazardous liquids such as solvents, oil and antifreezes. Oil filters should be drained before disposal. Some marinas use oil filter compactors, which although more costly, recover twice as much oil as gravity draining.

Outreach

Education is the best tool to prevent pollution. Marinas can share information with staff and customers through workshops, newsletters, notices in monthly bills, lots of signs, and by visiting boaters at their slips or in the customer lounge. ♪

Waste disposal signs should be posted in a conspicuous location.



ROBERT QUEEN



RON FASSBENDER

Construction activity was recently performed at the Yacht Works Marina in Sister Bay.

Tips for a clean marina

- Restrict boat maintenance to impervious surfaces and designated work areas with a roof when possible.
- Store boats and conduct maintenance work out of the water, where feasible, to better control runoff.
- Contain dust from sanding and debris from blasting. Restrict or prohibit sanding on the water and uncontained blasting as much as possible. Have tarps available to capture debris.
- Minimize impacts of painting operations. Paint in a well-ventilated area or spray booth.
- Recommend that customers use bottom coatings and paints that contain the minimal amount of toxic compounds. Use water-based paints when practical.
- Prohibit spray painting on the water. Limit in-water painting to small jobs. Mix only the amount of paint needed for the job. Use spray painting equipment that has high transfer efficiency.
- Avoid using hazardous materials. Dispose of the waste in accordance with federal and state regulations.
- Minimize impacts of pressure washing hulls to remove bottom growth. Allow contaminants to settle out of the collected wastewater.
- Prohibit underwater hull cleaning in marina waters.
- Offer spill-proof oil changes and provide an oil/water separation service to filter bilge water.
- Use environmentally safe petroleum storage.
- Locate fuel docks, when possible, away from wave action and boat wakes. For safety reasons, fueling station should be accessible by boat without entering or passing through the main berthing area.
- Provide a stable platform for fueling. Install automatic back pressure shutoff nozzles on pumps.
- Supply oil absorbent pads and pillows at the fuel dock to mop up spills.
- Place plastic or nonferrous drip trays lined with an oil absorbent material beneath fuel connections at the dock to prevent fuel leakage from reaching the water.
- Attach a container to the external vent fitting to collect overflow.
- Offer services to install fuel/air separators on boats.
- Inspect/repair fuel lines and nozzles regularly.
- Have trained staff at the fuel dock to oversee or assist with fueling and promote environmental precautions.
- Report spills. Federal regulation requires that any sheen upon the navigable waters of the United States be reported to the U.S. Coast Guard.
- Keep a well-maintained pumpout system and offer it to your clients.
- Have a dump station for clients to empty portable toilets.
- Have a clean and functional restroom open to clients.
- Reduce waste and litter in daily operations. Conduct trash pickups within the marina and along the shoreline.
- Control disposal of fish scraps to areas/methods that will not impair water quality.
- Provide trash bins and dumpsters that offer recycling options and are covered, well marked and conveniently located.
- Have a stormwater management system including cultivating planted areas, limiting paved areas and training staff about what they can do to prevent runoff during maintenance and operations.
- Employ shoreland erosion control measures.
- Practice water conservation.
- Use upland and inland areas for storage and maintenance.
- Avoid using toxic lawn and garden chemicals whenever possible.
- Promote the use of biodegradable chemical counterparts to traditional chemicals by ensuring that the marina store carries "green" products.

Milwaukee's South Shore Yacht Club: Harbor of Hospitality

Mike Dukes has been a member of Milwaukee's South Shore Yacht Club, located on Lake Michigan, since 1958 and was club commodore in 2000 and 2001.

From modest beginnings in 1913, the club has become one of the largest yacht clubs in Wisconsin. During its growth, Dukes says, the club has been proud to be called the "Harbor of Hospitality" on the Great Lakes. Its members also have become environmentally conscious.



LeeAnne and Mike Dukes are long-time South Shore Yacht Club members and sailors.

South Shore Yacht Club members include boating enthusiasts whose activities range from competitive and casual day sailing, to an active power boating fleet.

Located at 2300 E. Nock St., the club has 550 members and 243 slips, with a one- to two-year waiting list for membership.

"I've been working with boats since I had a paper route and there are many differences in boating operations today from when I was a kid," Dukes says.

The club's sailors and boaters alike are more interested than ever in pollution prevention and have made investments to back that up.

"I recall when the heads would empty into the lake and no one thought twice about it," Dukes recalls. "In the late 1960s and 70s we started seeing the effects of the pollution because boating was be-

coming more popular and the volume of pollution was increasing."

Dukes says that manufacturers responded to this concern by building boats with enclosed heads and, by 1969, building boats with holding tanks. Even with that technology, Dukes says sewage disposal was tough because there were few places to empty holding tanks.

"Only major marinas and a few public places had pumpouts," he recalls. "But that changed as people became more conscious of the problem."

The South Shore Yacht Club invested in its own pumpout facility five years ago.

Dukes' boat, a 43-foot long sailboat called TARDIS ("Time and Relative Dimensions in Sailing" named after the time travel machine on the "Doctor Who" television show), is equipped with two heads and holding tanks.

Dukes stores his boat on the club grounds, and he, his wife and their boating partners do their own cleaning, but hire help for painting. They begin spring maintenance as soon as the weather warms.

In the fall they also do their own cleaning and winter storage maintenance.

Dukes says club members are encouraged to contain debris from maintenance work and use less toxic paints. They share tips in the club newsletter, "The Compass."

"The club also is talking about ways to better control runoff," Dukes says. The club already has green spaces, gardens and trees. "We'd like to go further and maybe build a containment building where

maintenance work could be done under more controlled conditions."

Members also recycle their trash and there is a compactor on the grounds.

"If you ask people to be environmentally smart," Dukes says, "then you need to provide the facilities so that they can do that."

The club houses oil collection containers for recycling and they hire an authorized dock person to work at the fueling dock and pumpout station.

Members of the junior program — ages 8 through 18 — are expected to participate in area beach and shoreland clean-ups.

"They become aware at an early age about the importance of keeping the environment clean," Dukes says.

Inside one marina: Bringing pollution prevention to Wisconsin's maritime capitol

Jack Culley, general manager of the Manitowoc Marina and president of S.I. Marina Management (Sailboats Inc.), knows the routine.

Every spring he watches sailors and power boaters at his marina on Lake Michigan work so that their yachts are sea — and sight — worthy. In the fall they prepare to put their boats away.

Year-round, Culley and staff are there to see that environmentally sound methods are used for maintenance and operation.

The bottom line: The Manitowoc Marina does not welcome polluters.

"Clean water and a clean environment are essential to good boating and the marina industry," Culley contends.

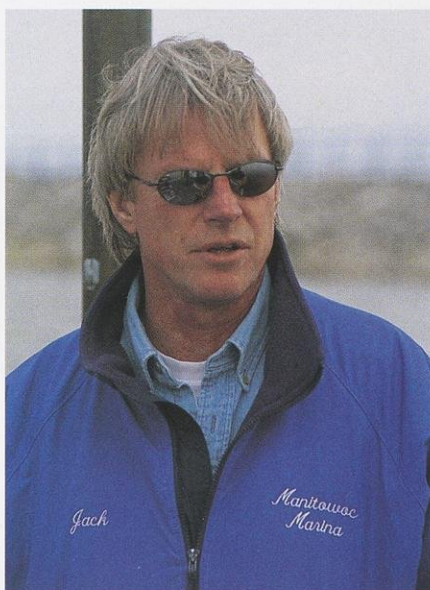
"We are not just a place to anchor your boat," Culley says. "We have about 200 boats stored here and we do about 80 percent of the maintenance on them."

His marina offers 235 wet slips (24 to 100-feet), indoor and outdoor storage, mechanical, electronic, rigging, structural repairs, refinishing services and fuel sales.

The marina, which opened in 1985 and is in its second year of a new 20-year lease with the City of Manitowoc, is located within walking distance of the Wisconsin Maritime Museum. It meets the six-mile Lakeshores Mariner's Trail.

Where Culley's office sits was once water. The area was landfilled to build a marina facility. As predicted, the marina brought in boaters from near and far. Half of Culley's customers reside outside the county. Other marina customers include about 10 fishing charter boats.

Culley also considers the City of Manitowoc an important business partner and works closely with the Public Works Director and harbormaster to plan marina operations.



(BOTH PHOTOS) ROBERT QUEEN

Manitowoc has a rich maritime heritage. During World War II, the Manitowoc Shipbuilding Company built submarines for the war effort. Today, Manitowoc is the sole Wisconsin port for the SS Badger (a 410-foot passenger vessel/car ferry that crosses Lake Michigan), and is home to the Burger Boat Company, a premier builder of custom mega-yachts.

Indians called Manitowoc "*Munde-owk*, Home of the Good Spirit," because of the beautiful harbors and rivers.

Culley wants it to stay that way. His commitment to environmental protection

Jack Culley, general manager of the Manitowoc Marina, encourages his customers to let his staff do the "dirty" boat maintenance work.





is expressed in the marina mission: "Provide the boating community with a personalized, professional and dependable service, in an environmentally clean and inviting maritime atmosphere."

To lessen his marina's impact, Culley provides customers with the marina's environmental management policy.

Culley believes his customers appreciate the environmental attention.

The marina staff encourages boat owners to let them do the "dirty" work.

The marina's stormwater pollution prevention plan requires that all boat sanding be done in designated areas where residue can be collected. Culley insists on using dustless sanders or professional grade sanders with dust collection capability. The marina rents these sanders at the ship store.

"We use the lowest VOC paint that we can," Culley says. "We use paint that dries almost instantly so fumes are limited."

The marina provides dumpsters for used paint cans, thinners and brushes so that they are properly disposed or recycled.

Much boat maintenance is done inside. "It's easier to control the environment when the boat is inside," Culley says. "We have a ventilation system. Painting is done before the boat goes into the water."

The \$7 million Manitowoc Marina facility houses a new 24,000-square foot heated winter storage building.

"There's a waiting list for the storage building," Culley says.

Storing a boat inside protects it from ultraviolet radiation, keeps it dry and extends the paint job and hull life. The storage facility contains "green" building features — skylighting and insulation.

The marina also sells fuel, but fueling at slips is prohibited. Tanks are filled at the fuel dock where there are environmental controls. Fueling dock staff use oil absorbent pads around the nozzle to catch spills, and a no-spill container with suction cups fitted over the fuel tank vent to capture fuel "upchuck."

