Wisconsin natural resources. Vol. 32, No. 6 December 2008

[Madison, Wisconsin]: Wisconsin Department of Natural Resources, December 2008

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WISCONSIN NATURAL RESOURCES

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Celebrating 25 *years* of endangered resources success

Piecing together nature

Green pastures, green futures

Making tracks

Winter wanderers

The only true lark species in North America, the horned lark congregates in winter flocks ground feeding on weed seeds. The species is philopatric, returning to its birthplace each year for breeding and feeding following migration.

BILL SCHMOKER

Larks and buntings are a welcome, but spotty winter find.

Anita Carpenter

Wisps of snow dance across the country road between fields covered with six inches of sparkling white. I'm out on this crisp day searching for winter birds that like wide-open, windswept places. With miles of travel already behind me, it's becoming a slow birding day. Many snow-covered clods catch my attention. I check each one hoping to find a sleepy-eyed snowy owl. Today, they prove elusive.

Finally several small, slender, seven-inch birds run nervously along the road, darting here and there, pausing often to pick up seeds. A few fly up, circle low around the field and return to the road. Horned larks, *Eremiphilia alpestris*, are always a delight to see with their tiny black "horns," yellow chins and black breast bands. As I linger to enjoy the birds, more magically appear. The flock eventually grows to include an incredible 200 birds, the largest flock of horned larks I've ever seen. These birds should be farther south but nature is always full of surprises.

continued on page 29

WISCONSIN NATURAL RESOURCES

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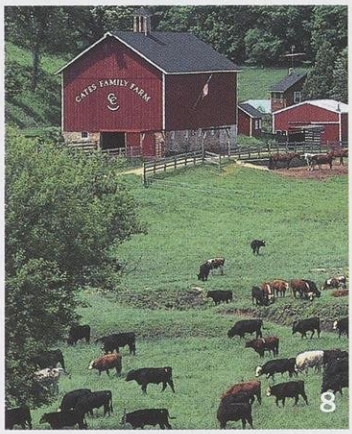
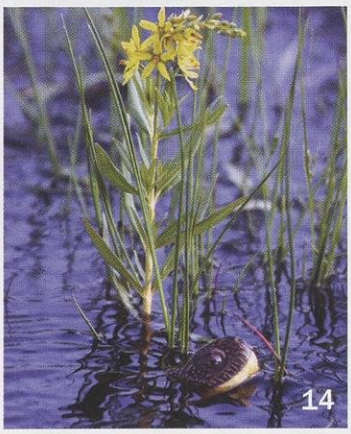
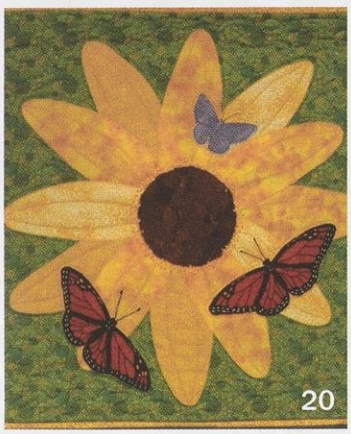


ROBERT QUEEN



SHANE RUCKER



ROBERT QUEEN

FRONT COVER: Celebrate the dividends of your 25-year investment in the endangered resources tax checkoff. A state recovery program for trumpeter swans (*Cygnus buccinator*) starting in 1989 aimed to establish 20 breeding pairs. Now Wisconsin is home to 128 breeding pairs in 20 counties, with an estimated flock size of 650-700.

DON BLEGEN, Spring Valley

BACK COVER: Fern Dell Gorge State Natural Area in Sauk County. (*Inset*) Common polypody fern (*Polypodium vulgare*) For more information, or to order a guidebook to State Natural Areas, contact the State Natural Areas Program, Bureau of Endangered Resources, DNR, P.O. Box 7921, Madison, WI 53707 or visit dnr.wi.gov/org/land/er/sna.

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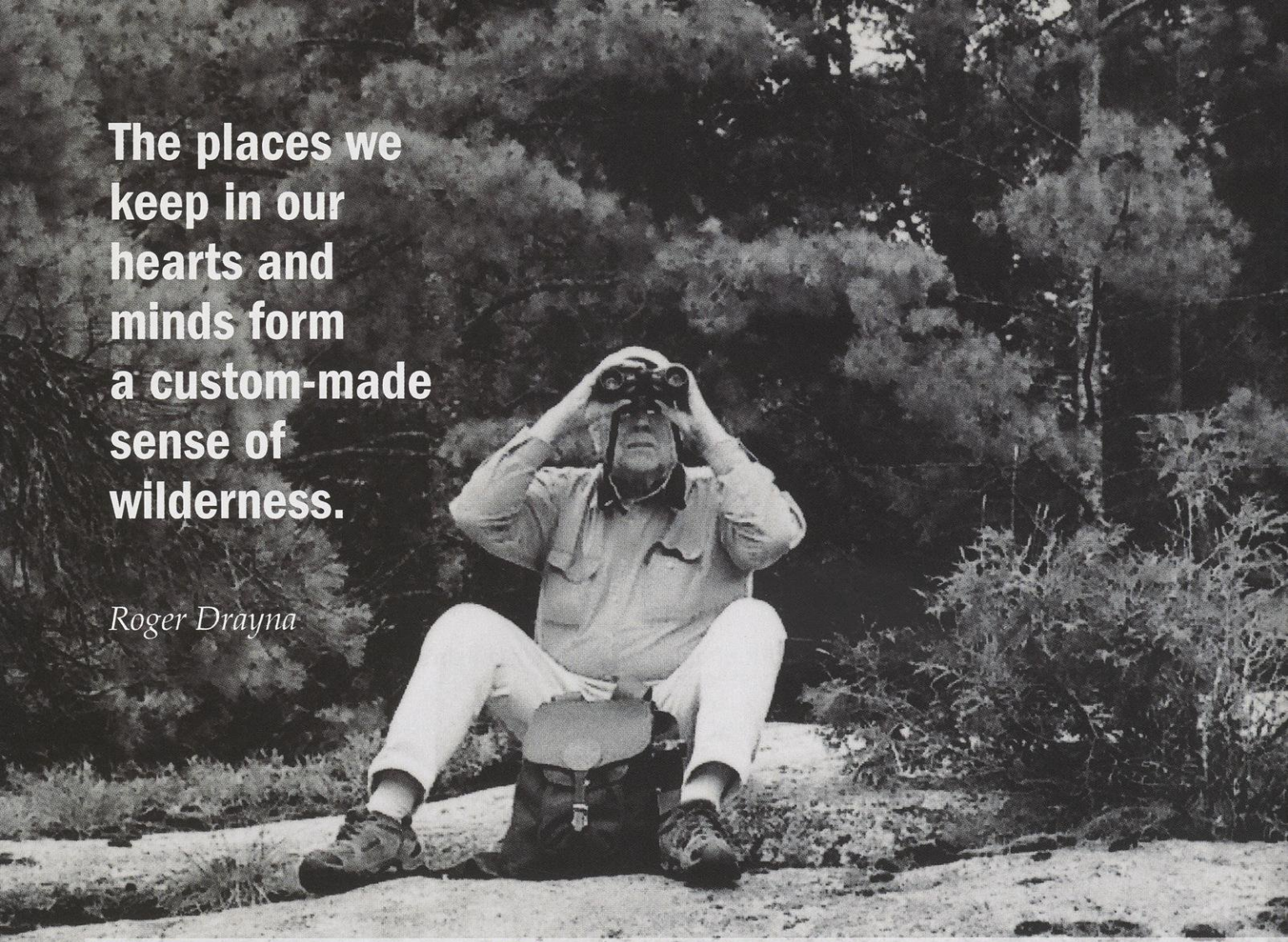
PUBL CE-012
ISSN-0736-2277

Wisconsin Natural Resources magazine (USPS #34625000) is published bimonthly in February, April, June, August, October and December by the Wisconsin Department of Natural Resources, 101 S. Webster St., Madison, WI 53702. The magazine is sustained through paid subscriptions. No tax money or license fees are used. Preferred Periodicals postage paid at Madison, WI. POSTMASTER and readers: subscription questions and address changes should be sent to Wisconsin Natural Resources magazine, P.O. Box 7191, Madison, WI 53707. **Subscription rates are: $8.97 for one year, $15.97 for two years, $21.97 for three years. Toll-free subscription inquiries will be answered at 1-800-678-9472.**

Printed in the U.S.A. on recycled paper using soy-based inks in the interest of our readers and our philosophy to foster stronger recycling markets in Wisconsin.

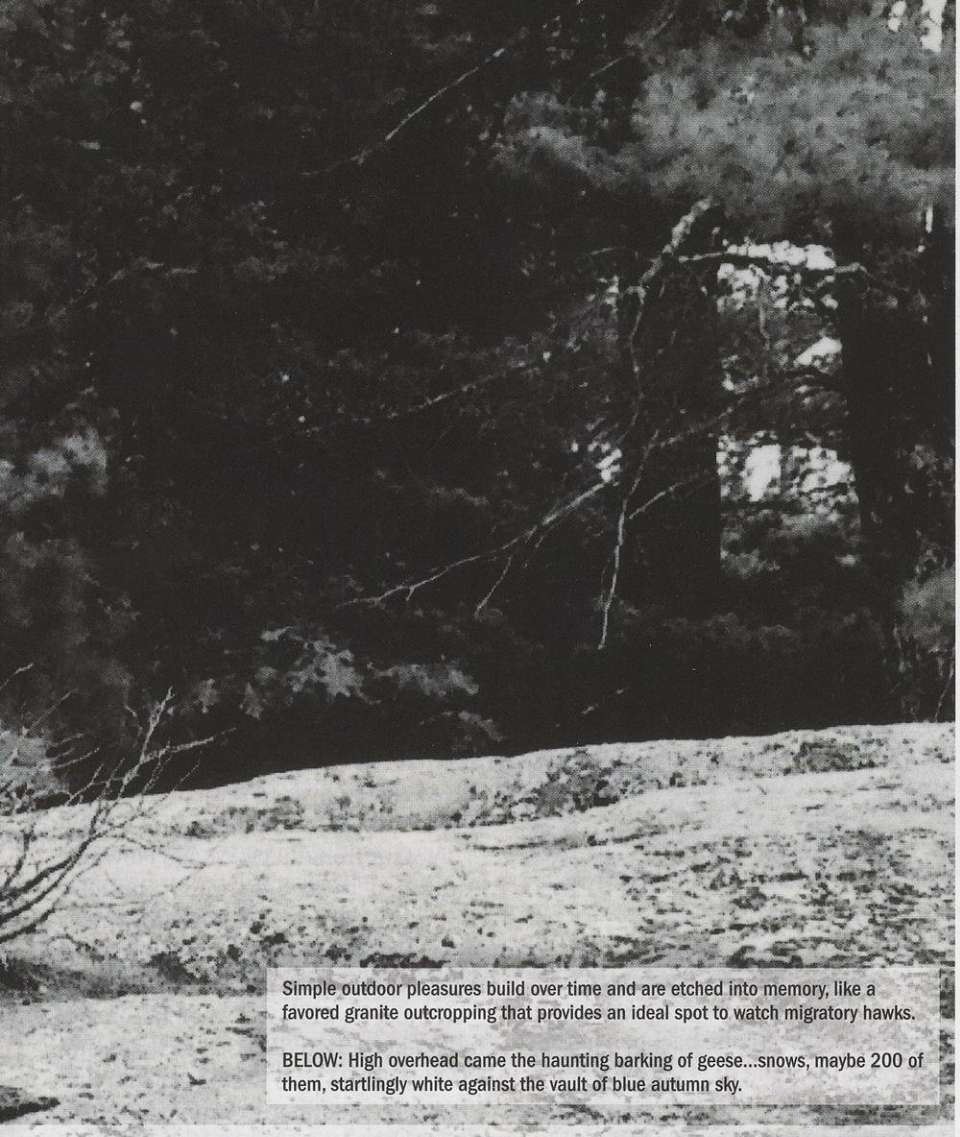


The places we keep in our hearts and minds form a custom-made sense of wilderness.

Roger Drayna

THE GATHERER

IT'S DIFFICULT TO RECALL HOW MY COLLECTION GOT STARTED. It could hardly be called acquisitiveness. Other than a desultory boyhood run at stamp collecting, a Navajo rug and a Hopi pot from our Southwestern days, and my father's baptismal certificate executed in Cyrillic script, there is not much of the pack rat in me. ■ It got started, I guess, "Behind the Pattison" (see our August 2007 story). If that doesn't strike you with household familiarity, your education in Wisconsin geography has not been neglected. Behind the Pattison was simply the whole province of fields and brushy woods stretching away from the back door of the Martin Pattison Elementary School; it has meaning only for kids who grew up in Superior from the late 1930s through the World War II years.



Simple outdoor pleasures build over time and are etched into memory, like a favored granite outcropping that provides an ideal spot to watch migratory hawks.

BELOW: High overhead came the haunting barking of geese...snows, maybe 200 of them, startlingly white against the vault of blue autumn sky.

ROBERT TUMAN

TERRY SPIVEY, USDA FOREST SERVICE

To the maternal inquiry, "Where are you going?" we'd answer, "Behind the Pattison." Our mothers, who thought it meant the playground or the baseball field, were stunned when, at last, they realized that Behind the Pattison reached as far as the Nemadji River — a good four miles south of town. It was a whole world of endless fascination; a place for kids to wander and wonder and learn, and to cause parents to worry when we came straggling home after dark. All of those adventures remain vivid in my memory and are a part of my collection.

One that stands out over sixty years later is an early Saturday morning in late October. I can picture myself yet, hip-booted and knee-deep in an oozy bottomed, ice-rimmed pothole, just lifting a large muskrat, very sodden and very rigid, from a drowning set. In 1945, its pelt would bring two and a half bucks. Hopalong Cassidy went for a quarter at the Palace Theater matinee. All these years later, I can sense the excitement, the nearness of affluence, as I dropped it into my pack.

At that very moment, high overhead, came the haunting barking of geese. I craned my neck to search for them. They were snows, maybe two hundred of them, mostly in one large wavering vee, startlingly white against the vault of blue autumn sky. In breathless reverence, I followed the receding whiteness as it dimmed with distance. Then, they were gone. Ever more faintly, the barking continued. Then, it too, was gone.

The scene is burned into my memory. The skinny kid trapper, the pond, the scraggly willows and popples already gone to the grayness of winter, the sky and the geese. My geese. Forever my treasure. More valuable, I would understand at last, than the lump of muskrat in my pack.

I can still find that pond and deliberately seek it out, now and then, when my travels take me to the Head-of-the-Lakes. It is not very impressive, less so since it is now hemmed in by an oil refinery and offensive petroleum smells assault my nose as I push through the tall swamp vegetation to get a better look. But, it still speaks to me of solitude and bleak beauty and the love of

ROBERT TUMAN

A quarter-mile down from the Woods Flowage trailhead surrounded by cedars and pinnacle-topped balsams, the author will cast for thick-sided trout and do a little bird-watching.

wild places that awakened within me as I roamed the reaches Behind the Pattison.

Unlike the pond, which is mythic, most of my wild places remain beautiful, and I visit them now and again for what they promise of wilderness — even just a momentary glimpse of it.

Along the headwaters of the Bois Brule River up in Douglas County, I can thread my canoe through gauntlets of Ice Age boulders where, close by each shoulder, ragged black spruce stab at the sky and cedars arch over the stream. There may be other canoes ahead or behind me, but their sounds make me think only of the voyageurs who once fought their way up this strong-willed river in search of the Northwest Passage. Aside from that, I hear nothing but the wind and the small sounds of flitting warblers; this could be an Alaskan river.

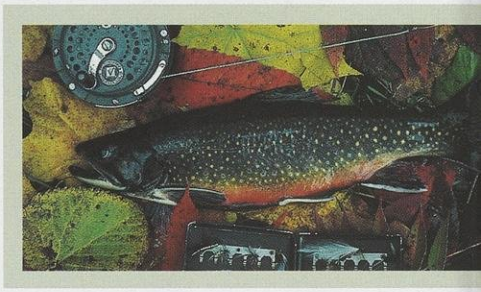
On clear days, heading west between Hurley and Ashland, there is a sweeping panorama just as U.S. 2 swoops down from Birch Hill. Away to the northwest, beyond the forested miles of the Bad River Indian Reservation and the Kakagon Sloughs, Chequamegon Bay spreads itself in horizontal brightness, a sheet of hammered silver, merging itself with the vastness of Lake Superior. Beyond the Bay, there is a rampart of hazy green, the backbone of the Bayfield Peninsula. It is one of the few places I can sense wilderness without even raising a sweat.

In Marinette County, a slanting ramp of granite juts out not far north of Highway 8. I hike to it so I can sit in the warm April sun and consider tufts of moose moss holding to its coarse face and pine seedlings jamming roots into crevices. Often, for the hawk migration is underway in that season, I'll watch a redtail move in effortless circles, tip its wings, and slide away on the wind.

Several miles cross-country, a spring bursts icy-cold and gin-clear from among the roots of white cedars. Although fishermen, coaxing brookies from beneath the tangle of logs in the K. C. Creek, pass within a hundred feet of it, I've never seen a human footprint in the soft, shadowy earth around it.

There are few places, these days, where water is beyond the reach of the parasitic giardia. Still, nothing but sand hills and gravel ridges stretch away for miles in the direction from which this spring gathers its water. I never hesitate to kneel on the wet carpet of forest debris, plunge my face into it and gulp. My cheeks tingle, my lips become numb and there is momentary aching of my teeth. On a hot July afternoon, these are rewards.

Brook trout in fall spawning colors are as vivid and spectacular as the leaves.



Maxwell Spring in Langlade County is a place where the brook trout, bellicose and aflame with color, begin to gather each October answering the primordial command to perpetuate themselves. I try never to miss this celebration of species continuity.

Not far from there, Woods Flowage, embraced by cedars and pinnacle-topped balsam firs, is good for thick-sided trout, warbler migrations and spicy watercress to garnish a salad.

I must be a slow learner, because it took a good two decades of following these seasonal rites until I realized that I had put together an unusual collection. That idea just sort of emerged in my consciousness like dawn revealing a world of promise around our boyhood campsites. What it is, and continues to become, is my personal, custom-made wilderness, assembled from the places I have known and loved and which please me greatly.

Within its amorphous boundaries are hidden valleys where spring flowers carpet the hardwoods with incredible profusion. There are Lake Superior shorelines, sometimes placid, sometimes booming and groaning with heaving floe ice, sometimes thundering with fearsome power.

A towering moraine in Lincoln County is unfailing for sunsets, for facing a raw November wind, and for listening to the first hard snow crystals rattling among the russet curls of oak leaves.

Sometimes I give names to places, but they will never appear on any topo map. One of these runs through my woods in the Harrison Hills and only to me is it known as the Long Road; it leads

"Our ability to perceive quality in nature begins, as in art, with the pretty. It expands through successive stages of beautiful to values as yet uncaptured by language." – *Aldo Leopold*

me farther into the Hills than any other.

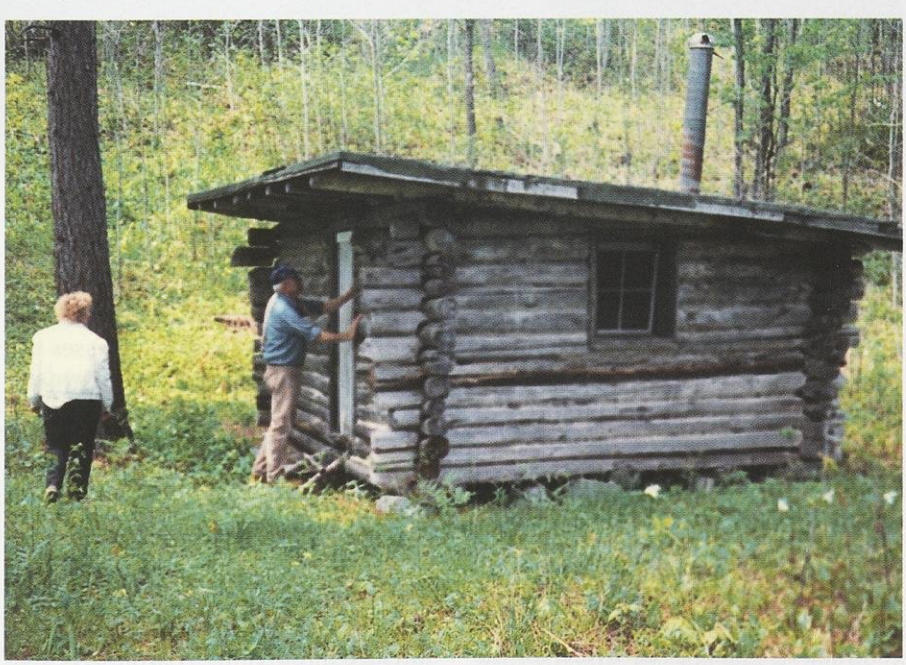
The crown jewel of my collection is a Norway pine grove near the Michigan border. I first visited it back in 1952 when my wife's father hiked me to it. I had borrowed my dad's car to drive Marcy home from college. She had not yet agreed to trade in her sturdy Scottish surname, Ramsay, for my Slovakian one — but I was working on it. The pines, there are about fifty of them, are hidden on a sandy flat enclosed by a U-shaped ridge — on eighty acres Neil had acquired two decades earlier. They are "volunteers." In the lexicon of foresters that means they grew from seed windborne from a couple of really big Norways up the steep slope to the west. When first I saw them, they were not impressive, but he liked them, saw the promise they held. They were maybe twenty feet tall then and five or six inches in diameter. Today, they reach up almost a hundred feet, and I can barely get my arms round them.

The place was a favorite of Neil's; over time, it became a favorite of mine. He helped me build a crude little cabin among them; when our kids were little, Marcy and I would take them there for overnights.

In the spring, I can search out trailing arbutus hidden among layers of fallen needles. Later, delicate blue harebells nod in shafts of sunlight. Almost every year, a bear comes through, reaches as high as it can, and claws bark from the same tree asserting territorial rights.

Neil died in 1991, not far from ninety. He was tall and lean and straight — like his trees. Almost to the last, he loved to walk and did so with the easy grace of an athlete. In honesty and physical toughness, he was as uncompromising as these rugged hills and the Highlands of his forebears.

A month or so after he died, I felt the need to visit his woods and struck off through the residual snow of March. Four miles later, I sat admiring his pines and thinking about him — the rivers we had paddled, the trout we had caught, and the grouse we sometimes tumbled out of swift flight.



ROBERT TUMAN

This spare cabin provided a base for family overnight trips to Neil's Grove.

Suddenly, that light went on again. I recalled Jim's Grove, a clump of alpine fir where climbers bivouac before taking on Long's Peak out in Rocky Mountain National Park. In that instant, I knew, for me, this place would always be *Neil's Grove*.

I played with the thought as I finished off the last of a thick meat sandwich and drained my thermos of coffee. Then, I cinched up my pack, and started the long walk back to warmth and companionship. Crossing the low ridge, I took another look. Neil's Grove. Perfect!

The Wilderness Act of 1964 was enlightened legislation, and its goal of 61 million acres preserved as true wilderness has now been exceeded. Keeping some natural treasures forever wild is certainly a reasonable commitment for the richest nation in the world. Roads don't have to penetrate every fastness, and every tree need not be calculated in board feet. But we can get to these "real" wilderness areas only occasionally — if we are lucky.

So, I go about this business of gathering these small places where I can get the feel — if only briefly — of the wild, the unspoiled and the lovely.

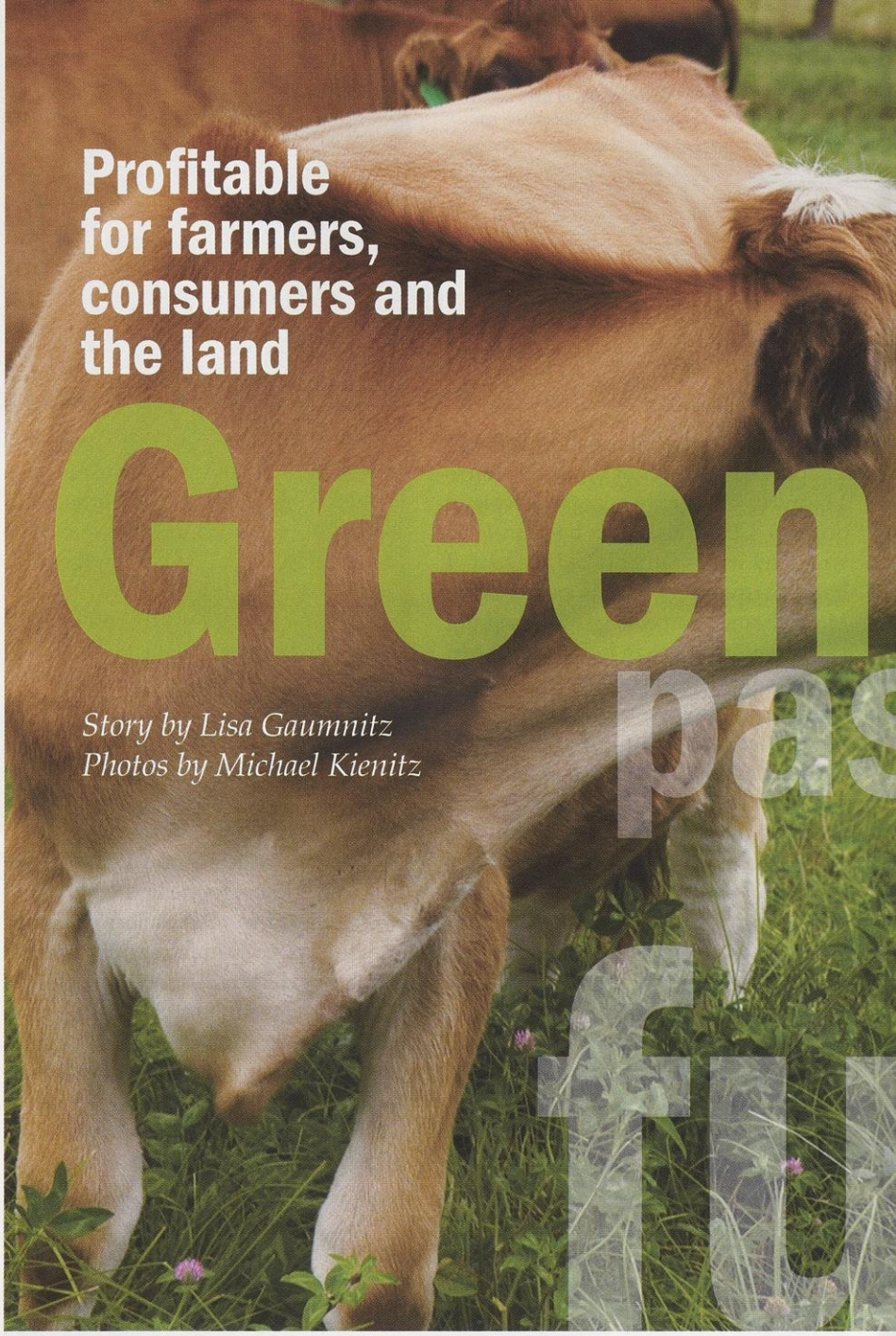
"Our ability to perceive quality in nature begins," said Aldo Leopold, "as in art, with the pretty. It expands through successive stages of beautiful to values as yet uncaptured by language."

That, I suppose, is the whole point. This collection is mine, because it is a part of what I am.

Yet, what is mine may be yours, as well, for reasons known only to you — if they can, indeed, be known. You may be moved by feelings deeper and more profound than mine.

The 107 million acres now designated as wilderness are an achievement. But, let us never forget the importance of the small triumphs like Behind the Pattison and Neil's Grove. Governmental edicts do not protect them. Only our sensitivity and our vigilance can do that.

Writer, retired teacher and former public relations director Roger Drayna lives in Wausau.



Profitable for farmers, consumers and the land

Green pas ful

Story by Lisa Gaumnitz
Photos by Michael Kienitz

To fish biologist Dave Vetrano, a cow with its nose deep in clover on a managed pasture is an ally for Wisconsin trout streams — not a threat. To fourth generation dairy farmer Larry Wilkinson, it's a proven pathway to a better life for himself, his wife, and their livestock.

And to Dick Cates, a beef cattle producer and founder of a University of Wisconsin program for beginning livestock and dairy farmers, it's the future. "We think in the long run that it's going to be the viable means for family farms to survive," he says.

Managed grazing, once the Rodney Dangerfield of the agricultural world, is getting more respect.

A growing chorus of farmers, agricultural agents and academics advocate putting livestock out to pasture instead of feeding them stored corn or some other forage year-round. They say it's better for the farmer, the livestock, the consumer and the environment — and a growing body of research backs them up. The UW-Madison Center for Dairy Profitability recently found that grazing farms in Wisconsin retained 26 percent of their business earnings, compared to 14 percent for confinement farms and 21 percent for organic farms. Farmers managing grass-based systems reported significantly higher satisfaction with their lives than most other dairy farmers, another UW-Madison study found.

Most importantly, farmers are voting with their feet. Now, nearly one quarter of Wisconsin dairy farms use managed grazing, one of the highest rates in the nation. Fully 50 percent of new farm start-ups in dairying are managed grazing operations.

They are spurred, in part, by the rising costs of feed, fertilizer and fuel, aided by growing state and federal infrastructure to provide farmers the technical help, research and education they need, and lured by markets eager to capitalize on a growing public appetite for grass-fed and organic products.

"We were attracted to rotational grazing because it looked economically preferable and certainly a better way to manage a dairy herd," says Mike Gingrich, who partners with his wife and another couple in a grazing farm that produces its own specialty cheese. "We feel it is a much better way to produce milk. It's easier on the land, easier on the animal, and easier on the farmer. Neither Dan nor I are enamored of equipment. So this suits us very well."

Taking the leap and loving it

Conventional farming methods popular since the end of World War II typically involve the farmer growing, storing and hauling feed to livestock confined to a barn or barnyard for the most part. Unless the farmer purchases all or most of the feed, he invests in a lot of machinery.

In a managed grazing system, farmers bring the livestock to the food — a buffet of lush, seasonal grasses the animals graze on for a day or two before moving them to another field. Farmers let the cow chips fall where they may, the animals sleep under the stars, and each pasture gets 20 to 30 days of growth and rest before the next dinner bell.

Larry Wilkinson switched to managed grazing in 2000 after careful study, tutelage through the Wisconsin School for Beginning Dairy and Livestock

Dick Cates shows dairy and livestock farmers by example how putting cows out to pasture is less costly, uses less energy, takes less machinery, makes less work and is better for the land while producing healthy products that consumers prize.

tures, green tures

Grazing dairy and beef cattle on grass meadows is lighter on the farmer, the herd, the land and the wallet.

Farmers, and seeing operations of farmers who had successfully made the leap. But what really sold him was the chance to quit being a personal valet to 35 to 40 dairy cows.

"I had to carry all the feed to them and haul the manure out afterwards," says Wilkinson. "With a managed grazing system, the cows could all of a sudden feed themselves, and I didn't have to take a shovel and clean up after them after they were done."

On a recent late summer day, Wilkinson demonstrated his labor- and back-saving routine at his Loganville farm nestled among the rolling hills of Sauk County. The sun was setting as 18 dairy heifers grazed on a mix of orchard grass, rye and clover in the first of a series of 50 x 150 foot fields separated by movable electric fencing.

Wilkinson grabbed a bucket of feed and poured it in a trough in the middle of the field with the cows, saying, "I gotta keep the animals busy so they don't bother me. I have about five minutes to move the wire."

He strode the length of one fence, pulling out the temporary guides that held the electric wire in place and then let the wire retract into its holder before hanging the spool on a fencepost. On the opposite side, he picked up another wire spool, started to wind it and then

Simple fencing lets the herd feed on grass for a day or so before it is moved to a fresh paddock.

threaded it through the guides he placed every 30 feet or so apart.

"This is enough to feed the cows for 24 hours," Wilkinson says. The rule of thumb is you need one acre of pasture for one cow for one year. His cows graze from May 1 to early October and stay on the pasture until late November before wintering in a barnyard, then they eat the hay and corn Wilkinson grows to cover the winter months. He uses a similar number of acres that a more conventional farmer would use for raising feed.

"Tomorrow, I'll move the wire behind us. That way they won't eat the new growth off of the field we just took them off of."

By now, one cow had turned away from the trough to the fresh greens. Her bovine brethren followed, pushing their noses deep into the grass, filling the twilight with the sounds of contented chewing.