The marina houses two 12,000-gallon underground fuel tanks connected to the fueling station by lines that run under-



(BOTH PHOTOS) ROBERT QUEEN

Performing boat maintenance indoors makes it easier to capture dust and other debris.

ground, then within the dock. These are fitted with leak detectors and tested annually. If a line broke, the marina has enough boom material to encircle the spill or close off the harbor entrance.

The marina also offers a tank where used motor oil and diesel fuel is collected and recycled offsite. Used oil filters are collected for disposal.

Overboard dumping or discharge of oil is not allowed. The marina requires that all bilges have oil absorption pads and that engines are maintained to prevent oil and fuel leaks and ensure maximum fuel efficiency.

Starting a winterized engine in the water or parking lot, which allows antifreeze to run off into marina waters is not permitted outside of designated areas. The marina requires that antifreeze be collected and disposed of. The marina also collects used batteries and contracts to have them properly recycled.

When boats are hauled out of the water for storage, algae growth is removed using a high-pressure spray. Marina staff builds a hay bale berm to capture algae and paint debris released during washing.

Cleaning a boat bottom is not allowed



A container with suction cups captures fuel and prevents spills.

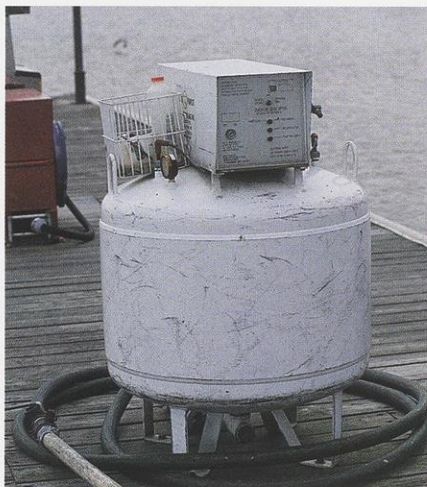
in the parking lot, since the waste could run into the marina waters. There is a designated boat cleaning area near the launch well and boaters are asked to avoid scrubbing their boat bottom while in the water.

Fish cleaning is not permitted in the marina, except at the designated fish cleaning station where there is a grinder/disposal unit for fish entrails. The station



ROBERT QUEEN

Properly dispose of all trash onshore.



ROBERT QUEEN

Fuel tanks at a dock with environmental controls rather than in the slip.

is well utilized and free to the public.

At Manitowoc Marina, the boat sewage management rules are simple: No overboard discharge of any sewage is allowed. Instead, customers use the shore-side restrooms and pumpout service (free to seasonal dock customers; there is a charge to visiting boaters). The parking lot houses an RV pumpout station, offered

for free to the public.

Formaldehyde chemical additives to holding tanks are banned and Port-a-Potties must be emptied into the designated dump station.

Culley also requires that clients use the trash and recycling containers provided.

Boats within the basin are required to run "slow no wake" to avoid interfering

with other boaters and to preserve the shoreline. A green space along the docks heightens aesthetics and helps control stormwater runoff from the parking lot.

The marina ship store sells environmentally friendly products.

But Culley says that these environmental initiatives — especially waste disposal — come at a price. As a business, he must pass that cost along to customers and does so through an environmental remediation fee. Dockage rates are subject to a 2½ percent environmental fee while storage rates are subject to a one percent fee. The fee hasn't hurt his occupancy rate.

"Our customers notice and seem to appreciate the added environmental services we provide and are willing to pay for it," Culley says.

"All boaters have to realize that the environment that they are enjoying now is precious and something to preserve for future generations and they have a role in that."

The Manitowoc Marina encourages customers to perform hull maintenance while boats are out of the water



On land and in water: How boaters can control pollution

Boaters know how much work goes into keeping a boat clean and working well.

But many boaters are also learning that their choice of products and maintenance methods impacts water quality and aquatic life.

On land, and in the water, there are ways boaters can control and prevent pollution.

Cleaning

Working on a boat out of the water and on an impervious surface under cover will prevent stormwater from carrying pollutants into the water.

With large boats, and those moored in permanent locations, this may not be

practical. In those cases much care must be taken to capture paint chips and other debris by working over a filter fabric or tarp. A berm or retaining wall may be built to capture debris.

Boats should be washed often with plain water and scrubbed using a sponge to prevent algae and other growth. Detergents should be phosphate-free, biodegradable and nontoxic. Even biodegradable detergents should be used sparingly, since some can destroy oils on fish gills and inhibit fishes ability to breathe.

Likewise, teak should be cleaned with a mild soap and abrasive pads.

Instead of pressure washing, clean hulls above the waterline by hand to reduce the amount of water needed and the total contaminants entering the water.

If pressure washing is necessary to remove bottom growth, minimize impacts by using filtration or chemical treatments that settle out heavy metals and paint solids. If pressure washing, use the least amount of pressure necessary to remove the growth. A garden hose and soft cloth may be enough.

If underwater hull cleaning is necessary, make sure there are no colored plumes, which indicate paint is being removed. Use the least abrasive material practical (sponge or soft carpet) when cleaning a vessel in the water.

Sanding, blasting and painting

Vacuum sanders and grinders, which collect dust as soon as it is removed from the hull, may be bought or rented. Paints, thinners and solvents may be toxic, and fumes — volatile organic compounds (VOCs) — released by some paints and solvents pollute the air.

Select fast-drying, environmentally friendly bottom paints. Nontoxic coatings are the most environmentally friendly and contain Teflon or silicone to produce hard, slick surfaces that plants and other organisms cannot firmly attach to. Use water-based paints when practical. Share left-over paint and varnish.

Waste

In 1987 Congress passed the Marine Plastic Pollution Research and Control Act to regulate garbage disposal at sea. Under federal law, it is illegal to discharge plastic or garbage mixed with plastic into any waters.

Regional, state or local regulations also may apply. All garbage disposal is prohibited in the Great Lakes and connecting tributary waters. Violators face a civil penalty, a fine and imprisonment.

When boating, use reusable containers

A little elbow grease goes a long way in boat cleaning and maintenance, and is better for the environment than solvents found in cleaners, paints and other products.



ROBERT QUEEN

Eco-friendly boating with these tips

Before you launch — spring maintenance:

- Wear protective clothing, especially eye and hand protection during boat maintenance.
- Ask your marina what maintenance is allowed. Perform boat maintenance in designated areas and work inside when possible.
- Spread tarps between the boat and dock when sanding, painting, blasting or cleaning. Tarps should extend high enough to contain residue.
- Use a dustless/vacuum sander, or hand-sand small areas and wipe as you go. Avoid sanding in the slip.
- Never spray paint in the slip. Use environmentally friendly and low-VOC boat paints. Share leftover paint, varnish and teak cleaners; or take them to a hazardous waste collection site.
- Use phosphate-free and biodegradable cleaning products. Eliminate in-water hull cleaning as practical. Wait 90 days after painting before cleaning hull.
- Wax your boat to prevent surface dirt from becoming ingrained.
- Clean engine parts over a container or in a parts washer. Use drip pans when changing fluids or working on engines.
- Check battery charge, water levels and connections for corrosion. Inspect electrical work.
- Tune-up motor to increase fuel efficiency, reduce consumption and discharge fewer pollutants.
- Use nontoxic bilge cleaners and/or bilge pillows that digest hydrocarbons.
- Lubricate the propeller shaft before re-installing the propeller.
- Check belts for cracks or excessive wear.
- Check power steering fluid level.
- Inspect spark plugs. Clean and replace as necessary.
- On outboards, make sure the water pump indicator hole is debris-free.

- Inspect the dock surface and roof. Tighten nuts and bolts. Check bolts between dock sections for looseness or missing parts. Check for loose bumpers.
- Don't forget trailer maintenance. The most common causes of trailer breakdown are blown tires, bearing failure or structural failure due to rust.

While on the water:

- Dispose of waste at a fish cleaning station or compost the waste.
- Leave nothing on the dock to fall into or blow into the water.
- Clean mud, plants and organisms from the boat, trailer, propeller, live well and anchors before leaving the launch to prevent the spread of exotic species.
- Keep a covered garbage container on board. Bring back what you take out. Recycle.
- If you have an installed toilet, use a sewage pumpout facility. Empty portable toilets into a restroom. Federal law requires all boats with fixed toilet facilities to have a U.S. Coast Guard approved Marine Sanitation Device (MSD). On the Great Lakes, Type III MSDs are required (called holding tanks) to keep the waste aboard until pumped out into a sewage system. The other type of toilet that is legal is the portable toilet, which must be carried ashore and dumped into a waste receiving station.
- Dispose of pet waste properly by using disposable bags for clean up.
- When filling the gas tank avoid spilling, topping off or overfilling to reduce the risk of fuel overflow and allow room for expansion in the tank. Wipe up spills.
- Participate in a hazardous waste collection program for antifreeze, paint, thinner, oil, oil filters, bilge water, batteries, gasoline fluids, solvents and oily rags. Never pour hazardous materials down the drain, on the ground or into the water.

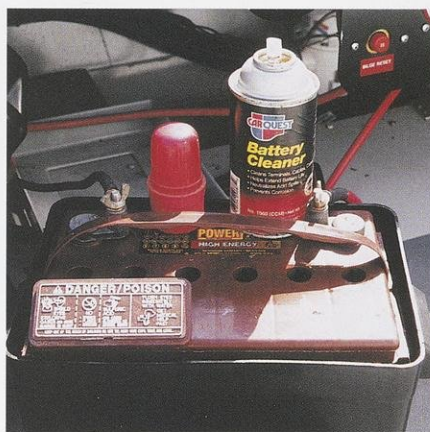
- Do not speed in no-wake and shore zones. Boat wakes erode the shoreline, stir-up sediments, and contribute to silt build-up, which requires dredging.
- Have U.S. Coast Guard wearable life jackets in the proper sizes for everyone on board.

Before storing the boat in winter:

- Remove the bilge plug.
- Remove and clean the propeller and lubricate the shaft. Change lower unit gear oil.
- Change engine oil and filter, replace water-separating fuel filter.
- Drain fuel lines, pumps and carburetor; drain tank or fill and add fuel stabilizer to the gas tank. Check fuel lines for cracks, abrasions and leaks.
- Unless the motor has a closed cooling system, all water needs to be drained from the manifold, hoses, petcocks and block to prevent freezing. Check the closed cooling system coolant levels (antifreeze) if applicable.
- Drain the toilet.
- On outboard motors, lubricate the swivel bracket, tilt support, tilt tube and the steering cable.
- Clean the engine exterior and sand and touch-up paint on scratched areas to prevent rusting.
- Remove the battery for storage, clean the top surfaces, grease terminal bolts, and place in a box or carton and store in a cool, dry place.
- Lubricate the gimbal bearing and the gimbal bearing ring/bell housing pivot pins before storing and again before putting back in the water.
- A professional can winterize your boat, but if you want to tackle it yourself, winterize your engine according to the manufacturer's instructions.



Give your boat a check-up before launching.



Check that your battery is charged; clean as necessary.



Don't neglect the trailer. Pack the bearings and inflate the tires.

and products with less packaging. Recycle as at home and properly dispose of all trash onshore. Trash should be taken home or left in the proper dumpster at the marina. Recycle used oil, oil filters and antifreeze. Used solvents and waste gasoline may be disposed of at a local hazardous waste collection station.

Find out what the marina's fish disposal policy is. Bag the waste and compost or dispose at home or in the proper dumpster.

Sewage

"In Wisconsin, we don't allow any discharge of sewage treated or untreated into our waters for recreational boaters," explains James Lubner, an educational specialist at UW Sea Grant Institute in Milwaukee.

Lubner explains that many people on small boats use portable toilets, which can be drained at toilet dump stations. However, vessels over 26 feet long typically have installed toilets. The Clean Water Act requires that all vessels with installed toilets have a certified Type I, Type II, or Type III Marine Sanitation Device (MSD).

Type I systems mechanically cut solids and disinfect waste. Type II systems treat sewage to a higher standard and generally require more space and energy to run. Type III systems do not discharge sewage — holding tanks are common. Incinerating systems are another option.

Some marinas provide a sewage pump-out station.

"If there's a problem in freshwater that relates to sewage," Lubner contends, "it's probably due to a lack of easily available pumpout stations."

Fueling

Several products prevent spills and reduce emissions when fueling. A fuel/air separator installed along the vent line allows air, but not fuel, to escape through the vent opening. A safety nozzle attached to a portable gas line used to fill outboard engines automatically stops the fuel flow when the tank is full.

A bilge switch may be installed to prevent oily bilge water from being dis-

charged. Alternatively, a bilge water filter connected to the vessel's bilge pump filters oil, fuel and other petroleum hydrocarbons from the water.

When fueling, only fill the tank 90 percent to allow room for thermal expansion. Slow down at the beginning and end of fueling. Fill the tank just before leaving rather than returning from boating to reduce spillage due to thermal expansion.

Engine

EPA requires each outboard motor manufacturer to decrease overall emissions of its line by a certain percentage by 2006. New four-stroke motors meet these re-

Boaters can prevent exotic species from spreading. Remove plants and animals from boats and trailers at the launch area.



Household products that may surprise you: alternatives to toxic cleaners

Baking soda will remove stains. Lemon juice can combat mildew. Here are some alternatives to using toxic products when cleaning your boat.

Toxic	Alternative
Bleach	Hydrogen peroxide
Scouring powder	Baking soda or salt
Floor cleaner	One cup white vinegar in two gallons water
Window cleaner	One cup vinegar in one quart warm water, rinse and squeegee
Varnish cleaner	Wipe with ½ cup vinegar and ½ cup water solution
Head cleaner	Put in baking soda and use a brush to clean
Shower cleaner	Wet surface, sprinkle baking soda, rub with scouring cloth
Aluminum cleaner	Two tablespoons cream of tartar in one quart hot water
Chrome cleaner/polish	Apple cider vinegar to clean; baby oil to polish
Fiberglass stain remover	Baking soda paste
Drain opener	Disassemble and replace; do not use toxic drain openers
Mildew remover	Make a paste using equal parts lemon juice and salt
Wood polish	Use three parts lightweight mineral oil and one part white vinegar; almond or mineral oil (for interior unvarnished wood only)

— Compiled by the International Marina Institute. Visit www.imimarina.org.

quirements and are why some boaters are switching over from two-stroke engines.

An EPA study shows that approximately 25 percent of the fuel/oil mixture from two-stroke engines are emitted unburned in exhaust. EPA data also shows that two-stroke engines produce over eight times the hydrocarbon emissions produced on average by four-strokes.

Four-stroke engines also are quieter, more fuel efficient and foul fewer spark plugs than two-strokes. Four-stroke engine parts are lubricated without mixing oil and gasoline.

The downside to four-strokes is that they cost at least 10 to 15 percent more than two-strokes, and need periodic

checking of crankcase oil level, and regular oil and filter changes. Larger repairs for four-strokes are generally more expensive and involved.

New direct fuel injection (DFI) two-strokes, while not as clean as four-strokes, produce significantly lower hydrocarbon discharges than other two-strokes. Using fuel injection and variable exhaust ports also reduces personal watercraft emissions by 75 percent.

Michael Moore, a biologist at the Woods Hole Oceanographic Institute in Massachusetts, points out that there are other sources that also leak fuel and hydrocarbons into the water — personal watercraft, leachate from paved roads,



Antifreeze should be stored in a clearly marked container on an impervious surface until it can be recycled.

sump oils, carbon black from tires, fuel transfers, oil spills, leaking storage tanks and more.

No matter what kind of engine you have, ensure that it operates as effectively as possible and use the gas-to-oil ratio recommended by the engine manufacturer.

There are two types of antifreeze on the market. Ethylene glycol, the traditional antifreeze often identified as green or blue, is toxic and should be collected and recycled. Propylene glycol antifreeze, the pink antifreeze, is less toxic, but is still harmful to the environment and should be recycled or disposed of properly.

Be a cautious consumer. Carefully read product labels. And pay attention to signage in and out of the water.

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The world's largest remaining stand of American chestnut is under study and under siege in Wisconsin.

Chestnut's last stand

Gina Childs

Each spring doctors come from all over the country, from West Virginia, Michigan, Maryland, and New York, to visit La Crosse, Wis. They come armed with the tools of their trade, a liquid slurry of fungi and hypovirus, a leather punch, and unrelenting optimism. These are not medical doctors, but doctors of forest pathology and plant genetics. Their patients are not wriggling babies lined up in the halls of the local public health depart-

ment; they are thousands of mammoth chestnut trees standing on 60 acres of private forestland in La Crosse County. These trees comprise the largest remaining stand of American chestnut in the world. The scientists are determined that these trees will not be the last.

Many baby boomers are too young to remember the "Redwood of the East," but the American chestnut once dominated the Eastern forest. One out of every four trees within the 200 mil-

Off to the rescue! An international team of plant pathologists heads out to stave off chestnut blight in an isolated stand in southwestern Wisconsin.

lion-acre forest that stretched from Maine to Florida and west to Ohio was a chestnut. Chestnut was so visible in the forest that during summer when the tree flowered, the Appalachians appeared snow covered. The tree earned its nickname because it grew to redwood-like proportions, sprouted readi-



PAUL SISCO

This National Champion American chestnut in Sherwood, Ore. shows how massive these "redwoods of the East" once grew.

ly after being cut, and its wood resisted rot.

The tree was not only prolific, it was majestic. Parks and town commons often featured chestnuts eight to nine feet in diameter. In forest situations, where trees compete stiffly for sunlight and nutrients, chestnuts could grow larger across than a dining room table and rose to heights as high as a seven-story building. Few tree species in the country today achieve this size and stature.

The tree was a staple of Eastern life. Turn of the 20th century recipes commonly included chestnut meats in their list of ingredients. Eastern farmers found harvesting chestnut fruit profitable and sent trainloads of chestnuts to Philadelphia and New York City to be roasted and sold by street vendors during the holiday season. At a time when money was scarce, the nuts sold for as much as five to eight dollars a bushel! Native Americans and pioneers used chestnut leaves to treat whooping cough. The rot-resistant wood made excellent fence posts and barn beams. According to Don Willeke, founding member of the American Chestnut Foundation, the famed fence rails split by Abraham Lincoln were made of chestnut. On your next visit to the East, check out farms and houses on the National Historic Register — many boast beams and flooring made of chestnut. Pay attention to fine pieces of Early American furniture on the *Antiques Roadshow* — and you will gain an appreciation for the beauty and versatility of chestnut wood.



USDA FOREST SERVICE

American chestnut is not native to Wisconsin. This stand, the largest remaining in America, survived the onslaught of chestnut blight because a few trees were planted in the 1800s hundreds of miles from the nearest infected trees.

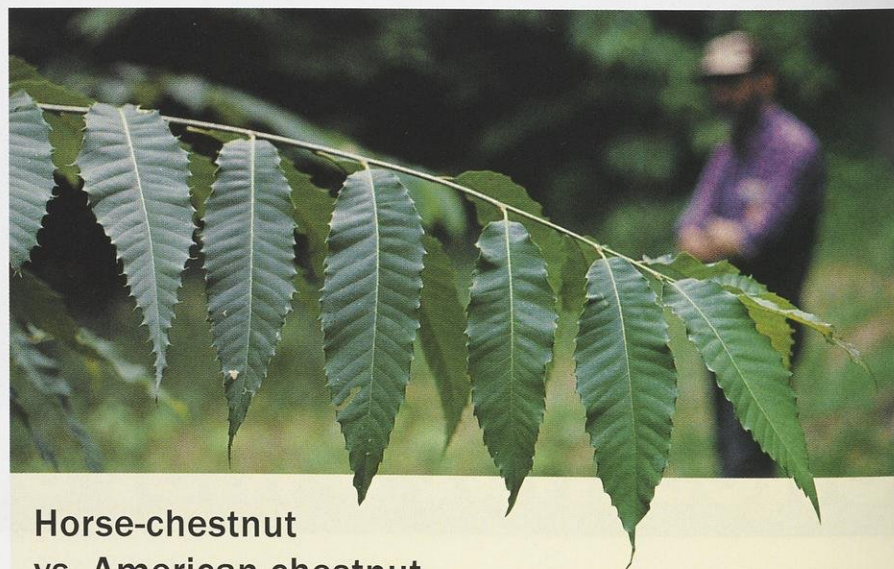
The tiny fungus that felled giants

So how did it happen that giant trees that were such a huge part of Eastern culture have all but disappeared from the American landscape? Dr. William MacDonald, Professor of Forest Pathology at West Virginia University, refers

to the plight of the chestnut as "the single greatest catastrophe known in recorded North American forest history."