"Look how peaceful it is," Wilkinson says. "This is my way of going green. You don't smell any diesel and I use few if any chemicals. Instead of bringing machines across the ground, I'm bringing the animals."

Managed grazing has reduced the pressure of constant deadlines, of being on time to plant, harvest and store at the right time to produce high quality rations. "You kind of let nature do a little bit more of the work," he says. "Years ago, I'd see a cornfield with quack grass and I'd want to get rid of the grass. If I see it now, rather than fighting it, I turn the cows out there."

He's also had to change how he views the profitability of his operation. His grazing cows don't produce as much milk per cow, in part because he's switched to breeds that do better on grasses but tend to produce less milk. However his production costs have decreased significantly and he no longer has to replace cows as frequently as he did. Their "culling" rate is now 15 to 20 percent, compared to 30 percent, when he replaced one of three cows every year.

The farm's financial success has brought other benefits. "It's made it a lot less stressful because I don't have to work off the farm," says Tina Wilkinson, Larry's wife. "Before, I was working third shift. When you work 40 hours and have an hour driving each way to Middleton (for the job), that's 50 hours a week before you get home and have to help out on the farm."

They sell their milk into the conventional market and could switch to the organic market pretty easily to get a higher premium, Wilkinson says. But they're happy with what they're doing, and have been able to double their herd to 80 cows. They plan to expand even more in coming years, an encouraging sign in a state that loses typically 1,000 family farms a year.

"I think this is a very good time to be a grazing farmer," Wilkinson says.

Down the road a piece, Mike and Carol Gingrich and Dan and Jeanne Patenaude would be hard pressed to argue.

After raising their children on conventional dairy farms in Iowa County, they pooled resources in 1995 to buy a larger farm near Dodgeville. They wanted to expand more fully into managed grazing, which Dan had been pursuing on a small scale after being inspired by the success and research of his brother-in-law in Vermont, and figured they needed more land and more animals to reach the "sweet spot."

The couples quickly found that even with more cows and land, they had less work and "were kind of tripping over ourselves on every management decision," Gingrich says.

"I thought we had some special flavor properties in our milk that we could take advantage of using in some value-added product, like cheese. We had just been putting it on a truck with everybody else's milk and the flavors were being diluted away."

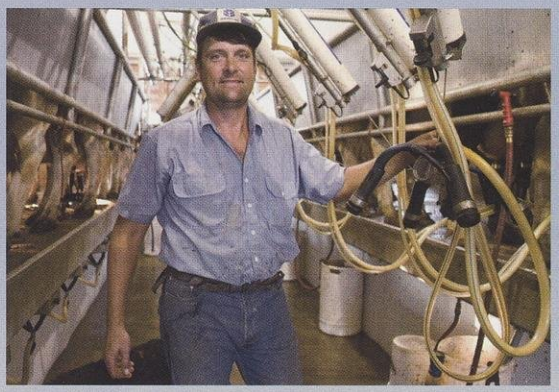
The partners decided to divide up the duties, with the Patenaudes continuing to run the grazing operation and the Gingriches taking on cheesemaking. They started making cheese in 2000, first using the facilities at Cedar Grove and then building their own plant on the farm in 2004. In their first year of commercial production, they won "Best of Show" from the American Cheese Society, propelling them to instant national fame and onto the shelves of top chefs and high-end stores.

"We do a number of things in the interest of maximizing the complexity and intensity of flavor," Gingrich says. Within minutes of milking the last cow in the morning, Gingrich is making cheese, and he only makes it when the milk is in peak condition because the cows have a lot of different grasses to choose from. The Gingriches don't pasteurize the milk. They wash and turn the cheeses daily, and they keep the cheese in "caves," rooms that are kept at high humidity to enhance and accelerate the aging process.

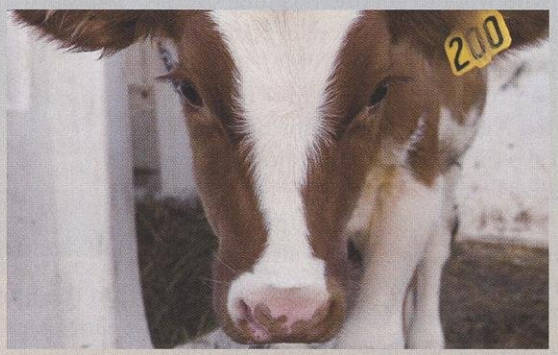
Sold under the Pleasant Ridge Reserve label, their cheese is now found all over the United States, as is the cheese that other Wisconsin specialty cheese makers produce from their milk.

Pleasant Ridge Reserve has made 60,000 pounds a year in recent years, significantly less than their capacity of 100,000 pounds, and a sign of the drought that has plagued south central Wisconsin in recent years. Their pastures have dried up and become less than optimal earlier in the summer.

"If we have to supplement more



Breeds that are efficient grazers don't produce quite as much milk, but since production costs are much lower and cows that graze on grass are replaced less often, this kind of farming can be more profitable.



Animals grazing pastures harvest their own feed and dispose of their own waste without human intervention, machinery or fossil fuels, notes food policy writer Michael Pollan.

"This is my way of going green," says Larry Wilkinson. "You don't smell any diesel and I use few if any chemicals. Instead of bringing machines across the ground, I'm bringing the animals."

than three to five pounds of hay a cow, we stop making cheese. Usually by mid-August, we get better rains and nice pasture in the fall."

They looked into irrigating their land, but decided against it. "We're captive to Mother Nature," Gingrich says. "When she's good to us, times are good. [With this system] when she's not, times are still good."

What it does to the land is magic

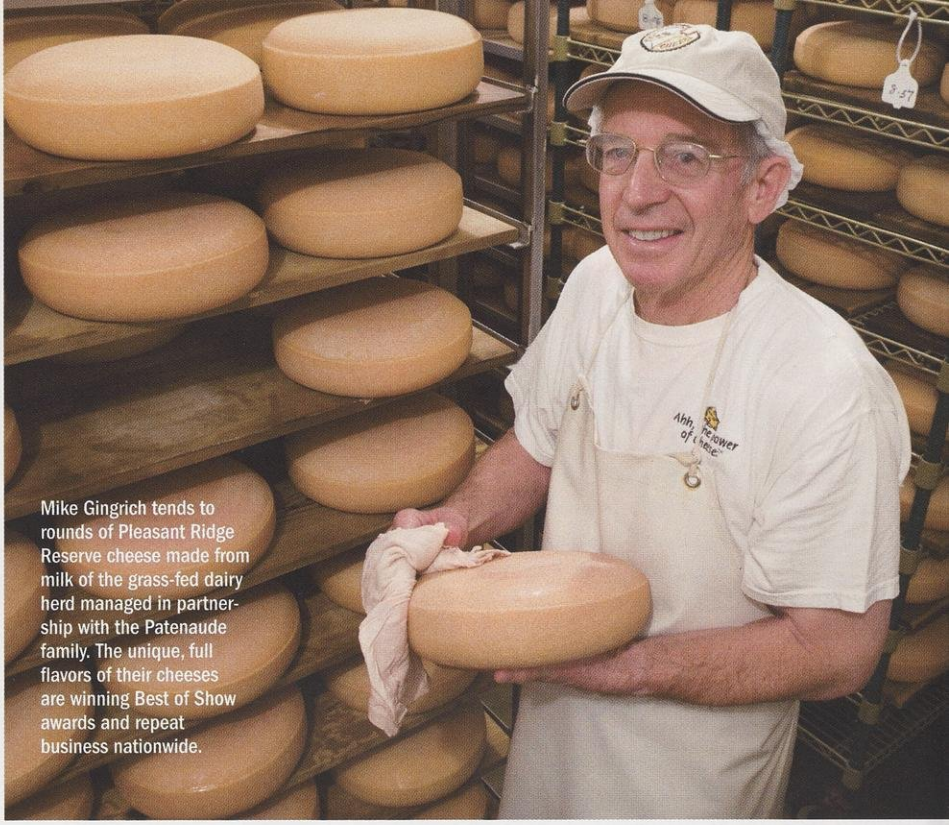
Managed grazing is even better for people who want to get into farming, Cates says. It's why the Wisconsin School for Beginning Dairy and Livestock Farmers, a program of the Center for Integrated Agricultural Systems he started in 1995 on the Madison campus, emphasizes managed grazing.

"It's a lower capital approach to farming," he says. "Young farmers typically have more energy and less equity."

The challenge for would-be farmers is to understand how to work on their business, not in their business. "Think about what you're good at, what you like, what are your goals," he says. "Then you have to find a way to get mentors, or a community of people who care about your future, and partner with those who have the fields you don't have. Barter, lease, contract — whatever you need to do. And then you have to own the animals."

There are new market opportunities for organic milk and grass-fed beef, enabling farmers to buck the conventional wisdom that they must get bigger to make money or more money.

The Cates Family Farm near Spring Green is a case in point. Originally owned by his father, a well-respected Madison lawyer, as a place to get away from it all and have his kids learn the value of hard work on neighboring properties, the farm got into Dick Cates' blood and eventually passed into his hands. After returning in the 1980s from a stint working at the world's largest dairy farm in Saudi Arabia, Cates, his wife, Kim, and three children, started restoring the farm to pasture. Eventually, the grass-based operation grew to finishing up to 800 beef cattle at farms scattered across several states.



Mike Gingrich tends to rounds of Pleasant Ridge Reserve cheese made from milk of the grass-fed dairy herd managed in partnership with the Patenaude family. The unique, full flavors of their cheeses are winning Best of Show awards and repeat business nationwide.

They pared back to 40 to 60 animals on the Spring Green farmstead after Kim Cates realized that the operation's size was only leading to ever more debt, work and stress, even with a grazing system. "Kim is the one who saved my life," Cates says.

The Cates' now buy beef and dairy steers from the beginning farmers who have gone through his program, and grow the animals out from about 300-600 pounds to 1,000 pounds on a series of 20 managed paddocks.

"I do very little on the production side; the emphasis is on customer relations and producing a product that the marketplace wants," Cates says. "We sell to households, stores and restaurants and we get a good price for that."

As important as the financial and lifestyle benefits managed grazing brings to himself, his family and his students, Cates appreciates what it does for the land.

"Historically, this was grassland. With our industrial mindset and yeoman mentality, we were tillers of the earth. The government, through the Homestead Act, offered individuals 160 acres and said, 'You till the earth and it will be a Garden of Eden.' So we went out and turned up the grassland, which was naturally fertilized, burned the organic matter out, and now we have to artificially fertilize it."

With managed grazing, he's working with what this land wants to be.

"Although we don't have natural fire any more, by moving livestock around from pasture to pasture, we're mimicking the natural grazing habits of the elk and bison that were here before settlement. We've replaced the predators — wolves — with the land manager, me, and replaced wildfire with a mowing machine so we keep woody brush from growing. The way it treats the land is what's so magic."

Vetrano, a veteran DNR fish biologist and rock star in the world of trout stream restoration, believes in that magic. He sees it reflected in the streams running through Cates' farm, the managed pastures in southwestern Wisconsin where he works, and on his own acreage near Bangor, where he raises a dozen beef cattle.

"If we could get more farmers into grass-based farming, most if not all of our concerns would disappear: erosion, manure, pesticide and herbicide runoff, overgrazing — all of that," says Vetrano, who has managed trout streams in Crawford, Monroe, La Crosse and Vernon counties for the last two decades.

If most or all of the farms carpeting the Driftless Area's steep terrain switched to managed grazing from conventional dairying or row cropping, Vetrano wouldn't have faced three major fish kills in four years due to manure

If we could get more farmers into grass-based farming, most if not all of our concerns for waters and trout streams would disappear: erosion, manure, pesticide and herbicide runoff, says DNR Fisheries Biologist Dave Vetrano, who has been managing trout stream programs in western Wisconsin for 20 years.

runoff, nor the constant battle to keep soil on the land and out of Wisconsin trout streams.

"Agriculture considers soil loss of T good," Vetrano says, referring to the tolerable (T) soil erosion rate, which typically ranges from two to five tons per acre per year, depending on soil type. "But T, from a biological standpoint, should be closer to zero. Just a little sediment entering the system at the time fish are spawning can cover fish eggs in the redds and suffocate them."

Managed grazing can actually enhance a trout fishery. Controlled foraging along a stream can help manage the excessive growth of box elder and willow that otherwise would occur. It keeps the stream corridor open, allowing for easier access by anglers, and better growth of the grasses and forbs that provide insects and other food for the fish. The brush control also keeps downed limbs out of the water, where they can trap sediment. As a result, the streams can become narrower and deeper, allowing water currents and temperatures more favorable to trout.

"The key word is it has to be *managed* grazing," Vetrano says. "Farmers limit the numbers, the time cattle are grazing. If the grasses aren't any higher than a half-inch, that's not a managed pasture."

Vetrano is so enthusiastic about managed grazing that he serves on the board of directors for The Wisconsin School for Beginning Dairy and Livestock farmers and proselytizes its benefits to fellow DNR fish managers and staff who work on animal waste and water quality issues.

"We still have a lot of people in the DNR that look at ag, and if they see cows, they think 'bad.' No. There are ways you can be in agriculture and not have all the standard issues we normally have. Managed grazing fits in very well with DNR's mission, and the farmers are maintaining a living and enjoying a better quality of life."

Lisa Gaumnitz is DNR's public affairs manager for water and fisheries issues.

MEET THESE INNOVATIVE FARMERS

Hear Larry Wilkinson, Dick Cates and Dave Vetrano in their own words and see rotational managed grazing in action in a video on our website, wnrmag.com. Click on this symbol near the listing for our story.

SEE HOW IT WORKS FOR YOURSELF

Iowa County UW Extension Agent Rhonda Gildersleeve knows from talking to conventional farmers that some of the biggest barriers to switching to managed grazing are likely in their minds.

Common perceptions are that they won't be making the money they need to support their families, especially during the transition; that they need more land than they do for managed grazing; and that managed grazing represents a big change in their farming lifestyle; none of which has proven true for those who've made the switch.

She shares the experience of Wisconsin grazers and results from studies, including a 2007 study of 38 farmers by the Michael Fields Agricultural Institute, showing that the average debt load of Wisconsin dairy farmers does not limit their ability to switch to managed grazing. They typically do not need more land than they already control, and they actually keep more profit on the farm.

Most importantly, Gildersleeve arranges eight to 12 "pasture walks" a year on managed grazing farms in Iowa, Grant and Lafayette counties. The sessions are led by the farm owners themselves and are never lectures. They are always on-farm discussions that allow farmers to share their experiences and approaches to problems. What works and what does not, she says.

That same "kick the tires" approach permeates the curriculum of the Wisconsin School for Beginning Dairy and Livestock Farmers. The five-month long certificate course provides for on-farm internships, one-on-one mentoring with experienced farmers, and classroom learning that pairs discussion from an academic expert with a farmer reporting how it worked in the field.

That combination has proved very successful. About 270 students have passed through their doors and 75 percent of them are now farming. Of those, half are using managed grazing.

To find a pasture walk near you in 2009, go to Grassworks, a membership association of farmers who promote successful and sustainable farming through the use of managed grazing. grassworks.org

To learn more about the Wisconsin School for New Dairy and Livestock Farmers visit the Center for Integrated Agricultural Systems. cias.wisc.edu/dairysch.html

Gifts that kee

Enjoy this sampler of the natural riches that your support for the endangered resources tax checkoff has brought in the program's first 25 years.


HERBERT LANGE


VIC BERARDI


JOEL TRICK


JACK BARTHOLMAI

Story by Kathleen Wolski

Bald eagle

(Haliaeetus leucocephalus)

In July 2007, a months-old eaglet left a nest atop a white pine and took its first flight along the lakeshore. Though a common sight near rivers and on lakes in northern Wisconsin, this particular solo flight was along the Lake Michigan shoreline in Mequon, a few miles from downtown Milwaukee.

This past spring, a pair of eagles returned to the area. For a second year, after an absence of more than a century, another baby eagle took flight in southeastern Wisconsin. A permanent, secluded nesting area for these birds was secured thanks to gifts from individual donors, the Ozaukee Washington Land Trust, financial help from the Milwaukee Metropolitan Sewerage District and a state Stewardship Fund grant.

Thanks to your generous spirit, eagles soar and Wisconsin is a leader in bald eagle recovery with about 1,150 breeding pairs found statewide, the third largest population of bald eagles in the lower 48 states.

Osprey

(Pandion haliaetus)

Like the bald eagle, osprey numbers declined rapidly during the 1950s and 1960s, victims of pesticide contamination and emergent suburbs. Today, these magnificent birds with their five-foot wing spans are staging a remarkable recovery. Osprey are nesting in more than half of Wisconsin's 72 counties. Last year about 480 pairs of nesting ospreys successfully hatched nearly 570 chicks; two-thirds of these birds rely on artificial nesting platforms built by volunteer organizations and sponsored by Wisconsin businesses.

Kirtland's warbler

(Dendroica kirtlandii)

Breeding pairs of these very rare warblers were discovered in Wisconsin for the first time this summer. At least 10 of these warblers fledged in young jack pine forests of central Wisconsin on parcels owned by the Plum Creek Timber Company and managed with assistance from the U.S. Department of Agriculture, the Wisconsin Department of Natural Resources and the U.S. Fish and Wildlife Service.

Black tern

(Chlidonias niger)

Wisconsin is fortunate to host some of the largest black tern colonies in the Midwest, attracting researchers and biologists from across the country to study, band and record observations of this Species of Special Concern. Research aims to quantify its population and range in the upper Midwest.

Learn what steps *you* can take to provide further support for endangered resources at dnr.wi.gov/org/land/er/donate/

p on giving

Eastern massasauga rattlesnake

(Sistrurus catenatus)

Massasauga means "great river mouth" in Ojibwe (Chippewa), and the massasauga rattlesnake is usually found in river bottom forests and nearby fields. Historically, these snakes were found across southern Wisconsin. Records indicate thousands of them were killed in the late 1800s as the city of Milwaukee expanded. The eastern massasauga is one of two poisonous snakes in Wisconsin, and until 1975 a bounty of up to $5 a tail was paid to kill this "swamp rattler" and its cousin, the timber rattlesnake.

When the bounty was lifted, the massasauga was placed on Wisconsin's endangered and threatened species list. While some feared this protection would allow the snake to multiply out of control, their numbers actually appear to be steadily declining. Loss of wetlands and other habitat continues to be a limiting factor, and the number of snakes killed for the bounty may have reduced the population to such low levels that recovery is difficult.

Presently, massasaugas are found only in isolated areas of southeastern, central and west central Wisconsin. There is no solid evidence of how many massasaugas remain in the state; consequently, there is no recovery or management plan for this species. Life history studies have been proposed and hopefully will yield information from which a management plan can be crafted. Without such protection, the massasauga has little chance for survival.

Ornate box turtle

(Terrapene ornata)

Two of Wisconsin's 11 turtle species are threatened – the wood and Blanding's turtles – and the ornate box turtle is endangered.

The five-inch ornate box turtle is strictly terrestrial, preferring dry prairies and oak savannas with sandy soils where it can burrow deep enough to avoid freezing in winter. This turtle is slow to mature but can live 40 years or more. As its name implies, when threatened, the box turtle retreats into its shell and draws its upper and lower hinged shells tightly together. Loss of habitat, fatal encounters with cars and illegal collection by people looking for unusual pets have threatened this ancient species with extinction.

Timber wolf

(Canis lupus)

A little more than 40 years ago, the U.S. Fish and Wildlife Service designated the timber (or gray) wolf federally endangered. When wolves began to re-colonize Wisconsin in 1975, the timber wolf joined the state endangered species list.

Many wildlife advocates recognized the importance of a healthy wolf population to a diverse and healthy ecosystem. The Department of Natural Resources began intense monitoring using radio collars, winter snow-tracking and summer howl surveys. In 1980, 25 wolves in five packs were documented statewide. In the 1990s, the wolf population grew rapidly, and last year's count found about 540 wolves across northern Wisconsin and expanding southward. Federal courts recently restored national protection for the timber wolf.

Prairie white-fringed orchid

(Platanthera leucophaea)

This rare orchid that is endangered in Wisconsin and threatened nationwide grows in pockets of moist prairies and wet meadows. Perhaps as few as 400 plants remain in the 11 spots where this orchid has been identified. Restoring the higher water table, discouraging invasive plants and carefully monitoring set prairie fires may help this rare species.

Karner blue butterfly

(Lycaeides melissa samuelis)

The Wisconsin landscape supports the largest and most widespread Karner blue populations worldwide. For the past five years the Department of Natural Resources has been working with the federal government and 25 partners on a statewide Habitat Conservation Plan to ensure suitable habitat across the state for this thumbnail-sized butterfly.

Mink frog

(Rana septentrionalis)

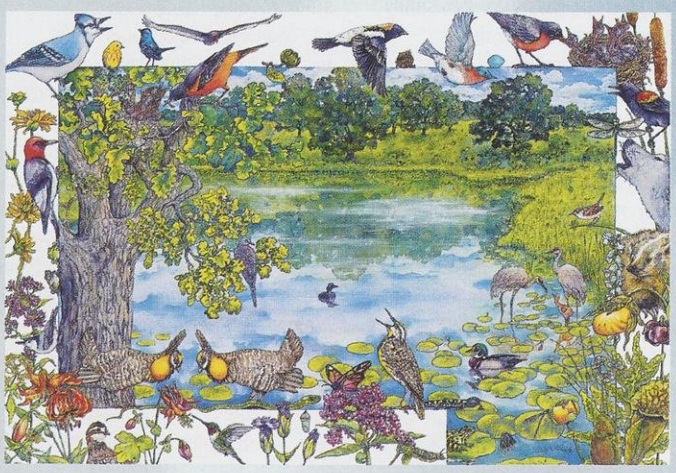
This small frog is found only in northern Wisconsin, northern Ontario and Michigan's Upper Peninsula. Its call has been likened to the sound of horses' hooves trotting over a cobblestone street. The males call while floating or seated on lily pads. Its most unique feature is its smell, a musky odor compared to rotting onions.

Sustaining the best of our natural heritage

More than 590 State Natural Areas protect remnants of our natural past and provide home and habitat for rare species. But natural areas don't protect themselves. People provide the oversight to prevent development, remove invasive species, repair weather damage and slow down succession. Here, a parcel of Spring Green Preserve in Sauk County is periodically burned to retard weedy growth and open up space for native plants, a role that wildfires used to play to maintain the sand prairie in this Wisconsin "desert." This steep bluff adjoining the prairie grades into an oak forest at the bluff top. The site is home to nearly 40 species of plants, including plains snake-cotton and Venus' looking-glass. Birds, three lizard species and invertebrates — including predatory wasps, five species of cicada, eight tiger beetles and 10 species of burrowing spiders — thrive on this property.

Kathleen Wolski is the public involvement manager for the Department of Natural Resources in Madison.

ARTFUL SUPPORT FOR THE RARE AND BEAUTIFUL

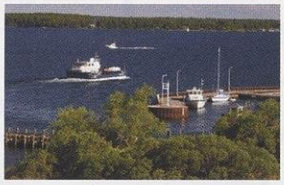


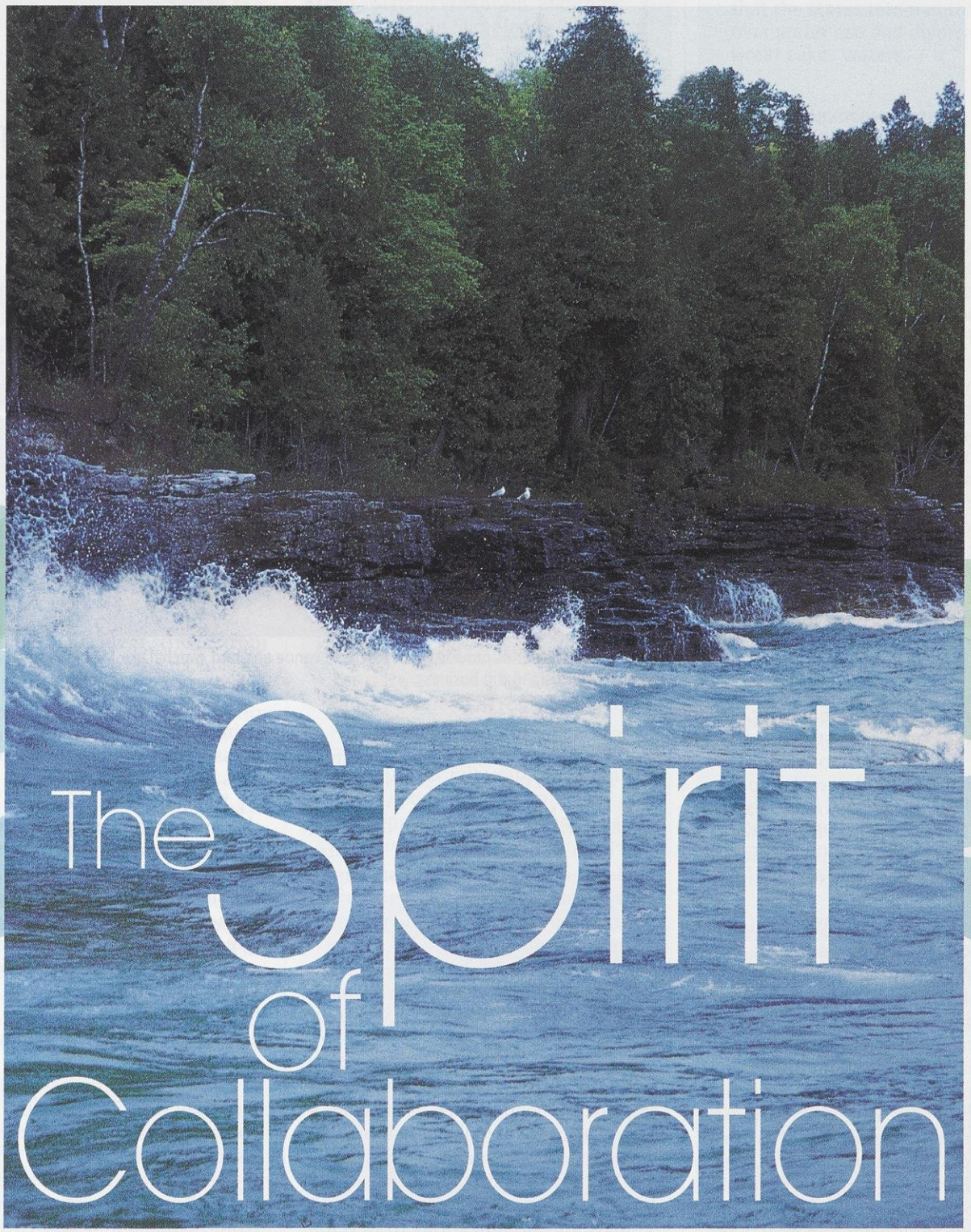
The Endangered Resources program recently received this original watercolor painting of the boyhood home of John Muir titled *Through the Eyes of John Muir*, a gift from Baraboo artist, Janet Flynn. The painting depicts species of native plants and animals in rich, vibrant colors and will be offered in an exclusive line of signed, limited edition prints, note cards and posters. Proceeds will help the Endangered Resources program continue its work.

The painting reflects an oak savanna, Ennis Lake and many colorful species of plants and animals once found at the property, including the now-extinct passenger pigeon. Muir's family settled on this land in 1849, and his life was shaped by the beautiful, diverse landscape that surrounded him.

Many people will recognize the painting as Muir Park State Natural Area, located within John Muir Park in Marquette County; one of Wisconsin's 590 State Natural Areas purchased to protect outstanding examples of native species and their habitats in our state. These properties are in place for us to enjoy now and are preserved for future generations.

WISCONSIN'S GREAT LAKES STRATEGY STEERS AHEAD.



The Spirit of Collaboration

A national treasure

GREAT LAKES PROTECTION AND RESTORATION

Have you ever dipped your toes into Lake Superior's clear, icy waters? Experienced the excitement of a Great Lakes charter fishing trip? Enjoyed a Lake Michigan sunrise or a sunset on a Door County beach?

Nearly all of us in Wisconsin live within a short distance of a world-class water resource. To the west flows the mighty Mississippi River. To the east Wisconsin is bordered by Lake Michigan. To the north lie the vast waters of Lake Superior.

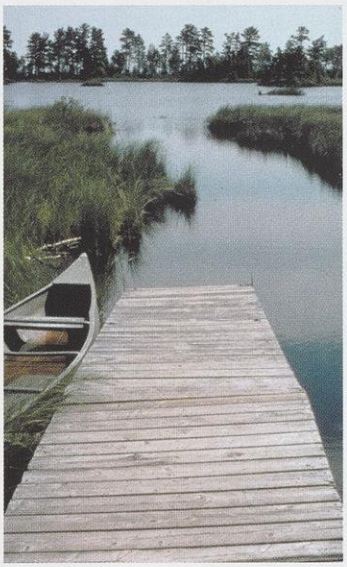
Aside from their stunning beauty, these two Great Lakes are critical to our health and welfare.

"The Great Lakes define this region and their waters sustain our recreation, our way of life and our economy," says Wisconsin Gov. Jim Doyle. "From the majestic shores of Lake Michigan to the brutal and beautiful waters of Lake Superior, the Great Lakes are not just part of our heritage, but part of who we are."

The five Great Lakes make up one-fifth of the fresh water on the earth's surface. They provide drinking water, food, recreation and transportation to more than 35 million North Americans.

"About one-third of Wisconsin lies in the Great Lakes basin," says Wisconsin DNR Secretary Matt Frank. "Through the Great Lakes watershed, Wisconsin rivers, streams, lakes and groundwater are inextricably linked."

The lakes support manufacturing and recreational industries, providing thousands of jobs. They generate power and assimilate wastewater. They form a wet highway for shipping that extends to Europe and the Far East. But, most importantly, they define and support a huge freshwater and related terrestrial ecosystem found nowhere else on earth. The future of all these uses hangs on careful management.



U.S. EPA

ROBERT QUEEN

Lake Superior wetlands provide great places to canoe and bird watch. Lake Michigan hosts an active charter fishing trip business.

"As Governor, I've taken aggressive action to protect these resources," says Doyle, who chairs the Council of Great Lakes Governors. "In doing so, I've been joined by farmers, industry leaders and environmental stewards. One of our greatest competitive advantages in a 21st Century global economy is our water."

With this in mind, the Great Lakes Regional Collaboration was formed. Collaboration members (1,500 government officials, tribal leaders, researchers and others) developed a plan to address the Great Lakes' most pressing environmental issues. This plan is a call to arms that challenges all of us to protect these national treasures.

The Wisconsin DNR Office of the Great Lakes worked with many individuals and organizations to develop the Wisconsin Great Lakes Restoration and Protection Strategy, which brings the message home and addresses the Collaboration's priority issues in Wisconsin.

"The Office of the Great Lakes has the opportunity to promote integration and look at problems systemically from a geographic focus and comprehensively from an ecological approach," says retired Office of the Great Lakes Director Chuck Ledin.

Because they are interconnected, Ledin says, the five Great Lakes — Superior, Michigan, Huron, Ontario and Erie — must be managed as an ecosystem.

"One of the greatest challenges we face right now," says Ledin, "is to become ecosystem advocates instead of issues advocates."

Tremendous efforts have been made to clean up the lakes and protect them from further pollution. Governments at all levels have put billions of dollars to the task. Industries have made sig-

Great Lakes drainage basin in Wisconsin

DNR FILE

nificant strides in changing production processes, the products produced and cleaning up contaminated areas. Municipalities have upgraded sewage and water treatment facilities across the basin. Community and environmental groups have worked tirelessly to monitor progress and improve the environmental condition of the Great Lakes.

"We have made great strides, from the Clean Water Act to the recent passage of the Great Lakes Compact, in addressing water quality and quantity issues," says Todd Ambs, DNR Water Division Administrator.

Read on and learn about the collaborative success stories that have resulted from Wisconsin's Great Lakes Strategy. While much has been accomplished, more remains to be done.

"Water resources are the foundation of the upper Midwest's economic viability," says Ambs. "We must all do what we can to protect the Great Lakes, not only for the sake of the Great Lakes basin's environment, but for its sustainable economic future." ●

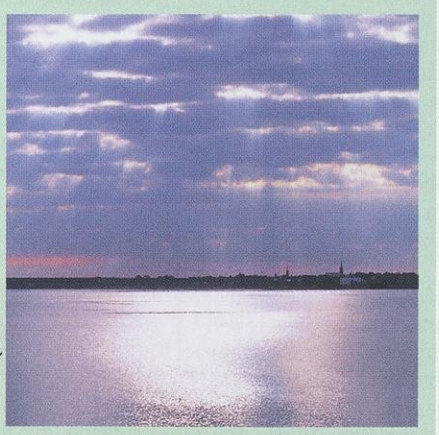
- **Visit Wisconsin's Great Lakes Strategy website at dnr.wi.gov/org/water/greatlakes/wistrategy/**
- **For information on the Great Lakes Regional Collaboration Strategy visit glrc.us/**

GREAT LAKES GATHERINGS

A recent effort to bring people to the table is the Great Lakes Gatherings presented by Gathering Waters, an umbrella organization supporting land trusts in Wisconsin, and the Lake Michigan Shorelands Alliance, a group of land trusts working to bring together business owners, government officials, community leaders, landowners and other citizens to tackle complex challenges facing the watershed. The alliance hosted a series of community forums in the Lake Michigan basin this fall. Visit greatlakegatherings.org for more information.