The great catastrophe began sometime at the turn of the 20th century when large, formal gardens incorporating exotic and unusual species of plants were the rage. It is likely that plant hobbyists inadvertently imported the fungus *Cryphonectria parasitica* when they introduced Asian chestnut varieties to the United States. In 1904, scientists discovered the fungus killing chestnut trees in New York City. Within 50 years, the fungus commonly known as chestnut blight spread throughout the entire range of chestnut, and destroyed almost

American chestnuts have long simple leaves with serrate margins. The nuts are delectable when roasted. Buckeyes from horse-chestnuts are considered inedible.



PHIL RUTTER

Horse-chestnut vs. American chestnut

Horse-chestnut is often confused with American chestnut, and yet the two trees are not related. Even Henry Wadsworth Longfellow mistakenly referred to the blacksmith working under the spreading limbs of the chestnut tree when he really meant horse-chestnut.

The American chestnut, *Castanea dentata*, is native to the United States and belongs to the beech family. The tree has simple leaves with a serrate margin and a highly edible, one-inch nut surrounded in a prickly bur.

Horse-chestnut, *Aesculus*, is non-native and belongs to the buckeye family. The tree has palmately compound leaves with five leaflets. The shiny, one-inch nut is enclosed in a leathery capsule and is not recommended for human consumption.



Dr. William MacDonald, forest pathologist from West Virginia University, is part of a scientific team trying to save the Wisconsin chestnut stand by inoculating trees with a virus that attacks the fungus responsible for chestnut blight.



DNR forest pathologist Jane Cummings Carlson coordinates the field work to fight chestnut blight in the West Salem, Wis. stand.

Exotic invasives

Saving chestnut is just one thing that DNR Plant Pathologist Jane Cummings Carlson worries about. Increased global trade has increased the number of insects and diseases entering our country and affecting forest health in Wisconsin. Always on the alert for a possible threat to the trees and forests of Wisconsin, she is also keeping a watchful eye on other exotic diseases like butternut canker, white pine blister rust, oak wilt, sudden oak death and gypsy moth.

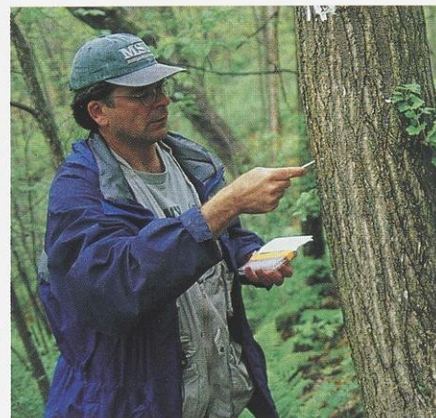
all of the majestic stands of this glorious tree.

American chestnut, unlike Asian chestnut varieties, has no resistance to the fungus that causes the blight. The spores of the fungus spread readily by wind, birds and mammals. Once the spores land on an American chestnut, they cause cankers on the trunk and branches. As the disease progresses, the canker encircles the tree or limb, completely cutting off the tree's ability to transport water and nutrients. Eventually everything above the canker wilts and dies. This explains why one of the first visible signs of chestnut blight is a dead or wilted branch.

Since the blight kills only the portion of tree above the canker and the tree resprouts readily, chestnut is not likely to become extinct. However, the new shoots sprouting from the stump only live for a short time until they too become blighted and die. This tree that once towered above the forest canopy has now been reduced to a shrub, altering the ecology of the Eastern forest forever.

Tenuous survival in an isolated stand

If you want to experience the unique grace and beauty of a chestnut forest,



Dr. Dennis Fulbright of Michigan State University counts chestnut cankers on a tree prior to treating it.

one of the few places you can do so is in La Crosse County. Featured in *National Geographic* and studied by the best and brightest forest pathologists in the country, approximately 2,500 chestnut trees grow on 60 acres near West Salem. These trees are the descendants of those planted by Martin Hicks, an early settler in the area. In the late 1800s Hicks planted nine or so chestnuts, probably as a fencerow, or maybe as protection from harsh winter winds. Perhaps he was trying to bring a touch of the East to his new home in Wisconsin. You can be fairly certain that Hicks did not know he was planting history.

Planted outside the natural range of chestnut, these trees escaped the initial onslaught of chestnut blight, but in 1987, scientists found blight in the stand. Early efforts to save the trees involved the immediate removal and destruction of any tree suspected to have blight. The fungus prevailed and a team of scientists proposed a new tactic — inoculating the trees with a debilitated strain of the fungus that had its own disease — caused by a virus!

The largest remaining stand of chestnut has now become the largest laboratory in the fight against blight. Scientists who once marveled at the large size and beauty of the forest are now working shoulder to shoulder to try to save the trees and prove their theories at the same time. Fueled by the shared will to bring American chestnut back to the Eastern forest and funded by the American Chestnut Foundation, the Wisconsin Department of Natural Re-

sources, the USDA Forest Service, and the universities of West Virginia, Michigan State, and Cornell, this team is making a valiant effort to save the La Crosse County chestnuts.

Scientist and Plant Pathologist Jane Cummings Carlson of the Wisconsin Department of Natural Resources serves as guardian, local arrangements coordinator, and liaison to the landowners. For the past 15 years, Cummings Carlson has watched over the forest with the protective eye of a parent. She has consulted with the best pathologists in the country, written research proposals to gain funding and continues to be a stalwart champion for the chestnuts in La Crosse County. Landowners Ron Bockenbauer, and Karl and Debbie Rhyme know the trees are special and lend their support by granting access to the scientists and allowing tours and field trips on their property.

When removing blighted trees no longer proved an effective solution, Cummings Carlson sought the guidance of Dr. MacDonald. He suggested using a naturally-occurring virus to attack the fungus that causes chestnut blight. The two contacted Dr. Dennis Fulbright at Michigan State University. Dr. Fulbright had been studying a stand of recovering chestnut in Michigan and

had isolated a virus growing within the fungus, (termed a 'hypovirus') that weakened the fungus sufficiently for the trees to recover. Although the hypovirus had been previously discovered in Europe, this was the first time it had been found growing naturally in the United States. MacDonald's theory was that by introducing the Michigan virus into the West Salem stand, the virus would attack the fungus and the trees would overcome the blight.

Will the blight end the chestnut?

The farmers rather guess not. It keeps smoldering at the roots and sending up new shoots till another parasite shall come to end the blight.

— Robert Frost

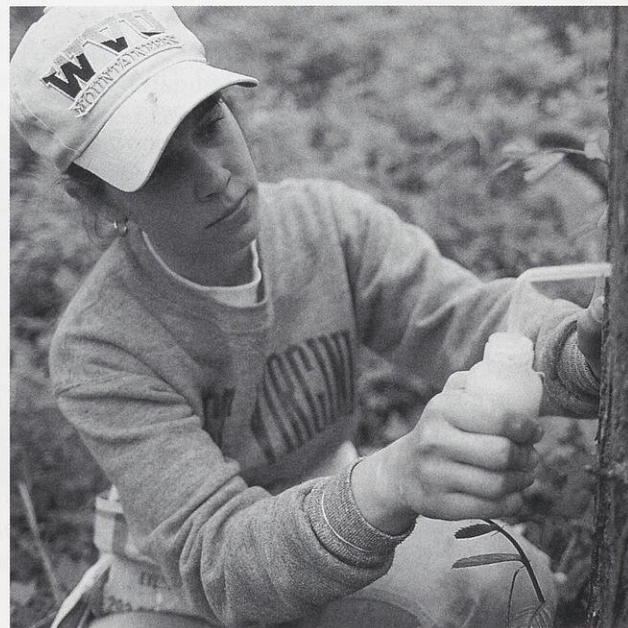
The scientists quickly consulted Dr. Michael Milgroom of Cornell University. Dr. Milgroom's expertise focuses on genetics and DNA fingerprinting of plant viruses. He tested samples of the chestnut blight fungus in La Crosse County and concluded, "Isolates of the pathogen revealed only one strain of the fungus was present in the stand.

This lack of genetic diversity in the pathogen creates an ideal situation for introduction of one biocontrol agent." His conclusion gave the green light to the scientists — the hypovirus might work!

In a procedure that appears to be half science fiction and half outpatient surgery, the scientists set out to introduce the hypovirus into the chestnut blight. They collected the hypovirus from trees in Michigan. Back in their laboratories they created a slurry of fungus mixed with the virus. Like a doctor inoculating a child with a vaccine, the scientists punched holes in infected trees' bark, injected the slurry, then "bandaged" over the holes with tape. In Michigan, the virus moves from tree to tree with the fungus. Every chestnut is infected with blight, but the virus keeps the blight in check and many of the trees eventually recover. The scientists hoped the same would happen in Wisconsin.

The treated chestnut responded immediately. Trees began to heal over their cankers. According to Dr. MacDonald, "It was very rewarding. Every tree with a canker had a great response." However, the Michigan virus proved to be *too* debilitating. The virus was so efficient at attacking the fungus

A group of Italian and American scientists prepare a slurry of fungus and hypovirus to inoculate chestnuts. Forestry students pound small holes through the chestnut bark with a leather punch. The slurry is infused and the treated trees are bandaged with tape until the holes heal over. Reddish cankers, signs of the blight, are healing over in the treated trees, but the fungal blight is still spreading through the stand at a faster rate than the virus intended to kill off the debilitating disease.





The researchers pack up a "black bag" of leather punches, viral slurry, bandages and tape. They climb the chestnuts with ropes to inoculate cankers that are higher than ladders can safely reach.

that it prevented the fungus from moving from tree to tree. Only the treated trees were recovering.

In desperation in the late 1990s, the scientific team used an Italian hypovirus to treat infected trees. Again, the treated trees showed signs of recovery. However the fungus continues to spread through the stand at a rate much faster than the virus. In addition, Dr. Milgroom has now discovered several genetic variations of the chestnut blight fungus present in the stand, making a large-scale rescue of the stand improbable.

Will the stand survive? That depends on whether you are a pessimist or an optimist. "It also depends on what you consider success," says Dr. Fulbright. "Is success a breeding population of chestnut that can survive the blight or is success saving a few individuals from the blight?" Because of these perspectives, scientific opinion regarding the future of the stand varies. It is a safe bet that 50 years from now chestnut will still be growing in La Crosse County, but all 2,500 trees may not survive. They may not be as grand or awesome as they are now, but some will endure. According to landowner Karl Rhyme, "The trees are quite unique, and we are all trying to do



something about the blight. The scientists do their thing, but in the end, Mother Nature does her thing."