GET TO KNOW THE GREAT LAKES

- **The Great Lakes account for 90 percent of the United States' and 20 percent of the world's fresh water.**
- **The Great Lakes economic region is a vital part of the U.S. economy with 300 of the nation's Fortune 1000 firms located in this area.**
- **Lake Superior is the largest of the Great Lakes with a surface area of 31,700 square miles and a volume of 2,900 cubic miles. Lake Michigan has a surface area of 22,300 square miles and a volume of 1,180 cubic miles.**
- **Lake Michigan is the largest freshwater lake wholly within the United States and it has 1,638 miles of shoreline including all islands. Lake Superior has 2,726 miles of shoreline.**



ROBERT QUEEN

Spread evenly across the contiguous 48 states, the Great Lakes' water would be about 9.5 feet deep.

WISCONSIN'S GREAT LAKES PRIORITIES

- **Water management**
  Ensure sustainable use of our water resources while confirming that the states retain authority over water use and diversions of Great Lakes waters.
- **Aquatic invasive species**
  Stop the introduction and spread of aquatic invasive species.
- **Habitat and species**
  Enhance fish and wildlife by restoring and protecting coastal wetlands, fish and wildlife habitats.
- **Coastal health**
  Promote programs to protect human health against adverse effects of pollution in the Great Lakes ecosystem.
- **Areas of concern/ contaminated sediments**
  Restore environmental health to the areas identified by the International Joint Commission as needing remediation.
- **Nonpoint source management**
  Control pollution from diffuse sources into water, land and air.
- **Persistent toxins**
  Continue to reduce the introduction of toxic substances into the Great Lakes ecosystem.
- **Sustainable development**
  Adopt sustainable use practices that protect environmental resources and enhance the recreational and commercial value of our Great Lakes.
- **Information and indicators**
  Standardize and enhance the methods by which information is collected, recorded and shared within the region.

Great Lakes timeline

The United States and Canada share a history of working together to address significant issues facing waters that cross their common boundary. The Boundary Waters Treaty of 1909 started this formal cooperative process and created the International Joint Commission (IJC) as a forum to resolve Great Lakes issues. Over the past 100 years, there have been many environmental threats as well as attempts at all levels to protect or restore the Great Lakes.

- **1940s** - Demand for chemicals, weapons and other materials for troops used in WWII leads to major industrial expansion in the Great Lakes basin, and the start of large-scale chemical and heavy metal discharges to the lakes.

- **1950s** - Scientists find reproductive failures in fish-eating birds, including the almost total reproductive failure of double-crested cormorants, bald eagles and herring gulls. Later, toxic chemicals including the widely used insecticide, DDT, are blamed.

- **1959** - Opening the St. Lawrence Seaway allows ocean-going freighters access to the lakes and mid-continent heartland, and allows more widespread introduction of exotic species, which hitchhike rides in the ballast water picked up in foreign ports.

- **1962** - Publication of *Silent Spring* by Rachel Carson raises concerns about risks from chemicals and pollution for the environment and human health.

- **1969** - An oily surface on the Cuyahoga River in Cleveland catches fire, receives international coverage and leads to a call to tackle pollution discharges to the Great Lakes.

- **1971** - PCBs are found to be widespread including in Great Lakes fish.

- **1972** - U.S. Clean Water Act is passed.

  Canada and the United States sign the first Great Lakes Water Quality Agreement, intended to control sewage and phosphorus discharges. This leads to severe restrictions on phosphates in detergents and to billions of dollars of investments in sewage treatment facilities. The agreement also raises toxic substances as a major concern.

- **1978** - Canada and the United States sign the second Great Lakes Water Quality Agreement, introducing the concept of protecting the entire ecosystem and the philosophy of eliminating all discharges of persistent toxic substances to the lakes. Includes the term "Great Lakes Basin Ecosystem."

- **1983** - The 1978 agreement is amended to enhance efforts to reduce phosphorus runoff into the lakes. Scientists from both countries set target loads for each lake that need to be met to achieve the water quality objectives in the agreement.

  The Council of Great Lakes Governors is formed to address environmental and economic challenges facing their states.

- **1985** - Concerns about possible water diversions from the Great Lakes to dry parts of the southern United States prompt the eight Great Lakes states — Minnesota, Michigan, Wisconsin, Illinois, Ohio, New York, Pennsylvania and Indiana — along with Ontario and Quebec to sign an anti-diversions agreement called the Great Lakes Charter.

- **1986** - Governors of the Great Lakes states sign the Great Lakes Toxic Substances Control Agreement promising to reduce toxic discharges to the maximum extent possible. Later, Ontario and Quebec sign a memorandum of understanding, joining the agreement.

- **1987**- Canada and the United States sign a protocol amending the Great Lakes Water Quality Agreement to deal with more than 300 contaminants identified in the Great Lakes ecosystem. The protocol also covers airborne pollution that falls on the lakes, leaking landfills and polluted runoff. The nations agree to develop remedial action plans to bring business people and citizens into the process of helping clean up contaminated areas of concern around the lakes.

  The zebra mussel, an exotic species that likely arrived in the ballast water of an ocean-going ship, is discovered in the Great Lakes.

- **1989** - Great Lakes states governors establish the Great Lakes Protection Fund as a permanent environmental endowment to support actions to improve the health of the Great Lakes ecosystem. To date, the fund has made about 217 grant and program related investments representing more than $53 million in regional projects.

- **1991** - The Canada-United States Air Quality Accord calls for reducing air pollutants, including those contributing to smog across the lower Great Lakes.

  Canada and the United States agree to establish the Binational Program to Restore and Protect the Lake Superior Basin. This establishes Lake Superior goals to eliminate discharges and emissions of nine toxic and persistent chemicals that accumulate in natural food chains.

- **1993** - Flooding introduces *Cryptosporidium*, a protozoan parasite, into Milwaukee's drinking water system. The outbreak affects about 400,000, hospitalizes 4,000 and kills 111.

  A report from the International Joint Commission says governments need to do more to protect human health from toxic chemicals in the Great Lakes, especially those that cause reproductive problems.

- **1997** - Canada and the United States sign the Great Lakes Binational Toxics Strategy. The goal is to build collaboration among major groups around the basin, including all levels of government, tribes and businesses to work toward eliminating persistent toxic substances resulting from human activity.

- **2001** - Governors of the Great Lakes states and premiers of Ontario and Quebec sign Annex 2001, an update to the 1985 Great Lakes Charter, to help clarify policies to keep control of the use of water resources within the basin.

- **2003** - The Council of Great Lakes Governors identifies nine priorities for Great Lakes restoration and protection.

- **2004** - The Federal Great Lakes Interagency Task Force is created. President Bush recognizes the Great Lakes as a "national treasure" and directs the U.S. Environmental Protection Agency to convene a "regional collaboration of national significance for the Great Lakes."

- **2005** - The Great Lakes Regional Collaboration (GLRC), a cooperative effort to design and implement a strategy for the restoration, protection and sustainable use of the Great Lakes, releases a "Strategy to Restore and Protect the Great Lakes." This $26 billion federal-state plan calls for modernizing sewage treatment, cleaning up polluted harbors, restoring wetlands and preventing introductions of invasive species. The GLRC Strategy proposes restoring all 43 Great Lakes' Areas of Concern by 2020.

- **2008** - The Great Lakes-St. Lawrence River Basin Water Resources Compact is signed into law.

RESTORING LAKE MICHIGAN'S RIVERS AND SHORELINES.

Urban rehab

Decades of abuses across the country have degraded urban rivers and led to deteriorating water quality, increased flooding and fish habitat loss. In Wisconsin, pollutants such as metals, polychlorinated biphenyls (PCBs) and polyaromatic hydrocarbons (PAHs) flowed and drifted into Lake Michigan for years from these urban arteries — a vestige of the industrial and urbanized character of the watershed. As a result, the Milwaukee Estuary — including sections of the Milwaukee, Menomonee and Kinnickinnic rivers — has been designated as one of 43 Areas of Concern (AOC) in the Great Lakes region considered severely degraded, according to the U.S. Environmental Protection Agency.

But now, many urban rivers, including the Milwaukee Estuary AOC, are being rehabilitated, and riverfront once used for warehouses and factories is available for parks, housing and nonindustrial uses. River restoration activities include concrete lining removal, toxic sediment remediation, wastewater treatment improvement, navigation improvement and habitat improvement resulting in greater recreational and economic value, and community pride.

"Collaboration is the key to bringing together a watershed in a fashion that replicates what nature started," says Kevin Shafer, executive director of the Milwaukee Metropolitan Sewerage District (MMSD). "The entire Great Lakes are vital to Milwaukee. A clean environment drives a strong economy and a strong economy can drive a clean environment."

MMSD is a regional government agency that provides water reclamation and flood management services for about 1.1 million customers in 28 communities in the Greater Milwaukee Area. Shafer says turning Milwaukee's urban river woes into wonders has required creative funding as well as collaboration by university researchers, district planners, county staff, state agencies, elected officials and the community.

STEVAN KEITH

Bradford Beach water quality benefits from rain gardens and a parking lot renovation.

Bring back the beaches

It wasn't too long ago that people believed that beach closings along Lake Michigan were somehow linked to sewage overflows after heavy rains. But Sandra McLellan, an associate scientist at the University of Wisconsin-Milwaukee Great Lakes WATER Institute (GLWI), suspected otherwise. She believed bacterial contamination in the lake could come from any number of sources. That's why she began to sample beach water and sand. By sampling the water and then analyzing the bacteria's unique DNA, McLellan was able to link bacteria to a source. Analyses suggested the *E. coli* at the beaches was mainly from gull droppings and stormwater runoff from parking lots, and not from sanitary sewers.

Shafer is among the public policy makers who have relied on the GLWI's scientific detective work to make decisions about protecting local beach water quality.

Bradford Beach is a poster child for beaches that have directly benefited from McLellan's work. A 2005 Milwaukee Journal Sentinel article called

TED BOSCH

Sediment cleanup at the Blatz Pavilion lagoon removed about 300 pounds of PCBs in nearly 4,000 cubic yards of mud.

TED BOSCH

The lagoon bottom was restored and waterfront renovated. The project cost about $1.3 million.

it "Milwaukee's dirtiest beach." This declaration came after the city health department reported *E. coli* counts there exceeded safe levels for 61 percent of the three-month swimming season.

Today, Bradford Beach is not only safe and swimmable, it is sporting a new look with beach grooming, rain gardens to retain and filter water, and a parking lot stormwater management project that, combined, should prevent about 90 percent of stormwater from reaching the beach.

In the summer of 2008, Miller-Coors LLC donated $500,000 to the Bradford Beach Revitalization and Blue Wave Campaign (cleanbeaches.org) over five years to clean up and revitalize the property.

Contaminated sediment cleanups

The Blatz Pavilion lagoon in Milwaukee's Lincoln Park has reopened for recreation after sediment containing PCBs was removed.

The Blatz site is a one-acre lagoon off of the Milwaukee River adjacent to the pavilion in Lincoln Park. The lagoon was identified for cleanup in 2005 because it is heavily used by the public and there was a risk of exposure to PCBs through skin contact and potential ingestion from consuming contaminated fish, says Greg Hill, who leads the DNR's statewide contaminated sediment management program. Cleanup began in spring 2008.

The project removed about 300 pounds of PCBs trapped in nearly 4,000 cubic yards of sediment. About 2,000 tons of high-level contaminated sediment were shipped out of state to a chemical waste landfill. About 3,500 tons with much lower levels of PCBs were disposed of in a local solid waste landfill.

The lagoon bottom was restored with a sand and gravel base and the waterfront was renovated. The project cost about $1.3 million paid for with the Great Lakes Program Funds that Gov. Jim Doyle and the Wisconsin Legislature provided to address toxic chemical contamination in Great Lakes tributaries. Planning continues for a larger cleanup effort adjacent to the Lincoln Park lagoon and channel.

Experience on other sediment remediation projects, such as the Lower Fox River project in northeast Wisconsin, helped here. "Each project adds to our knowledge base as contaminated site cleanups continue," Hill says.

In 2007, the Kinnickinnic River on Milwaukee's South Side became infamous as one of the 10 most endangered rivers in the United States as ranked by American Rivers, a nationwide advocacy group. The Kinnickinnic is the smallest of Milwaukee's rivers. Draining 25 square miles of land through some of the most densely populated and developed land in the area, "More than 1.5 million people have a front-row seat to the problems and have a vested interest in restoring the river," American Rivers said.

On July 20, 2008, Governor Doyle announced a $24.4 million project to clean up contaminated sediment from the Kinnickinnic River. The state devoted $7.7 million to leverage $14.3 million in federal funds under the Great Lakes Legacy Act for the cleanup. The city of Milwaukee, through a Business Improvement District, contributed $500,000 to the project. Starting in spring 2009, this project will remove 170,000 cubic yards of contaminated sediment along a 2,000-foot section of the south side waterway. Removing the sediment will create a 20-foot deep navigation channel and allow greater boat traffic and recreation.

Flood management

Several projects also are underway in

Milwaukee to help reduce the risk of destructive floods.

"We've turned the tide," Shafer says. "We are a model for the nation on how to remove concrete-lined channels and bring the community into the process."

Flooding in Milwaukee County in 1997, 1998 and 2000 caused about $96 million of damage to homes, businesses and neighborhoods. Since 1973, flooding claimed four lives in the county. Officials and the community agreed that something needed to be done.

"There is an interesting history of flood management in Milwaukee," says Tom Chapman, MMSD flood project manager. "Historically floods were dealt with by paving the streams." In fact, 28 miles of streams in the Milwaukee area were paved over in the last 60 years.

But that thinking changed about 15 years ago, Chapman recalls, and paving was replaced with more natural solutions. Engineers learned that paving streams sent waters faster and more directly downstream, harming fish habitat and creating greater safety and flooding problems.

Today, MMSD is storing flood water, and where possible, restoring rivers in Lincoln Creek, Southbranch Creek and Indian Creek and other area watersheds. Milwaukee has been removing concrete lining and restoring natural stream flow.

Lincoln Creek has a history of flooding and other problems. This continuous nine-mile tributary of the Milwaukee River drains 20.7 square miles of urbanized watershed. The entire stream length had been channeled to accommodate floodwaters. About 25 percent of the channel was lined with concrete. Masonry and rock walls lined about 10 percent of the channel. The remainder was in very poor hydraulic condition.

Now flood controls for Lincoln Creek reduce flooding, improve aquatic and terrestrial habitat and provide recreation. The project widened the creek in some places and added detention ponds in others. Two miles of concrete riverway were removed and restored to natural conditions. Pools and riffles were created to encourage fish and wildlife habitat. The project was completed at a cost of about $120 million. As a result, Lincoln Creek did not flood during strong rains in June 2008, Chapman says.

WILL WAWRZYN

A walleye spawning reef has been created in the Milwaukee River Estuary. The reef stones needed to be small enough to attract walleye and other species to spawn but large enough to stay in place.

"Every neighborhood is different in terms of what they want their rivers and streams to be like," Chapman says. "But now we shouldn't have this flooding problem for our kids and their kids in the future."

Shafer says the lessons learned in Milwaukee can be applied to smaller communities wanting to make a difference. "Communities need to know that they can't do it all by themselves," Shafer says. "They need to get all the interested people to sit down together and identify the goal. It doesn't cost much to install a rain barrel or rain garden, but it's a start and that gets people involved in the issue, then more people will come to the table."

GREENSEAMS

MMSD's Greenseams program aims to prevent future flooding by permanently protecting key lands. The program buys undeveloped, private properties in areas expected to have major growth in the next 20 years. To date, more than 1,600 acres of natural areas along streams, shorelines and wetlands have been protected. These lands will remain undeveloped, protecting water and detaining rain and melting snow. Wetlands maintenance and restoration at these sites will provide further water storage and improve water quality.

Milwaukee River rehabilitation

The Milwaukee River rehabilitation effort has provided outstanding examples of local cooperation, and citizen and community involvement in cleanup activities at all levels. Major investments have upgraded public and private wastewater treatment facilities and contained and treated combined sewage overflows. A comprehensive plan recommends improvements throughout the Milwaukee River basin.

On a grassroots level, the Milwaukee River Revitalization Foundation raised community support to acquire land for a recreational trail and corridor along the lower riverbank. Area high school students were engaged through Testing the Waters, an educational water quality monitoring program. Farther out in the watershed, landowners work with the state on cost-sharing programs to help reduce runoff from their farms.

But much of the river's physical recovery can be linked to projects that

removed 10 obsolete dams on the main stem and tributary waters starting in 1987 including the largest dam on the river, the North Avenue Dam. Removing the dam and impoundment was a linchpin for the river's recovery. In late 1990, the dam gates were opened lowering water levels to accommodate replacing a water main and bridge.

The 2.5 miles of river impounded above the dam from Capitol Drive to the North Avenue Dam narrowed considerably as the free-flowing river resumed a more natural course. But the drawdown also exposed more than 150 years of accumulated garbage. In the summers of 1991 and 1992, volunteers removed more than 2,000 tires and other debris including auto parts, shopping carts and appliances. As the water, sediment and habitat quality improved, fish moved in from upstream and downstream of the former dam.

Further study recommended removing the dam in its entirety. Permits and funding were secured and the dam was taken out in 1997 marking the first time since 1835 that stretch of the Milwaukee River flowed freely. The habitat improved and the fishery quickly responded, notes Will Wawrzyn, a DNR fisheries biologist in Milwaukee.

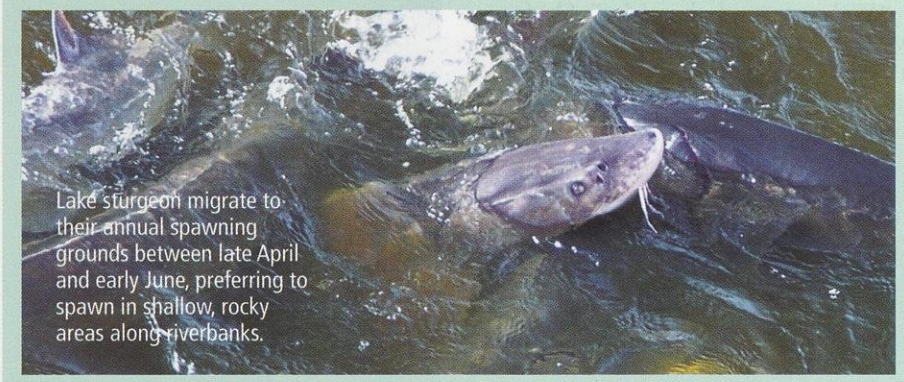
Waters that used to hold carp and a few other fish species tolerant of degraded habitat now have healthy populations of smallmouth bass and 32 other native fishes. The state-threatened greater redhorse is now common in the river.

Previously neglected for most water-based recreational uses, the river is a destination for anglers from around the Midwest pursuing spring and fall trout and salmon runs from Lake Michigan.

Because walleye are now able to reach historic spawning grounds, streambed improvements were made. In the fall of 2006 Wawrzyn was part of a team that recreated a walleye spawning reef in the Milwaukee River Estuary. With funds provided by the U.S. Fish and Wildlife Service and Walleyes for Tomorrow, the half-acre reef was built on time and under budget.

"Monitoring shows potential for walleye spawning in the area and other fish species also are beginning to use the reef," Wawrzyn says.

RETURN OF THE LAKE STURGEON



Lake sturgeon migrate to their annual spawning grounds between late April and early June, preferring to spawn in shallow, rocky areas along riverbanks.

In the early 1800s, lake sturgeon, the largest native fish of the Great Lakes system, were slaughtered because their bony plates and size ruined commercial fishing gear. By the mid-1800s, however, sturgeon were prized for their caviar, skin and succulent flesh. Overfishing, along with dam construction, habitat loss and water pollution caused sturgeon populations to plummet. The sturgeon's slow maturation rate (15 years for males and 20 to 25 years for females) contributed to the population's vulnerability.

Hundreds of thousands of sturgeon roamed Lake Michigan in the early 1800s. Researchers now estimate that only 2,000 to 5,000 adult sturgeon remain in the lake, with no record of sturgeon in the Milwaukee River since the 1890s.

Brad Eggold, a DNR fisheries supervisor, says the Department of Natural Resources recognized the cultural and historical significance of the fish and began stocking the Milwaukee River with hatchery-raised sturgeon in 2003. Like salmon, sturgeon return to the river where they were born to spawn.

To maximize the opportunity for Lake Michigan sturgeon to imprint on the Milwaukee River, the Department of Natural Resources and Northern Environmental, a consulting firm, designed a streamside rearing facility (SRF), which acts as a mini-hatchery. This 8 x 20-foot trailer pumps water from the Milwaukee River into rearing tanks, enabling sturgeon to be raised in the Milwaukee River water from day one. This project is funded by the Wisconsin Department of Natural Resources, a Great Lakes Fishery Trust grant, the U.S. Fish and Wildlife Service and the Riveredge Nature Center in Newburg.

ALL PHOTOS DNR FILE/UW-STEVENS POINT PHOTO

A streamside rearing facility at the Riveredge Nature Center raises sturgeon on Milwaukee River water.

In the spring of 2006, Riveredge Nature Center became the first site in Wisconsin to operate a Lake Sturgeon SRF. Eggs are hatched around May 1 with the goal of releasing sturgeon in early October. In 2006, about two dozen fish were first stocked from the SRF. The next year 156 sturgeon were stocked. And 767 fish were stocked in October 2008 below the dam in the Thiensville Village Park. After being released, fish are tracked by sonic tags.

"This continued stocking in a Lake Michigan tributary is an important step in restoring lake sturgeon, not only in the Milwaukee River but also in Lake Michigan," Eggold says. "This is an ongoing project because the sturgeon is a long-lived species. We won't know the success of the streamside stocking effort for 15 to 20 years."

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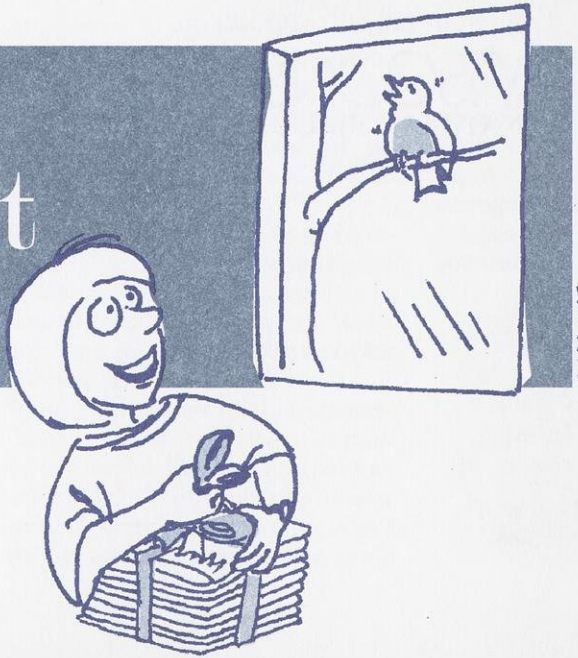

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JANE EDWARDS, CITY OF SUPERIOR ENVIRONMENTAL SERVICES DIVISION

KEEPING MEDICINE AND MERCURY OUT OF OUR WATERS.

Many people have gotten in the habit of flushing unused and outdated medicines down the toilet, but this is an emerging concern for the environment and public health. Most wastewater treatment facilities are not designed to remove pain killers, hormones, antibiotics or other medicines. Thus, these chemicals can end up back in the drinking water supply.

Several cities in Wisconsin are giving people an alternative by collecting old medicines. In 2006, Brown County hosted a two-day collection event that took in about 109,000 pills.

In April 2008, the Great Lakes Challenge encouraged communities in eight states to responsibly collect and dispose of unwanted pharmaceuticals. The goal, which was exceeded, was to collect one million pills. About 3.5 tons of medicines were turned in during a Milwaukee area collection. Tribal members from the Menominee Indian Tribe near Green Bay turned in over 23 pounds of medicines.

The City of Green Bay holds two pharmaceutical collection drives each year. Green Bay Mayor Jim Schmitt says, "We've had a very successful pharmaceutical collection, not just in the amount we've collected but in the participation we've had."

In September 2008, health care providers partnered with the Department of Natural Resources and U.S. Environmental Protection Agency to keep pharmaceuticals out of drinking water supplies by providing technical assistance to communities and easy-to-follow guidance to bolster health care providers' efforts to protect public health and the environment from hazardous waste while caring for patients.

Mercury reduction partnerships

Mercury pollution is a leading cause of statewide fish consumption advisories because mercury can accumulate through the food chain and contaminate sport fish. The goals of the Community Mercury Reduction Program, initiated in 1998, are to reduce the use of mercury-containing products, promote mercury recycling and reduce mercury spills while air quality staff works with power plants to reduce mercury emissions from coalburning.

Randy Case, DNR community program coordinator for the Bureau of Cooperative Environmental Assistance, says dentists are important partners. The main mercury source from dental offices is amalgam, the material of silver fillings that consists of about 50 percent mercury and 50 percent other metals. Case says the DNR has teamed up with the Wisconsin Dental Association to create a Best Management Practices Guide for recycling amalgam wastes.

Amalgam is a cost-effective, efficient, stable and long-lasting material to fill cavities, explains Case, so it is likely to continue to be used. But amalgam separators, available from several suppliers can reduce amalgam rinsed down the sink drain by 95 percent or more. In 2007, the Green Bay Metropolitan Sewerage District received a $50,000 grant from the Great Lakes Protection Fund to work with dental offices in Brown and Outagamie counties to provide rebates for installing amalgam separators. Captured mercury is then recycled.

Schools also are stepping up to reduce mercury, mostly found in science labs, but also in fluorescent lights, thermostats and thermometers. Some schools have received a cash award for exchanging mercury devices.

Communities have held thermometer exchanges where the public and businesses can exchange mercury thermometers for digital ones. Another source of mercury waste is manometers, which are used to measure pressure changes in the dairy milking process. A manometer replacement project, funded through the Great Lakes Protection Fund, collected 515 manometers containing 385 pounds of mercury.

Most recently, DNR wrote rules to reduce mercury emissions from coal-fired power plants, which are the largest human-caused source of mercury emissions to the air in the United States, contributing over 40 percent. The rules became law in fall 2008 and will be implemented in 2009, requiring utilities to reach a 90 percent cut in mercury emissions by 2015.

This rule requires all power plants over 150 megawatts to take either of two courses. Utilities can reduce mercury emissions by 90 percent by 2015, or they can reduce mercury emissions by 70 percent by 2015 and make reductions in other pollutants. Plants that choose the second option would have to reduce sulfur dioxide by 80 percent and reduce nitrogen oxides by 50 percent. In addition, utilities that take this route would have to achieve 80 percent mercury reductions by 2018 and 90 percent by 2021.

Because technology can efficiently reduce mercury and other air pollutants simultaneously, the new rule encourages Wisconsin utilities to do so. This "multi-pollutant" approach will dramatically reduce sulfur dioxide and nitrogen oxide, pollutants that cause increases in ozone, haze and particulate matter.

FOR MORE INFORMATION

- 4.uwm.edu/shwec/
- dnr.wi.gov/org/caer/cea/mercury/
- dnr.wi.gov/org/aw/wm/pharm/household.htm

A stinky sea of green

MAKING *CLADOPHORA* CONNECTIONS.

It's the awful sight and smell of rotting algae washed onto beaches that draws attention. Such problems affect property values as well as tourism and recreational uses, says Harvey Bootsma, a researcher with the Great Lakes WATER Institute at the University of Wisconsin-Milwaukee. Bootsma has studied the naturally occurring green algae, *Cladophora*, in the Great Lakes for seven years.

While the downside of large quantities of *Cladophora* on the shore is obvious, Bootsma says much of the algae probably settles deeper in the lakes and these effects are not yet known. In some areas of the Great Lakes, decaying *Cladophora* lowers oxygen levels and may be implicated in fish kills.

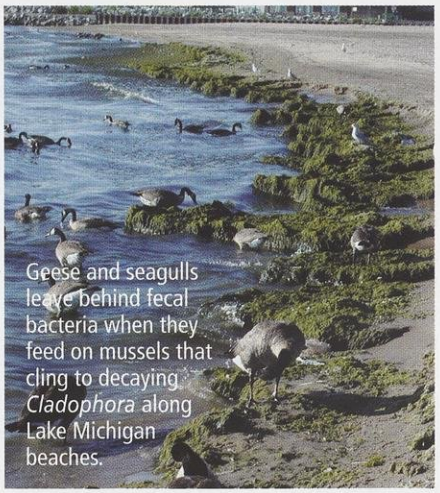
These algal blooms also clog water intakes. In Wisconsin there have been power plant shutdowns and partial shutdowns caused by *Cladophora* blooms.

What is this algae's story and why haven't we heard of it until recently?

Cladophora grows on submerged rocks and other hard surfaces, washes ashore at times in large piles, then decomposes. For the past five years, large quantities of decaying algae have been fouling Wisconsin's Lake Michigan shoreline. The reasons are complex, Bootsma explains, driven by increased water clarity due to filter-feeding invasive zebra and quagga mussels, a nearshore rocky bottom on which the sun-loving, stringy green algae grows, prevailing lake currents and an ample supply of phosphorus from runoff in the Great Lakes basin.

While this algae does not present a risk to human health like blue-green algae, rotting *Cladophora* along with mussels deposited on beaches attract large flocks of gulls resulting in high bacteria concentrations from gull feces.

Nuisance *Cladophora* levels were also a problem in the 1960s and 1970s, says Shaili Pfeiffer, a water resources specialist in the DNR Office of the Great Lakes. Research linked those blooms to high phosphorus levels, mainly a result of poorly maintained septic systems, inadequate sewage treatment and detergents containing phosphorus. Due to tighter restrictions, phosphorus levels declined during the 1970s and *Cladophora* blooms were largely absent in the 1980s and 90s.



DNR FILE

Geese and seagulls leave behind fecal bacteria when they feed on mussels that cling to decaying *Cladophora* along Lake Michigan beaches.

But then came zebra and quagga mussel invasions. The mussels increased water clarity allowing adequate lighting for *Cladophora* growth. The mussels also secrete phosphorus near shore and warm water temperatures enhance the algae, which thrives at 50 to 70 degrees Fahrenheit.

In spring 2004, the Department of Natural Resources initiated a work group to address Lake Michigan's algal problem. The department joined University of Wisconsin-Extension, University of Wisconsin-Milwaukee WATER Institute, University of Wisconsin-Sea Grant Institute, Wisconsin Coastal Management Program, county health departments and Centerville Citizens for Air, River and Environmental Solutions (CARES), in a *Cladophora* monitoring program. Sampling sites were established and data compared to historical data.

Results showed that *Cladophora* growth is abundant along the entire Lake Michigan shoreline. "Monitoring was critical to give us a baseline reading of phosphorus levels," Pfeiffer says. "Most of the time you will see a field of green carpeting the lake bottom."

Research also showed that nutrient concentrations slowly declined from south to the north and *Cladophora* became a bit more sparse north of Washington Island. "To me, this suggests that if we can get water quality along the shores between Milwaukee and Door County more like that north of Door County," Bootsma says, "we might see an improvement."

Since currently there is no way to eradicate zebra and quagga mussels, Bootsma says the best way to control *Cladophora* may be to starve it by limiting the amount of phosphorus from farms and other sources that is being carried into streams, lakes and rivers.

Pfeiffer and Bootsma are encouraged that several communities have joined in the fight. The Partnership for Phosphate Reduction, a citizen-based organization, is taking action to fight the overabundance of algae in Door County by asking people to switch to phosphate-free dish detergent and lawn fertilizer, and urging businesses to only sell phosphorus-free products.

Centerville CARES, an independent organization that identifies issues and advocates change to protect the Lake Michigan shoreline and water resources throughout Manitowoc County and Northeastern Wisconsin, has been sampling water quality in creeks for several years to establish a baseline of creek conditions in the basin. The organization also has requested that Wisconsin factory farms include water quality testing as part of their manure spreading regime.