Using a hypovirus to attack chestnut blight is just one approach being tested to restore American chestnut. Another approach involves successive genetic crossing of the American chestnut with the Asian chestnut until the resulting tree retains 99 percent of the American chestnut characteristics and the genetic resistance of the Asian variety. The American Chestnut Foundation is es-

sential to both efforts.

Founded in 1983, the American Chestnut Foundation is a nonprofit organization dedicated to restoring the chestnut to its former range. The Foundation exists almost solely on private donations and raises funds for its breeding program as well as other chestnut research. Membership has grown to over 5,000 and Honorary Board Directors include President Jimmy Carter and Nobel Peace Prize recipient Norman Borlaug. The Foundation follows founding member Dr. Charles Burnham's recommendations for breeding a blight resistant American chestnut. Dr. Burnham, famous for his work intercrossing corn varieties, developed a new breeding plan for chestnut, correcting the mistakes of previous efforts. Although Burnham recently passed away, his work lives on in the work of Dr. Frederick Hebard at the Foundation's farm in Virginia.

Dr. Hebard claims he "got infected early" with the desire to develop a blight resistant chestnut and says, "I just didn't know this would be a lifetime endeavor." Although it has been almost 100 years since chestnut blight was discovered in the United States, within the next five years Dr. Hebard and his colleagues expect to test a breeding population of chestnut for both blight resistance and American characteristics. A century without chestnut may sound like a lot in human years, but it is only a moment in ecological time.

Gina Childs leads the Information Management group of the USDA Forest Service office in St. Paul, Minn.

To visit the Wisconsin chestnuts

The American Chestnut Foundation will host its 19th Annual Meeting October 18–20, 2002 in La Crosse, Wis. The meeting will feature a tour of the privately held stand of American chestnuts on Saturday, October 19. To register for the tour or to find out more information about the American Chestnut Foundation, please contact the foundation by phone: (802) 447-0110, by e-mail at: chestnut@acf.org or visit their website: <http://www.acf.org>

CHRONIC WASTING DISEASE

CWD update

Practical tips for dealing with chronic wasting disease in Wisconsin whitetails.

Robert Manzwel

Efforts to eradicate a chronic wasting disease (CWD) outbreak in white-tailed deer continue. Though new information streams in every day, we wanted to give readers as up-to-date a summary as we can to answer common questions.

Why will chronic wasting disease continue to be a concern for years or decades?

Chronic wasting disease is the most significant health issue to affect Wisconsin wildlife in anyone's memory. There is no vaccine or treatment to cure the disease, and it is invariably fatal to an infected animal. To complicate matters, a deer can carry the disease for 15 months or more before showing outward symptoms. The only way to treat the disease is to destroy its host — the white-tailed deer that is carrying it. It is a communicable disease among some cervids — whitetails, black-tail deer, mule deer and elk — meaning an infected deer can pass it to a healthy one, but researchers don't know exactly how this happens. Veterinarians and wildlife biologists agree that drastically lowering the deer population in the infection area for up to five years is Wisconsin's best chance to eradicate the disease.

How long has CWD been present in Wisconsin?

No one knows for certain how long CWD has been in Wisconsin. Scientists at the Department of Natural Resources and the University of Wisconsin using a mathematical model developed by western states estimate CWD has likely been here for three to five years. Like most mathematical models, certain assumptions must be used to calculate an answer. This incorporates what we know about deer population density in the infected area, transmission rates of the disease and the results of testing more than 500 deer for CWD earlier this year.



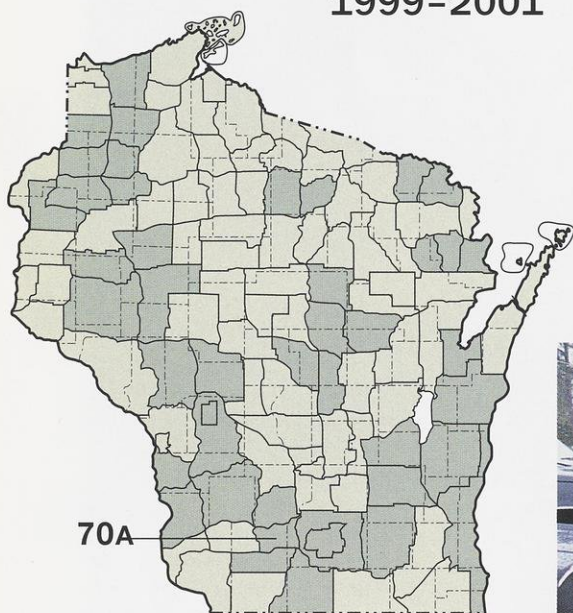
ROBERT QUEEN

How is CWD spread and what kinds of animals are infected by it?

Scientists don't know just how CWD is passed from one animal to another — whether it's passed in mucus, urine, feces or some other pathway. Chronic wasting disease is only shared among deer and elk. Other species have their own form of this disease, which scientists call a TSE or transmissible spongiform encephalopathy. Other forms of the disease are scrapie in sheep and bovine spongiform encephalopathy or "mad cow disease" in cattle. Humans

also have their own form of a TSE disease; it's called Creutzfeldt-Jakob disease or CJD and it infects about one in one million people. Wisconsin could be expected to record about five human cases of CJD each year based on our population. There is some evidence that CWD can exist in the environment — outside of its deer host — for some time and still retain the ability to infect a healthy animal. There is no evidence that CWD can be passed to cattle or to humans.

Deer Units tested for CWD 1999-2001



(right) DNR wildlife health biologists collected brain tissue samples from the shaded units on the map to test for chronic wasting disease.

(above) Three positive samples were identified from Unit 70A in February 2002.

(top right) The details of how CWD spreads from one deer to another are unknown, but it is clear that disease spread is more likely where deer feed communally. A ban on feeding and baiting deer statewide expires Sept. 1, 2003, pending permanent rules.



DNR FILE PHOTO



ROBERT QUEEN

What is Wisconsin doing to try and prevent the spread of CWD?

Wisconsin's Department of Natural Resources has been monitoring the state's wild white-tailed deer herd for tuberculosis and cranial abscessation syndrome since 1996 and for CWD since 1999. This effort has tested approximately 1,000 deer for CWD from 72 of 130 deer management units. Until the three positive cases were found this spring, all CWD and tuberculosis tests have been negative. Early detection of CWD gives Wisconsin a fighting chance at eradicating it as it appears to be localized in an area in western Dane and eastern Iowa counties. Review the article "Keeping an eye on the border and the future," (October 2001, p.4-8) for a more complete report on deer health monitoring. Special shoots, feeding and baiting bans have been instituted.

What causes CWD and what is the timetable to try and eradicate the disease?

There is no vaccine or cure for CWD. It is caused by an abnormal protein called a prion (PREE-on). In some way not yet understood, the abnormal prion is passed from an infected animal to a healthy one. Over time, the abnormal prion causes normal prions to change to abnormal. This change eats away at the brain tissue of the animal causing it to look like a piece of Swiss cheese under the microscope. The only way to remove the prion from the deer population is to remove the deer-host, thereby capturing the abnormal prion material present in the brain, spinal, lymph, eye and tonsil tissue of the infected animal and limiting new infections. Year-old deer tend to disperse in the fall at the approach of the mating season, so by acting now wildlife managers hope to limit additional spread of the disease.

What have legislators in Madison and Washington, D.C. done to get Wisconsin the legal authority and money to control CWD?

Wisconsin has appealed to the federal government for assistance in dealing with this wildlife crisis. Governor McCallum has asked for \$18.5 million in aid over a period of three to five years to finance CWD management, research and build capacity to test for CWD at Wisconsin laboratories. In an unusual special session called by the Governor, the Wisconsin Legislature passed a CWD bill that authorized the Department of Natural Resources to spend up to \$4 million from its existing budget to manage CWD. Most of the money would come from the Wildlife Damage Account that is normally used to reimburse farmers for crop losses caused by wildlife. The account is funded with hunter dollars collected through a \$1 surcharge on hunting licenses and

through sales of bonus antlerless deer harvest permits. The CWD bill also gave the DNR authority to use hunting methods normally not allowed, such as herding/shooting from aircraft, shooting from vehicles and shooting from tractors.

Game farms may be one source of CWD infection because deer and elk are transported from areas out west where CWD has been present for years. Who is testing these captive herds?

Wisconsin has 575 farms with captive white-tailed deer, and 272 with captive elk. CWD has not been diagnosed on any Wisconsin deer or elk farm. We also have about 100 farms raising red deer, reindeer, fallow deer and sika deer. We don't know if these species are susceptible to CWD.

The Wisconsin Department of Agriculture, Trade and Consumer Protection licenses and inspects all game farms and shooting preserves. Emergency rules passed by that agency to combat CWD spread in Wisconsin have effectively shut down new imports of deer and elk into the state. The rules also require strict monitoring of all captive deer and elk herds if the owner wants to move live animals in the state. Mandatory CWD testing is also required if any captive deer or elk 16 months or older is slaughtered, dies on the farm or if any portion of its carcass leaves the property. All deer killed on hunting preserves or game farms must be tested if the shooter wants to keep the meat or a trophy for mounting.

How will the special CWD shoots be managed this summer?

During the summer months, DNR issued "scientific collector's permits" to landowners in the CWD Eradication Zone. The permits allow landowners or their designees to shoot deer of either sex and any age during the four one-week periods in June, July, August and September. Special season regulations for the fall hunting period were approved as emergency rules by the Natural Resources Board in June. The rules set an extended gun hunting season and almost limitless harvest tags but

with an "earn-a-buck" provision. The emergency rules would open the fall gun-hunting season on Oct. 24 in the CWD Management Zone and Intensive Harvest Zones. Shooting hours would continue to be one-half hour before sunrise to 20 minutes after sunset.

Will shooting and deer removal in the Eradication Zone be limited to private property?

Yes. Shooting this summer will be confined to privately owned lands within the Eradication Zone through September. If an obviously sick looking deer is reported on state-owned land or else-

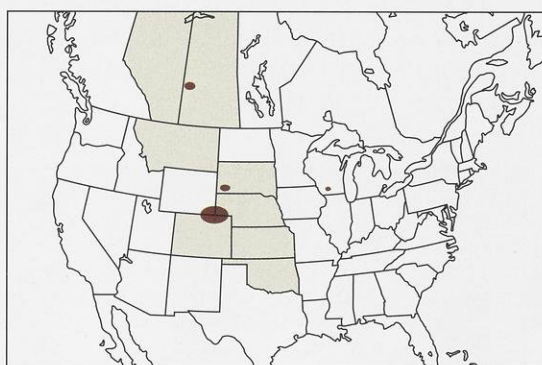
where, a DNR employee will act on all such reports to observe the animal. If deemed safe and appropriate to do so, such deer would be shot and tested for CWD.

Who will shoot deer on public lands in the Eradication Zone? How and when will property users be notified?

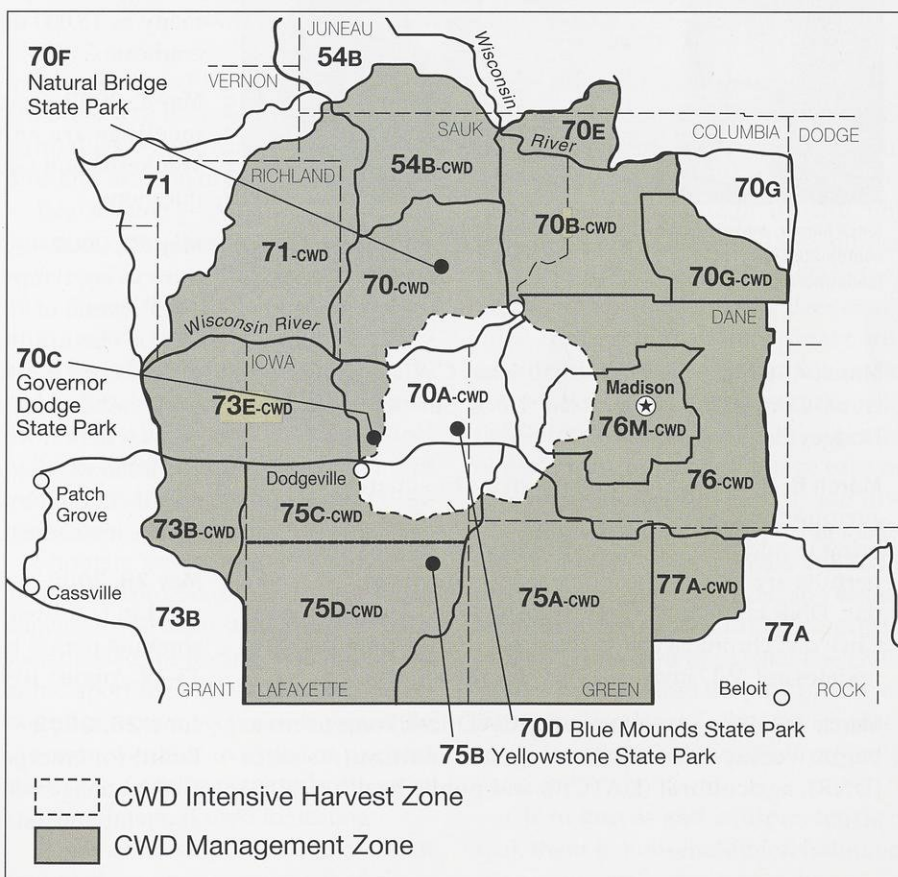
During the fall CWD special season, public lands will be open to all licensed hunters. With the exception of shooting already done in Blue Mound State Park in early May, no special hunts are scheduled for parks, until fall.

(right) In North America, CWD outbreaks have been found in captive herds of deer and elk in the shaded provinces and states; in wild animals where indicated in red.

(below) Extended fall hunting seasons will be held in the shaded CWD Management Zone. Within the Intensive Harvest Zone wildlife and health officials will work with landowners and shooters to greatly reduce the herd in an attempt to stop the potential spread of chronic wasting disease.



MOONLIT INK BASED ON DNR DATA



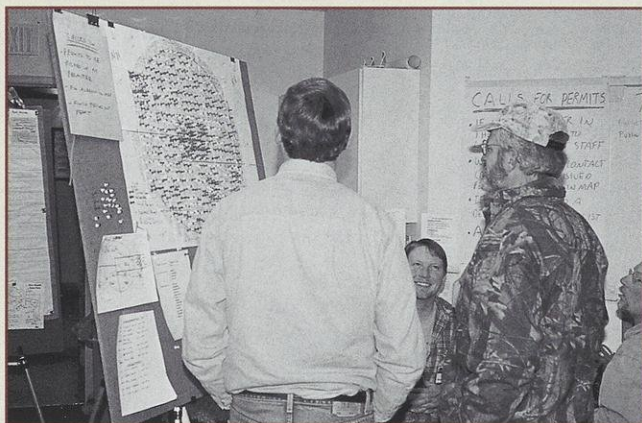
GEORGINE PRICE

CWD Chronology

1999, 2000 and 2001 — DNR wildlife disease specialists begin surveillance for chronic wasting disease in 1999 by collecting tissue samples from deer at fall hunting registration stations. Sites include deer units where deer populations congregate and stations near concentrations of captive herds. Approximately 1,000 deer from 72 management units in Wisconsin have been tested for CWD in that time.

Feb. 28, 2002 — Testing laboratories notify DNR staff that three deer tissue samples collected during the 2001 gun deer hunt in Mt. Horeb area tested positive for CWD. Conservation officers are immediately dispatched to inform the hunters who submitted these deer and to establish exact locations of the kills.

March 1, 2002 — DNR establishes a CWD Incident Command System to investigate CWD in Mt. Horeb area. Conservation law enforcement officers start an inquiry into possible sources of CWD infection.



Since March, workers at a CWD Command Post in Dodgeville have coordinated efforts to remove and test deer with close cooperation from area landowners.

March 4-6, 2002 — DNR establishes CWD Field Operations Command Post at the DNR Service Center in Dodgeville.

March 6, 2002 — Landowners in a 415-square mile area surrounding the sites of confirmed infection are asked to bring in additional deer for testing and special collector's permits are issued to cooperating landowners. The same day, DNR launches a CWD website www.dnr.state.wi.us. Click on "chronic wasting disease," to provide immediate updates as CWD investigations expand and evolve.

March 7, 2002 — An Interagency CWD Task Force forms to begin weekly meetings among state natural resource (DNR), agricultural (DATCP), and public health (DHFS) staffs.

March 6-April 9, 2002 — 516 deer are collected for CWD testing from the sample area. The majority of test animals were provided by area landowners, some were collected as roadkills and some were shot by DNR-authorized sharpshooters.

March 14, 2002 — Investigators began series of briefings for legislators on CWD issues, potential financial needs and consequences.

March 20, 2002 — DNR, DATCP and DHFS hold a public informational meeting on CWD at Mt. Horeb High School. Attendance is estimated at 1,100.

April 23, 2002 — Final results of additional CWD testing are reported. Eleven additional positive deer are found among 516 submitted. Including original samples, DNR reports 14 deer show positive signs of CWD infection from a total sample of 598 deer.

May 1, 2002 — DNR, DATCP and DHFS host a second public CWD-information meeting at Mt. Horeb. Attendance estimated at 1,600.

May 1, 2002 — As a strategy to contain the disease, the public is informed that investigators will establish a CWD Management Zone consisting of 13 deer management units in all or part of 14 counties in south central Wisconsin including a 287-square mile CWD Eradication Zone where as many as 15,000 deer may need to be shot in an attempt to eradicate CWD.

May 1, 2002 — Additional statewide CWD informational meetings are announced for Eau Claire, Rhinelander, Waukesha and Green Bay to update the public and answer questions.

May 22, 2002 — A new experimental CWD testing procedure using lymph nodes discovers four cases of CWD in deer. A total of 18 whitetails have now tested positive for CWD. The Eradication Zone is expanded to 361 square miles as one positive test came from just outside the previously indicated zone. To start reducing deer populations in areas where infected deer have been detected, four one-week shoots are planned for summer months. Most carcasses not claimed by landowners from the Eradication Zone will be incinerated.

May 28, 2002 — The first batch of shooting permits is issued to landowners in CWD Eradication Zone. The first shooting period is set for June 8-14. Other periods are July 13-19, August 10-16 and September 7-13.

June 26, 2002 — DNR staff ask the Natural Resources Board for emergency rules to establish a special hunt in CWD management area. These rules were approved as well as a temporary statewide ban on feeding and baiting deer.



Permits and special tags track each deer shot in the Eradication Zone. Carcass tags detail the location of each harvested deer.



(BOTH PHOTOS) ROBERT MANWELL

Deer harvested during four one-week summer shoots need to be promptly registered and sampled at one of the two registration sites. Carcasses from these summer shoots will be incinerated to minimize the potential for disease spread.

As a camper, hiker or bicyclist do I have to take safety precautions using public lands during CWD hunts this fall?

Safety precautions recommended during hunting seasons will be repeated for these special deer removal shoots. There will be ample public notice in advance of these special shoots.

Practical tips for those involved in the CWD shoots.

Landowners participating in summer deer collection within the Eradication Zone will be issued special collector permits and logs, and will be supplied with as many carcass tags as they can use. All shooters must carry and keep the collector permits with them while shooting, or transporting deer to the registration stations. Additionally, landowners will have a log sheet to record names and contact information for any shooters they authorize to shoot for them on their property.

Tagging shot animals — Each deer

must be tagged with a carcass tag. Shooters will be asked to indicate the animal's sex, approximate age, date, time and location of the shoot.

Registration — All deer shot during summer collection must be promptly registered at one of the two registration sites: Trout Creek Fishery Area, two miles north of Barneveld on County Highway T; or Mazomanie Wildlife Area, three miles north of Mazomanie on County Highway Y. DNR personnel will staff these sites from 6 a.m. until 10 p.m. every day during the special summer shoots.

Shooters are requested to shoot the animal in the chest thereby avoiding damage to the brain stem and lymph tissues needed for testing. It is important to transport the kill to one of the collection sites as soon as possible especially in warm weather in order to prevent spoilage of the important brain stem and lymph tissues used for testing.

If you are merely disposing of a shot animal, it is not necessary to field dress

it. The state will assume disposal costs.

If you want to save the meat for potential consumption, take these precautions during field dressing. Work quickly to prevent spoilage during hot weather. Wear rubber or latex gloves when field dressing. Register deer promptly. When butchering deer, minimize contact with brain, spinal cord, eyes or other nervous system tissue. Do not use household knives or utensils to field-dress the deer. Seal the remainder of the carcass in plastic garbage bags or containers along with gloves, and dispose of them in a landfill or bring inedible portions of these animals to a DNR disposal site. All bones, offal and scraps from processing should be carefully bagged and sealed in plastic. The DNR has not been advised that any private or municipal garbage collectors have refused to collect such wastes if properly packaged.