"There is no short-term fix or silver bullet to this problem," Pfeiffer says. "But we can reduce phosphorus over time and that has so many positive benefits for tributary streams and Lake Michigan."

For more information visit dnr.wi.gov/org/water/greatlakes/cladophora/

The heat is on

CLIMATE CHANGE THREATENS THE GREAT LAKES.

Climate change is threatening the Great Lakes. Many experts believe that climate change, especially global warming, is already affecting the chemical, physical and biological integrity of the Great Lakes ecosystem. The timing and significance of possible impacts are not well understood, but any alterations in water levels and water quality can affect to some degree the biological community including humans, wildlife and fish.

Jay Austin, a University of Minnesota-Duluth's Large Lakes Observatory limnologist, and his colleague, Steve Colman, have found, using Lake Superior weather buoys, that Lake Superior's average summer surface temperature has risen about 4 degrees Fahrenheit since 1980, a much greater rate of change than seen in previous decades.

They also studied ice cover data from the Great Lakes Environmental Research Laboratory in Ann Arbor and looked at air temperatures from every weather station within 500 kilometers of Lake Superior. The data showed that not only has the lake become warmer, windier and less icy since 1980, surface waters also have warmed twice as fast as the region's air.

What are the likely suspects for this warming trend? "The rapid rise in water temperatures is a combination of declining ice cover and warmer summer air temperatures, both contributing roughly equally to the observed rise in summer water temperatures," Austin says.

Less winter ice cover and higher summer temperatures can lead to increased evaporation rates resulting in lower lake water levels. More frequent and severe storms also are likely. The resulting increased erosion and runoff could seriously threaten tributaries and nearshore areas and the fisheries they support. Exotic species not usually able to adjust to the Great Lakes area climate may find these warmer conditions much more favorable.

While the specific effects of climate change are difficult to predict, the potential for environmental and economic damage is clear.

With this in mind, Wisconsin Gov. Jim Doyle created the Governor's Task Force on Global Warming in 2007. The task force consists of 29 members representing diverse interests including energy providers, large industrial energy users, consumer and environmental advocates, academics and others. The task force has developed a strategy for reducing global warming. For more information visit the DNR website at dnr.wi.gov/environmentprotect/gtfgw/.

DAVE HART

Lake Superior is losing water and getting warmer.

NEAL NIEMUTH

Less winter ice cover may lead to declining lake levels.

FRANK KOSHERE

Climate change poses a significant threat to the remaining wetlands in the Great Lakes region. Many fish species depend on coastal wetlands for successful reproduction.

REDUCE YOUR CARBON FOOTPRINT

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Lightening the load

REDUCING RUNOFF AND EROSION.

There is no denying the connection: Healthy watersheds lead to healthier streams and in turn, healthier fisheries. What happens on the land 30 miles from a lake can, and does, impact water quality in the lake.

Restoring buffers

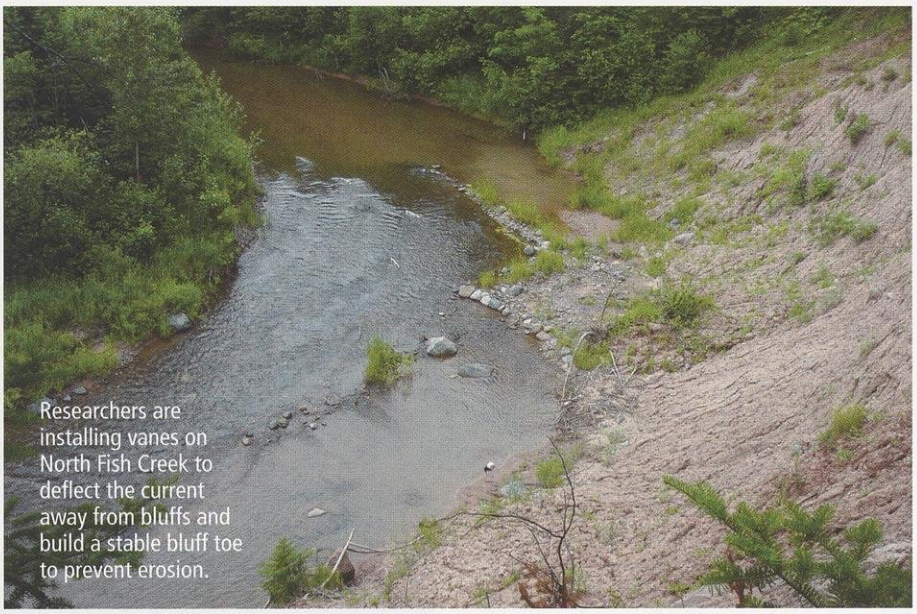
The Conservation Reserve Enhancement Program (CREP) is a voluntary land retirement program started in 2001 to help agricultural producers protect environmentally sensitive land, decrease erosion, restore wildlife habitat, and safeguard ground and surface water.

Program partners include farmers, tribes, state and federal governments, and private groups. CREP is an offshoot of the country's largest private-lands environmental improvement program — the Conservation Reserve Program (CRP) and is administered by USDA's Farm Service Agency.

CREP addresses high-priority conservation issues of local and national significance, such as impacts to water supplies, loss of critical habitat for threatened and endangered wildlife species, soil erosion, and reduced habitat for fish, says Jim Baumann, DNR's CREP manager.

CREP contracts require a 15-year or perpetual conservation easement commitment to keep lands out of agricultural production. CREP provides payments to participants who enroll eligible land. An annual rental rate and incentive payment is offered plus cost-share of up to 50 percent of the costs of buffer plantings. There is $240 million in funding available in Wisconsin for up to 100,000 acres.

Research has shown buffers to be very effective (70 to 90 percent) in filtering sediment and nutrients. These buffers are usually 30-feet-wide or more and planted with dense vegetation as an alternative to cropping or grazing close to a waterway. Buffers also provide wildlife habitat, and are especially important to Great Lakes tributaries, Baumann says.



UNIVERSITY OF WISCONSIN-MADISON

Researchers are installing vanes on North Fish Creek to deflect the current away from bluffs and build a stable bluff toe to prevent erosion.

Since CREP began, more than 1,616 acres have been enrolled in Wisconsin Great Lakes basin counties. "This has been a very successful effort by many partners with multiple benefits for our resources," says Baumann.

But the program is challenged by rising property values and rapidly rising crop prices. "Still, CREP remains important for water quality protection," Baumann says.

Andy Holschbach, director of the Ozaukee County Planning, Resource and Land Management Department, agrees. "For people like me who work with local landowners, CREP is another tool in the toolbox that we can offer them when talking about conservation options."

Reducing bluff erosion

Eroding streambank bluffs historically have sent tons of soil into North Fish Creek, a tributary to Chequamegon Bay and Lake Superior, burying spawning areas for trout and salmon. The creek's sediment load largely originates from erosion on 17 large bluffs.

But a collaborative effort to prevent erosion and re-establish spawning habitat is paying off for the creek's fish and anglers.

In 2000 and 2001 the University of Wisconsin-Madison Civil Engineering Department installed 45 submerged structures (vanes) along one river bend that has a large, eroding bluff in a series of arrays extending from the bluff toe toward the middle of the channel.

The vanes deflect the water current away from the bluff and build a stable bluff toe. The vanes are vertical plates that are installed on a streambed at specific angles to the flow. Vanes extend upward from the bottom to about 30 percent of the stream depth.

Since the original installation, vanes and other measures (such as increasing toe roughness with anchored logs and stream boulders, rock vanes and dams with streambed and bank material, and increasing the flow on the inner bank/point bar side of the stream) have been used at this and two other bluff sites on North Fish Creek and one site on the Marengo River (a tributary of the Bad River).

The vanes and other measures have been effective in bluff stabilization. Researchers are moving toward using the vanes more to keep a channel open along with other enhancements along the bluff side to decrease erosion there.

DNR staff is working with others to install vanes at other tributaries to Lake Superior with similar bluff erosion problems.

ANDY HOLSCHBACH

Without vegetative buffers, streams may become polluted with fertilizers, pesticides and other contaminants.

ANDY HOLSCHBACH

When properly installed, buffers control soil erosion and enhance fish and wildlife habitat.

Slowing the flow

Soil erosion and sedimentation along the red clay plain of Wisconsin's Lake Superior south shore has been the focus of debate and research for several decades.

This red clay plain landscape encompasses around 890,000 acres in Douglas, Bayfield, Ashland and Iron counties. It's a young landscape, geologically speaking, between 9,000 and 10,000 years old. Young landscapes are well known to exhibit naturally rapid erosion rates. However, human activity since the early 1900s has created even greater erosion rates than would be expected in this young landscape and is degrading the water quality of south shore streams and Lake Superior.

Understanding the erosion process in the red clay plain is challenging, but crucial to developing a reasonable management approach to reducing erosion impacts.

The first step is understanding the nature of the glacial deposits that make up this landscape.

"The red clay surface that is readily visible to everyone is a relatively thin layer. It is made up of a tightly bonded fine material containing 50-80 percent clay called the Miller Creek Formation," says Jay Gallagher, DNR Lake Superior Area forester. "But underlying this thin clay surface is a much thicker layer of a loosely-bonded coarser texture known as the Copper Falls Formation."

Modern day south shore streams have cut this Copper Falls material well below the Miller Creek red clay surface. As streams cut away, the lower slopes erode and fall into the stream channels. As this erosion continues, tons of streambank from the toes of slopes is "undercut" and shears off in large massive blocks of red clay. This material then slides down the slopes of the Copper Falls Formation and eventually enters the streams.

This erosion process is often jumpstarted by large volumes of water flowing into the streams. Reducing the flow reduces the energy available to cause erosion — thus the phrase "Slow the flow." If we can reduce the amount of water running into streams, we can reduce the erosion rate.

Today, land management decisions still accelerate surface flow from the uplands into streams. Creating large amounts of open land acreage in smaller watersheds, along with developing residential, agricultural and road drainage systems, lead to increased surface runoff rates. This rapid delivery of large volumes of water to the south shore streams creates excessive energy that produces the erosion we see today.

Research by the University of Wisconsin-Madison Forest Ecology Laboratory along with the U.S. Geological Survey also shows that vegetation plays a critical role in stabilizing soil and slowing runoff, especially on steep slopes. Roots help anchor soil, and the tree canopy slows falling rain and reduces the amount of water that reaches the forest floor, limiting surface runoff. Fallen trees and branches that reach the stream also improve the physical structure of the streambed and create a more stable environment.

Forest composition similar to vegetation that existed prior to European settlement is particularly beneficial in stabilizing soils in this area.

Restoring streambeds

Restoring conditions in the cold streams feeding Lake Superior's southern coast is improving habitat for trout and salmon and sustaining recreation along this part of the Great Lakes shoreline.

Brook trout were once common in most of the Lake Superior basin's cold-water tributaries and shoreline habitat adjacent to them, until their populations declined in the 1880s due to overexploitation, habitat loss and the impacts of beaver, which block fish runs and bury critical habitat. Today trout only thrive in the headwater reaches and seldom use the lakeshore habitat where they could grow more quickly and reach larger sizes.

Coaster brook trout are brook trout that live in the coastal waters of Lake Superior for at least part of their lives. These "coasters" grow to 11 inches or more, larger than fish that exclusively reside in streams. Historically, trout stayed near the stream mouths and along the 40 miles of rocky sandstone shoreline adjoining the Bayfield Peninsula. The remaining 85 percent of Lake Superior's south shore has a sand and clay bottom that historically held fewer coasters.

A Department of Natural Resources and U.S. Fish and Wildlife Service brook trout plan is underway to protect and improve self-sustaining brook trout populations and their habitat in the Lake Superior basin by removing migration barriers, improving stream habitat, and uncovering spawning areas that were buried under beaver flowages. Other actions include placing bag limits and experimental stocking.

While Dennis Pratt, DNR fisheries biologist in Superior, says it is too early to tell if these management practices will improve the fisheries, he is optimistic. Partnerships will lead to a long-term commitment to manage, protect and restore tributary habitat in the basin.

"When we combine this work with upland efforts to reduce flood flows, we expect both trout and salmon populations to improve," says Pratt.

Protection from long-range diversion

GREAT LAKES COMPACT PROVIDES THE LEGAL FRAMEWORK.

The Great Lakes – St. Lawrence River Basin Water Resources Compact creates unprecedented Great Lakes protections and ensures their future as a foundation for regional economic growth. It manages water diversions and withdrawals and provides a framework to sustain water in the basin.

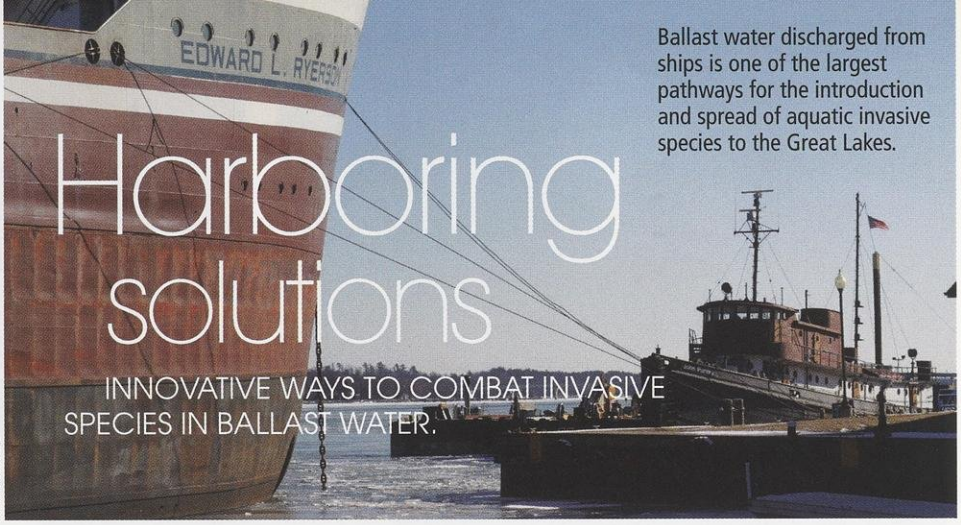
In spring 2008, Wisconsin lawmakers approved the Compact, passing it out of the Senate with a 32-1 vote and through the Assembly 96-1. The Compact was then approved by the governor and at the federal level and signed into law by President George Bush on Oct. 3, 2008.

"While the Great Lakes have been an important part of our past, they are absolutely critical for our future," says DNR Secretary Matt Frank. "The Great Lakes Compact is more than just ensuring that our water is not diverted to other parts of the country. The Compact will make sure that for the first time there is a coordinated regional effort to manage Great Lakes water for our environmental and economic future."

The Great Lakes Compact was inspired in part by the actions of the Nova Group, an Ontario consulting firm that in 1998 obtained a Canadian permit to ship tankers of Lake Superior water to arid areas of Asia. The plan was stopped amid public uproar.

The Compact became effective December 8, 2008 and applies to groundwater and surface water including Great Lakes, tributary streams and inland lakes in the Great Lakes basin. All entities withdrawing more than 100,000 gallons per day must have permits. Several thousand entities in Wisconsin, mostly high-capacity wells or municipalities, fall into that category.

"For close to a decade, the Great Lakes states have been negotiating and then building support for a Compact that would protect the amazing waters that define this region," says Wisconsin Gov. Jim Doyle. "The Great Lakes are the reason that you can look at a picture of the earth from space and pick out a state like Wisconsin. They have shaped our history, our cities, our industry and our recreation. And just as they have formed this region, they will continue to help determine our future."



BOB KORTH

Ballast water discharged from ships is one of the largest pathways for the introduction and spread of aquatic invasive species to the Great Lakes.

Harboring solutions

INNOVATIVE WAYS TO COMBAT INVASIVE SPECIES IN BALLAST WATER.

Aquatic invasive species, such as zebra mussels and sea lamprey, have dramatically changed the Great Lakes region ecology and economy. These organisms were introduced in a variety of ways, including ballast water discharges from ships. Ships use ballast water to provide stability and maneuverability during a voyage and in harbors. Water is taken on at one port when cargo is unloaded and usually discharged at another port when the ship receives cargo.

A lack of federal legislation mandating ballast water exchange means the introduction and spread of invasive species continues. The Wisconsin Department of Natural Resources strongly supports developing national performance and permitting standards or adopting proposed International Marine Organization standards for ballast water discharges, says Susan Sylvester, DNR Water Division section chief for permitting.