Clean knives and equipment, then soak them in household bleach diluted 50 percent with water.

Butcher and package the meat and place in your freezer clearly marking the packages. All deer kept for potential consumption will be tested for CWD. You will be notified by phone if the test is positive. You will be notified by letter if the test is negative. Hold onto this letter. If you intend to have your meat processed, some processors may want to see proof of test results before they will accept meat for processing.

There are no bag limits on numbers of deer you can keep from summer shoots within the Eradication Zone as the goal is to bring the deer population

What's next?

CWD descended on Wisconsin very quickly. Deer testing over the previous two years had all been negative, providing a false sense of security. Deer watching and deer hunting are inextricably linked with Wisconsin culture and tradition. These activities are also the basis of an important economy in Wisconsin.

Knowing what to do next is a complex question. DNR Secretary Darrell Bazzell has set the department's sights on eradicating the disease outbreak in Wisconsin — a tall order, but possible. A great deal depends on the cooperation of landowners in the affected area and the results of additional testing of deer from the CWD area. As we learn more, it's possible our management plan will change or be modified. The initial plan — to reduce deer populations to as near zero as possible in a small area with significant population reductions in a buffer area — has been acknowledged by wildlife experts across the country as a sound strategy.

One of our biggest challenges is to provide a scientifically sound base of knowledge about CWD to all citizens and to keep the public up-to-date on this rapidly evolving wildlife issue.

The legislature has given the department and its partners strong tools to address this problem including authority to ban baiting and feeding of deer, shooting from vehicles and to use aircraft in herding or shooting deer. It remains to be seen which of these tools will be used and to what extent.

Robert Manwell is a senior public affairs manager for the Wisconsin Department of Natural Resources and the chief communications officer helping manage CWD disease containment.



ROBERT MANWELL

TV, radio and newspaper reporters are closely monitoring the CWD control program and sharing the details at public forums, as policies and test results form options to contain this disease outbreak.

there as close to zero as possible. Given Natural Resources Board approval, fall hunters in the larger CWD Management Zone will receive an additional buck and antlerless tag for each antlerless deer they register.

Are there any tests to determine the safety of venison I already have in the freezer?

The short answer is, "No." Scientists have never found prion material (the infectious agent) in muscle tissue even in CWD-positive animals. Though we have no research to question the safety of venison, some people may choose to wait and see before eating venison based on widespread testing in the area where they hunted.



DON BLEGEN

After flowers are fertilized, the nodding Indian pipe blossoms turn upward. Seeds are dispersed after the dried, brittle flower stalk splits open in fall.

continued from page 2

If Indian pipe obtains its nutrients from below ground, why does it expend the energy to send up a stem? The answer is to flower and reproduce. Atop each three- to nine-inch scale-covered stem is a solitary, odorless flower as waxy white and translucent as the stem. The Latin species name *uniflora* refers to one flower. Because it also lacks color, the flower appears to be an extension of the stem. Take a look inside and you'll see that the nodding head reveals all the parts of a typical flower: stamens, stigma, style and ovary.

Only the young flowers of Indian pipe nod. In this position, you can imagine how earlier observers gave the plant its common name. After fertilization, thought to be by insects, the flower turns upward. The genus name *Monotropa* means "one turn," referring to the way the flower lifts to an upright position. Numerous seeds mature inside a capsule as the stalk toughens and turns black. Eventually the capsule splits and releases really tiny seeds that resemble a fine brown powder that drift on the wind.

There's a lot left to learn about Indian pipe's life history. As you explore a woods during summer, perhaps you'll discover which insects pollinate this perennial plant and how they do it. Maybe you'll learn what time of day or night pollination occurs and when the seeds germinate.

Don't pick this plant, for the stem rapidly deteriorates into a gooey black blob. Just enjoy Indian pipe in its native habitat and congratulate yourself for taking the time to investigate such an interesting plant.

Anita Carpenter explores the vacant lots, the leaves and the litter in the fields and woodlands near her Oshkosh home.

MUSHERS GRATEFUL

We were excited when people in our community began telling us that they read about the Empire 130 Sled Dog Race in your magazine ("Mad about mushing," December 2001). Thank you to Rich Trotto for taking the time to journey to our race and doing such a fine job of interviewing, reporting and photographing the event.

The Empire 130 has outlasted many start-up contests and we provide a favorite race for beginners and professional racers, too. Those who enjoy the sport must be dedicated to feed, train and care for their dogs year long so they can enjoy a few weeks of wintertime fun. They are a great group of people who speak kindly to their dogs and enlist help from family and friends on race day.

By the way, in 2003, the Empire 130 will be held January 4-5.

Jeanne Brown
Solon Springs

THAT COLORFUL SNAKE

I noted the colorful bright red and white snake on page 34 of your story about the history of State Natural Areas ("Persevering for preservation," April 2002). Can you tell me if that snake is poisonous?

Richard Drake
Sussex

The snake with distinct red and whitish blotched bands is a young eastern milk snake (Lampropeltis triangulum). The bands turn reddish-brown or brown as the snakes age. The underside is white with black rectangular markings. It is definitely not poisonous. In fact of Wisconsin's 21 types of snakes, only the eastern massasauga rattlesnake (Sistrurus catenatus) and the timber rattler (Crotalus horridus) are venomous. The massasauga is an endangered reptile that lives in isolated river bottoms and lowland forests in a

few west central counties. The timber rattler mainly inhabits river bluffs along the Mississippi and Wisconsin rivers.

The milk snake is much more widespread in the southern two-thirds of Wisconsin and is found in savannas, prairies, hardwoods, woodlots and pastures as well as around the stone foundations of old buildings. It even moves into vacant lots on the outskirts of towns. The adults feed mainly on rodents.

You can learn more about the "Snakes of Wisconsin" in a color guide available from DNR's Bureau of Endangered Resources, P.O. Box 7921, Madison, WI 53707. Enclose a stamped envelope at least 5½ x 8½ inches with 83 cents of postage if you want a copy.

BIRD ON THE WING

On Friday, April 5th or Saturday the 6th I heard honking and throaty noises high in the sky. About 25-30 birds were flying in a circle. I got out my binoculars and they looked like some sort of crane, but I couldn't see them well against the sky. Then I got out my spotting scope and these birds had long legs and black wing tips. They would fly in a V formation for a little while, then went back in a circle as if they were trying to regroup. This went on for 20 minutes. They finally flew out of sight flying northwest, about seven miles west of Blair.

I would like to know if others know what these birds were. My bird guide matches up with whooping cranes, but I know you are just bringing those birds back to Wisconsin now.

Peter Nelson
Blair

BECKMAN'S MILL

As people in the real estate industry say, it's location, location, location that counts. The photo caption in the April issue [that described] a fish ladder at Beckman's Mill as being on the Rock River in Green County needs

correction. The Beckman Mill, listed on the National Register of Historic Places is definitely located in Rock County and is most definitely located on the west branch of Racoon Creek, part of the Grant Pecatonica Watershed. Beckman Mill Park is owned by the County of Rock, on behalf of the citizens of Rock County. The work on the historic Beckman Mill, the Beckman Mill dam and the fish passage was done through the efforts of some 420 members of the Friends of Beckman Mill, Inc., who have spent many hours and many dollars working on this project of creating the dam to go with the historic mill as well as a fish passage to ensure a biological right-of-way around the dam.

Should you [or readers] desire additional information on the efforts of the Friends of Beckman Mill at Rock County's Beckman Mill Park, please contact us. The Friends website is www.beckmanmill.org. We invite the general public to tour the historic Beckman Mill, the new fish passage and the dam on the west bank of Racoon Creek. This park is being developed...to take care of recreational needs and to showcase the historic and cultural efforts of the early communities here in Rock County...

Thomas G. Kautz, CPRP
Parks & Conservation Director
County of Rock Public Works
Dept.
Janesville

We regret the error and visited the website, which describes the 140-foot curving fishway as having eight riffles and seven miniature holding pools that slow the water enough to allow even small fish to navigate passage around the dam.

We also received letters on this matter from Mark Johnson of Beloit, Val & Dick Donagan of Beloit, John Crank Jr. of Janesville, Howard Goebel of Janesville and Jeanie Fruin of Beloit.

TAKE A CLOSER LOOK

The lovely flowers in bloom at Happy Hills Glade in the April issue on p. 36 are shooting stars (*Dodecatheon meadia*), not trilliums. I had to use a hand lens to check it out, but we amateur botanists are fussy!

Mary Gease
Caledonia

The pros are sharp-eyed too! We also heard from Mark Leoschke, a botanist with the Iowa DNR Wildlife Bureau in Des Moines, IA.

FLOODING RIVER

What a timely story ("Changes on the Chippewa River," October 2001) for me to find and read after returning from my cottage on the Chippewa River near Eau Claire. This year, with below average snowfall and no advanced warning of major flooding in our segment of the river, we very suddenly had over a foot of water inside the cottage! It made me angry and frustrated that Xcel Energy et al can take over the water levels at the expense of others. Now they mismanage the dams for questionable benefits of upriver folks and flood the heck out of us. Do you have resources of help to address our side of this issue?

Paul Mencke
Lake Elmo, Minn.

Article author Tom Lovejoy responded: On April 15, 2002, Chippewa River spring flooding crested at about 60,000 cubic feet per second (cfs), measured at Chippewa Falls. According to DNR's floodplain engineer this discharge is roughly equal to a "ten year flood event." This year's flood event was higher than expected due to a combination of unseasonable warm weather and rainfall when the ground was still frozen.

Xcel Energy's hydropower projects have no effect on the magnitude of Lower Chippewa River flood flows. Much like the

COMMENT ON A STORY?

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

size of culverts under roads, the size of intakes to hydropower turbines limit the amount of water that can pass through. This hydraulic capacity at six hydropower plants on the Lower Chippewa River ranges from 5,600 cfs (Dells Dam at Eau Claire) to 12,240 cfs (Jim Falls Dam). Flow exceeding the hydraulic capacity of the power plant must be spilled through dam floodgates to prevent over topping of the dam. The flowages behind the dams have limited capacity to store water — they are not flood storage reservoirs. Also, discharges from tributary streams, such as the Eau Claire River, may have contributed to the magnitude and rate of flooding.

Without having the details of your flooding situation (i.e. where is your cottage located, was it basement seepage or one foot of water on the ground floor), we know that this year's spring flooding on the Chippewa River was completely contained within the 100-year floodplain. If your cottage is located in the floodplain, you can and should expect regular flooding problems regardless of hydro project operations.

There are actions that floodplain property owners can take to increase their personal safety and prevent or minimize risk of damage. I would encourage you to contact your local emergency management or zoning officials to discuss and consider options. Wisconsin DNR can provide phone numbers if needed.

THE WARM WINTER AND ICE-FREE LAKES

My neighbors and I, plus a lot of anglers are wondering what the impact will be that Green Lake

in Green Lake County didn't freeze over. People say this hasn't happened in more than 150 years. With sunlight shining through the water all year, no snowmelt to add to water levels and the absence of ice fishing, some things have to have changed. Don't they?

Mike Sutich
Green Lake

DNR's Green Lake Fisheries Manager Dave Bartz responded: From a fisheries standpoint, I believe the impacts are positive. On a lake like Big Green, where stocked lake trout (and other species) are under tremendous fishing pressure, especially through the ice, I believe the fish get a welcomed break from harvest.

Mark Sesing, area DNR lakes specialist added: Early plant growth might be more robust in the shallow littoral zones, [especially plants like] milfoil, curly leaf pondweed and elodea. More available light and shallower water could enhance plant growth. In the shallow zones in 2002 overwinter survival of plankton was enhanced, which could equal more algae and zooplankton. Water levels may be lower for lack of huge runoff events, but I believe the water

level will be pretty much normal during the recreation season. Shoreline disturbance might also decrease without the usual ice shoves.

NATIVE PLANT SOURCES?

I have a question regarding the 50 Years of Natural Areas article. It mentions a seed farm for Wisconsin native plants. Is it possible for the general public to get these seeds? If so, where?

Kevin Orcutt
Union Grove

DNR publishes a listing of firms that sell native seeds, plants and other nursery stock native to Wisconsin and the Midwest. That publication "Native Plant Nurseries and Restoration Consultants" is available online at <http://www.dnr.state.wi.us/org/land/er/invasive/info/nurseries.htm>. Read it before you print it; the document is 17 pages long.

We can also mail it to you from the magazine office. Send us a self-addressed stamped business envelope with 60 cents postage or a 9x12 envelope with 83 cents postage and mail your request to Wisconsin Natural Resources magazine, Native Nursery Listing, P.O. Box 7921, Madison, WI 53707.

The listing includes 37 firms that carry plants native to Wisconsin. A second listing details 100 firms that sell plants from a wider midwestern area. The listing is compiled as a service by Wisconsin DNR staff, but does not imply any endorsement or recommendation of listed firms by the agency.

MADSTONES

I'm responding to an article you carried in the November/December 1982 issue called "Madstones," by Gayle Steiner. It has taken a long time, but I finally have a madstone! I got it from the grandson of an Illinois doctor who practiced in the mid-1800s. It's possible his wife found it in the woods because I have no information on whether the doctor used it in his practice. The madstone is about 2.375 inches in diameter and looks similar to the one you pictured in the story.

William R. Jakus
Dousman

Talk about an old-time correspondence! Madstones are stonelike accretions that form in ruminant animals' stomachs much as an oyster forms a pearl around a foreign object like a grain of sand to limit an internal irritation. Also called bezoars, these "stones" were believed to have curative powers that could draw out poisons.

The madstones would supposedly adhere to wounds tightly until the poisons were drawn out and then would drop off, full of poisons. The stones were then soaked in fresh milk or lukewarm water until the poisons came to the top in small bubbles, then the liquid was poured off and the madstone was "cleansed" and ready for a fresh application.

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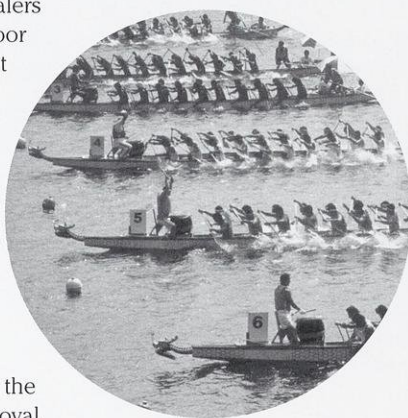
Who has the energy?

The annual enervation that descends on residents of temperate climes during late summer somehow seems to circumvent Wisconsin. Not that the place doesn't get sticky and steamy — it does. Or that the people don't get sticky, steamy and sweaty — they do, boy do they. It's just that, the warmer it gets, the harder Wisconsinites tend to work at their recreation. A thermometer flirting in the 90s is sure to bring out the circus strongman in us all.

Take the **Wisconsin Classic Human-Powered Boat & Bike Races**, August 15–17 in Sparta. This calorie-burning conflagration begins Thursday with a 24-hour human-powered boat race — a test of endurance to challenge the strongest of pedalers and paddlers. Friday's indoor races on ice for recumbent bikes and other human-powered vehicles will be followed by Saturday's 200-meter time trials on a closed-circuit race-course, with one-eighth mile elimination drag races for all classes of human power. Anyone still standing is invited to join in a variety of races at the Excalibur half-mile paved oval speedway in nearby Tomah on Sunday. See www.wisconsinbicycletours.com for details, or call (800) 354-2453.

For another chance to bust your buns in the hot summer sun, join in the **24 Hours of 9 Mile Mountain Bike Race**, August 17 in Wausau's Nine Mile County Forest. You and

your pals will be spinning your wheels faster than a hamster on espresso during this all-day, all-night team race. Visit www.team.sportsinc.com or call (262) 549-6801, ext. 80.



The voyageurs liked their canoes big and so do the teams participating in the first **Lake Superior Dragon Boat Festival** on August 24 at Barker's Island, Superior. The colorful long boats with a dragon's head at the prow can

hold a score of rowers, so balance is just as important as strength and rowing rhythm. Thirty teams from around the world will compete. (715) 394-8365.

Curiously, our forebears lacked this overwhelming desire to expend energy in the heat. Instead, they looked for ways to harness energy so they wouldn't have to toil endlessly under the noonday sun. At the **Badger Steam and Gas Engine Show**, August 16–18 in Baraboo, you'll see the state's largest display of early American steam-powered and gas-powered equipment. (608) 522-4905. Find out how to put a sheep to work and see the many ways that 19th- and early 20th-century farm families harnessed power at the **Power Exposition**, August 17–18 at Old World Wisconsin, Eagle. (262) 594-6300.

The **North Central Wisconsin Antique Steam and Gas Engine Club** holds its 29th annual show on August 23–25 in Edgar; the event features gas- and steam-powered machinery, plowing with steam tractors, threshing, a flea market, live entertainment, and a parade. (715) 352-2486.

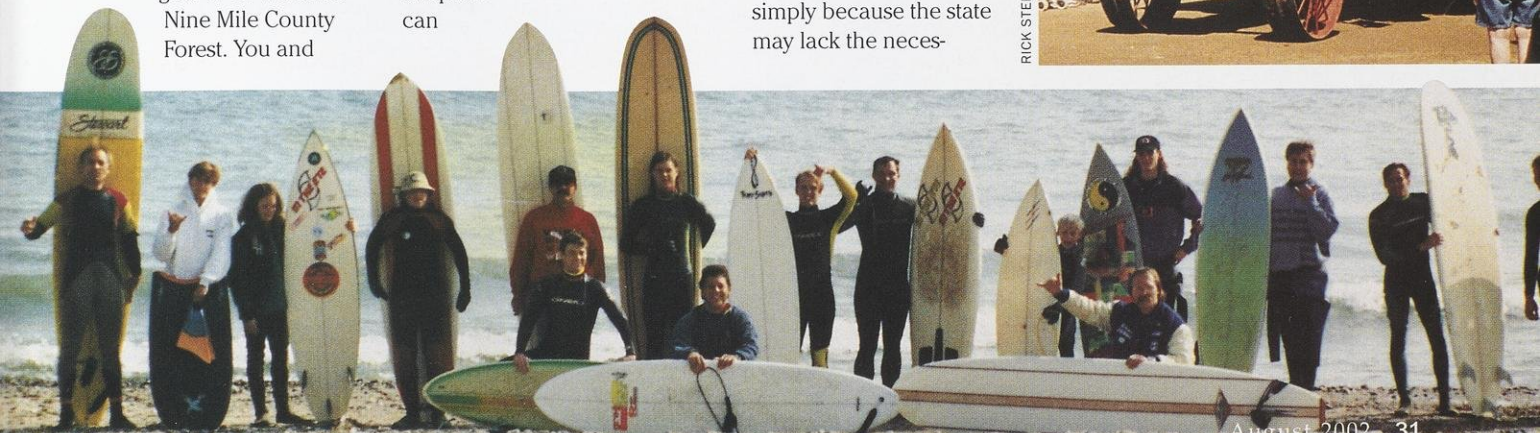
A true Wisconsinite is never held back from practicing a favorite form of outdoor recreation simply because the state may lack the neces-

sary...uh, equipment. Those who plan to participate in the **Dairyland Surf Classic**, August 31–September 2 on Sheboygan's lakefront, are perhaps the most endearing of our perennial outdoor optimists. The largest freshwater surfing event in the world, the DSC includes surfing and paddling competitions, a surfboard show, and a Saturday night surf party. Although it can't quite cough up the big waves like those at Waikiki, Lake Michigan has been known to roll some sweet and sassy breakers from time to time. If you haven't forgotten how to hang ten, take your Woody out of mothballs, grab your board, call Moondoggie and Gidget and the rest of the gang, and enjoy your own surfin' safari right here in the Badger State. (920) 457-1209. ☞

Badgers warm up for fun in the August sun. (left) Dragon boat races will be held in Superior. (below) The steam and gas engine parade heats up in Edgar and (bottom) boarders ride the waves at the Dairyland Surf Classic in Sheboygan.



RICK STENCIL (BELOW) LEE WILLIAMS



Wisconsin, naturally

SPRING GREEN PRESERVE STATE NATURAL AREA



Notable: Dry sand prairie, oak barrens and sand dunes known as the "Wisconsin Desert." Situated on a sandy terrace of the Wisconsin River and bordered on the north by a steep, limestone-capped bluff, this natural area

harbors plants and animals adapted to hot, dry, harsh conditions. Prickly pear cactus, wolf spiders, and a variety of lizards and snakes are found here.

How to get there: From the intersection of highways 14 and 23 north of Spring Green, go north on 23 for 0.5 miles, then east on Jones Road 0.75 miles, then north on an access road marked Angelo Lane to a parking area. Owned by the Wisconsin Chapter of The Nature Conservancy. *Wisconsin Atlas*: page 34, grid C3.



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