In the meantime, saltwater exchanges of ballast water tanks are being encouraged before vessels enter the St. Lawrence Seaway and several studies are underway to more closely regulate the discharge of ballast water. Roger Larson, deputy director of the DNR Bureau of Watershed Management, says the agency is progressing with a pilot project to test off-ship treatment of ballast at the Port of Milwaukee. The Department of Natural Resources, representatives from the Milwaukee office of Brown and Caldwell (an environmental engineering consulting firm) and the Port of Milwaukee formed a project team to evaluate ballast collection and treatment alternatives.

The group decided that the most feasible option is a specially adapted barge that can pull alongside a ship to collect, store and treat ballast water rather than piping water to an on-shore treatment facility.

"Critics of off-ship treatment have commented about the difficulty of extracting the ballast water from a ship to a barge, but our project team found a relatively simple solution, retrofitting the ship with a T-connection to an existing pipe and using the ship's existing ballast pumps to pump the ballast water to the barge," says Julie McMullin, Brown and Caldwell's project manager.

Bay Engineering, Inc. of Sturgeon Bay developed the conceptual ship and barge designs to accommodate ballast water treatment.

The Port of Milwaukee, which annually handles more than 85 overseas vessels, has applied for funding from the Department of Transportation to help acquire and outfit a barge. Cost estimates are $3.5 million for the treatment system and barge, $60,000 to $204,000 in ship modifications and T-connections per ship, and $160,000 annual treatment system operation cost.

"It's cheaper than other options that have been proposed," Sylvester says. "And keeping new invasives out of lakes is far more cost-effective than managing them once they have become established. Zebra mussel control alone costs U.S. taxpayers $5 billion annually."

Another effort underway in Superior called the Great Ships Initiative (GSI) is evaluating treatment technologies to remove and destroy aquatic organisms in ballast water. The GSI program involves port authorities, industry, and federal, state and provincial agencies. Researchers with the University of Wisconsin-Superior's Lake Superior Research Institute and University of Minnesota-Duluth's Natural Resources Research Institute work with GSI scientists. To learn more visit www.nemw.org/GSI/

"These efforts could go a long way to show the people of Wisconsin who use the Great Lakes that we are very serious about stopping the spread of new invasive species," Larson says.

Green growth

SUSTAINABLE GREAT LAKES TOURISM AND BUSINESS ARE LINKED.

The Great Lakes generate $55 billion in tourism for the region annually. So it makes sense that the tourism industry would promote businesses that have made a commitment to become more sustainable.

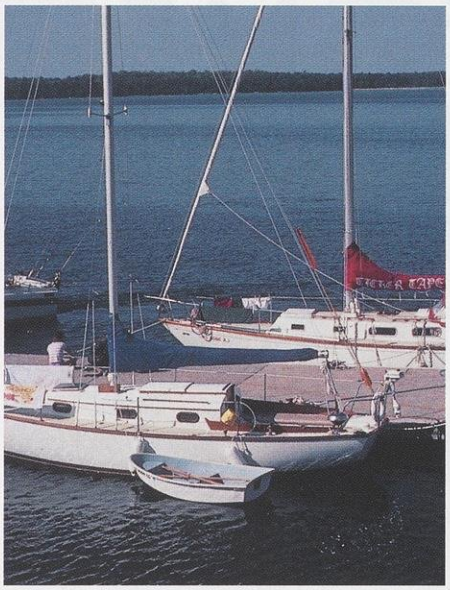
Travel Green Wisconsin is a voluntary program that reviews, certifies and recognizes tourism businesses and organizations that have made a commitment to reducing their environmental impact. The program encourages participants to evaluate their operations, set goals and take actions towards environmental, social and economic sustainability. Above all, the Travel Green Wisconsin program is designed to protect the beauty and vitality of Wisconsin's landscape and natural resources.

The program also educates travelers to Wisconsin about sustainable tourism and helps make green businesses recognizable. Wisconsin's Travel Green was the first such program sponsored by a state tourist department and has become the largest.

Paul Linzmeyer says sustainability is the future of business success in the Great Lakes region. "When I talk about sustainability I am talking about the interrelation among people, planet and profits," says Linzmeyer, sustainability chair of the New North and industry chair of the Wisconsin Global Warming Task Force. This triad is also known as "the triple bottom line."

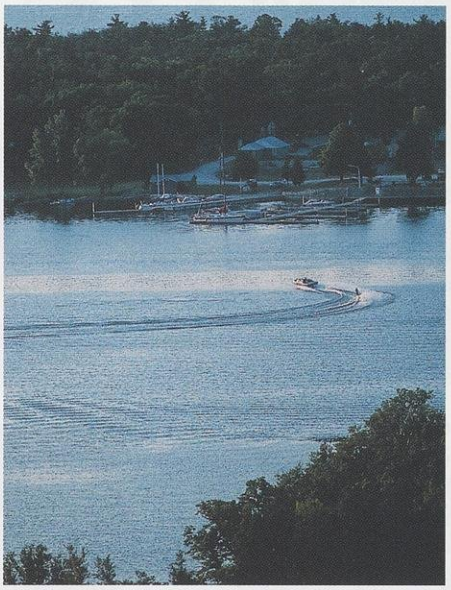
"The Great Lakes are the new oil; the new platinum," Linzmeyer says, and he calls on the Great Lakes states to collaborate with universities and manufacturers to create clean water technology and green jobs.

Fred Schnook, former mayor of Ashland, says one of the main reasons business owners want to connect to conservation efforts in the region is that they recognize that the health and appeal of life here attracts a strong workforce.



DNR FILE

Travel Green Wisconsin certifies a variety of businesses from campgrounds to marinas.



ROBERT QUEEN

Tourism in Wisconsin counties adjacent to the Great Lakes generates over $2 billion of economic activity annually.

Ashland's city Waterfront Development Plan calls for redeveloping the historic Soo Line Ore Dock area as a tourist destination — possibly a maritime park and fishing dock — that celebrates Ashland's industrial past and Lake Superior's national role.

Bayfield also has joined the movement toward sustainable eco-friendly tourism by taking actions toward environmental, social and economic sustainability by minimizing waste, integrating energy efficiency, conserving water, improving air quality and purchasing green and locally-produced products and services.

In September 2008, Bayfield Mayor Larry McDonald and Racine Mayor Gary Becker challenged Wisconsin harbor towns to support ecotourism initiatives such as boating and responsible use of natural resources.

The initiatives will be implemented by the Wisconsin Harbor Towns Association (WHTA) with support of the Wisconsin Department of Administration Coastal Management Program, University of Wisconsin Sea Grant Institute, Wisconsin Department of Tourism and Department of Natural Resources. Projects include beach and harbor cleanups, a voluntary Clean Marina program, and guides for tourists and boaters.

Sheboygan Mayor Juan Perez recently signed the WHTA agreement. "We realize we can make a difference in water quality," Perez says. In fact, beach cleanups in 2007 and 2008 yielded nearly 1,000 pounds of trash.

"We applaud the grassroots efforts of Wisconsin Harbor Towns to safeguard nearly 1,000 miles of coastline for the enjoyment of our residents and visitors for generations to come," says Wisconsin Tourism Secretary Kelli Trumble.

General green travel information can be found at: travelgreenwisconsin.com

To learn more about the Wisconsin Harbor Towns Association visit wisconsinharbortowns.org/

A long-term investment

FROM THE CLEAN WATER ACT TO THE GREAT LAKES WATER QUALITY AGREEMENT.

Wisconsin has taken many steps in the right direction, but much more is needed to fulfill the Great Lakes Water Quality Agreement's mission to fully restore and maintain Great Lakes water quality. Computer models forecast and scientific advancements have shown that actions once thought to be enough, are not sufficient to protect the Great Lakes ecosystem. So, where do we go from here?

Drafters of the original Great Lakes Water Quality Agreement anticipated that adjustments would be needed based on experience, new science and a greater understanding of the Great Lakes ecosystem. They recognized that they didn't have all the answers, but knew that urgent, forceful action was needed, says Chuck Ledin, retired director of the Office of the Great Lakes. Each revision to the Great Lakes Water Quality Agreement is made with hopes of improving this model of international cooperation.

"Thirty-six years after the passage of the Clean Water Act, we've made great progress and the Great Lakes are the poster child of that act," says G. Tracy Mehan, former assistant administrator for water at the U.S. EPA. But like Ledin, Mehan believes there is much more to do, not only in ratcheting down industrial waste (point sources) but curbing nonpoint source pollution from farms and cities, and softening impacts from development and other pollution sources.

"We need to recover the spirit of the 1970s when the Clean Water Act came out," says Ledin. "At that time, many people believed that the water quality problem was too big and there was nothing we could do. But a lot of people also understood that we needed to do something and as a result of private and public funding, we made a huge investment and we were the first state to meet the Clean Water Act goals."

RICHARD FREAR

The Great Lakes shorelines are dotted by 10 national parks and lakeshores, and hundreds of state and provincial parks.

That was a generation ago and Ledin says many people have again lost the confidence that we can take on emerging Great Lakes issues.

"We don't have to do it all tomorrow and be appalled at the price tag," Ledin says. "Let's do it over 20 years, or in some cases 50 years, but let's get a long-term view that is based on progress. After working on Great Lakes issues for more than 20 years, one thing is clear to me. Managing today's issues in Lake Michigan and Lake Superior is about long-term campaigns with expectations for results based on patience and teamwork."

FOR MORE INFORMATION

For more information on current Great Lakes issues, visit the DNR Office of the Great Lakes at dnr.wi.gov/org/water/greatlakes/

GREAT LAKES PROTECTION FUND

The governors of the Great Lakes States created the Great Lakes Protection Fund (GLPF) in 1989 to help protect and restore their shared natural resource. The GLPF is a private, permanent endowment supporting multi-disciplinary projects that lead to tangible improvements in the health of the Great Lakes ecosystem, promote the interdependence of healthy ecological and economic systems, and are innovative, creative, and venturesome. Seven Great Lakes states contributed $81 million to start the endowment. Wisconsin's contribution was $12 million and the Wisconsin DNR receives annual allotments from this fund.

Today, Wisconsin's GLPF grants are administered by the Office of the Great Lakes. Available dividends vary. At the high end, Wisconsin received $931,022 in 2000 but in other years no additional funds were available. Since the GLPF's first dividend payout in 1990 through Wisconsin's last payout in 2007, the state has received $6.3 million, says Kim Walz, GLPF manager for the Department of Natural Resources.

The Department of Natural Resources has an open enrollment process for grant fund solicitation. These grants are available to municipal, county and other local governments, universities, nonprofits and others. These funds have supported a wide variety of projects from Clean Sweep programs, removal and proper disposal of toxic substances like mercury, habitat enhancements, wetland protection and more. The funds must be used in the Great Lakes basin and support the Wisconsin Great Lakes Restoration Strategy.

There are many notable examples of efforts the DNR is supporting through this grant program to improve the Great Lakes. Having resources available to do these projects is a big step toward achieving long-term goals for the Great Lakes. Many of the projects and studies highlighted in this publication were supported in part by GLPF.

Improving fish habitat and access to the tributaries along the Great Lakes is key in achieving sustainable fish populations. By utilizing GLPF to fund studies that protect and restore these sensitive habitats we can improve our fisheries. The DNR has funded projects that look at the amount of woody debris, which is prime habitat for young brook trout and salmon, in Cranberry and Whittlesey creeks along the Lake Superior shore. Other projects educate county officials, highway departments and other groups on the proper design of culverts to facilitate fish passage to these critical habitat sites and promote sustainable fish populations.

The GLPF also helped the City of Bayfield build an advanced wastewater treatment facility to ensure a zero pollution discharge to Lake Superior. "The City of Bayfield went above and beyond reducing its discharge permit limits," says Walz. "The city is very aware of the special resource it has in Lake Superior and is serious about protecting it."

The best part of this money is the ability to leverage it with federal grants and combine our financial and cooperative resources with partner groups to achieve bigger projects," Walz says.

Sponsored by the Wisconsin Department of Natural Resources Office of the Great Lakes
PUB-CE-4020-2008
Written by Jo Temte and Kim Walz, Office of the Great Lakes, and Natasha Kassulke, creative products manager, *Wisconsin Natural Resources* magazine, wnrmag.com
Designed by Thomas J. Senatori
Cover photo by (from left to right) Frank Koshere, Catherine Khalar, Port of Milwaukee, Robert Queen, DNR File

Making tracks

At local woods or across the frozen waters, snowshoe hikes make for great winter adventure.

Story and photos by Timothy Sweet

The threat of falling temperatures, dangerous wind chills and near-blizzard conditions may trigger a hibernation response in some people leading them to spend more time indoors watching movie channels and nibbling on junk food. For others though — when the snowplow driver knocks the mailbox from its perch — winter has arrived and it's time to enjoy the piles of frozen flurries.

Open spaces at county and state parks are quiet spots to take a winter snowshoe hike. Get in shape, take your time, dress in layers and give it a try. Outdoor suppliers often rent recreation equipment if you'd like to try different kinds of snowshoes.

Wisconsin's wooded, rolling countryside and ice-covered lakes offer equally wide opportunities for snowshoeing. It's an activity that is easy to do, offers benefits of improved health and fitness, and the bonus opportunity to experience the special beauty nature creates during the coldest time of the year.

Getting yourself in shape before undertaking a strenuous outing is a good idea. A golden retriever provides me with regular and purposeful conditioning. If dog hair repulses you, take a walk with a friend and get those muscles limbered up for the trail.

I have a pair of very aesthetically-pleasing wood snowshoes hanging on the wall next to the front door. The floppy bindings have relegated these relics to service as a rustic hat rack. My wife got us each a new pair with lightweight steel frames. They have bindings that quickly and securely snap in place. (Waterproof hiking boots seem to fit best; larger insulated boots may be too big and heavy for this type of system.) Beneath each binding is a metal crampon that helps provide traction in icy conditions. These snowshoes don't make good wall decorations, but they sure work better than the old-fashioned ones.

Cold weather exercise should be bracing and refreshing without being bone-chilling. Dress in layers starting with polypropylene tops and bottoms to wick moisture away from the skin. Polar fleece or wool work best for middle layers, with a windproof shell on the outside. The layers are lightweight and comfortable. You will appreciate the change from cotton clothing, which absorbs perspiration and will make you feel cold when you stop physical exertion.

Start slow and start nearby. Many local nature centers have snowshoeing trails for the public to use. Some nature centers and outdoor sports shops even rent snowshoes so you can try them out before making a purchase.

Local community/county parks and trails provide good areas for you to hone your skills. I live in east central Wisconsin where the nearby Hayman Falls County Park in Shawano County has acres of wooded hillsides and steep ravines overlooking the Embarrass River. One memorable outing last year came after a night of wind-driven heavy snow. When dawn broke clear and cold, we went for a hike, and it was wonderful. Snow was still clinging

If you live in town, find out which trails, paths and routes are open for snowshoeing. Many county properties also offer beautiful places to explore on a sunny winter day.

Ambitious hikers can enjoy views only available by boat in the thawed-out seasons. Here a snowshoer visits Sherwood Point Lighthouse atop a 30-foot bluff at the northeast end of the Sturgeon Bay Ship Canal.

The Thordarson boathouse on Rock Island shimmers in spectacular ice in winter.

Tire bumpers atop the piers look like huge, frozen glazed doughnuts.

to every tree trunk, branch and bough in the woods. We came upon several places where deer had bedded down during the storm. It was invigorating and inspiring to be out in such pristine conditions.

Ice travel is another option for snowshoe use. I have enjoyed the beauty of crystal clear ice shoves along Cabot Point off Potawatomi State Park when following the shoreline out to Sturgeon Bay's Sherwood Point Lighthouse.

If you're a real adventurer at heart, consider a trip to Door County's Rock Island State Park in the dead of winter. The car ferry makes daily trips from Northport to Washington Island and back year-round. Drive across the island to Jackson Harbor. It's about a mile across the ice to Rock Island. You will be rewarded with spectacular snow and ice scenery. My last visit in February found the Thordarson boathouse pier completely coated in ice. Tire bumpers looked like glazed doughnuts. Icicles along the pier's north side looked as if they had been sculpted by Old Man Winter himself.

Such a trip requires extreme caution and preparation. Monitor the weather and contact the park rangers prior to your visit to check on ice conditions and to learn the safest route to follow. Bring some food, hot chocolate, water, a sleeping bag and a cell phone. Tell someone when you expect to be back in case there is a problem. Remember that no ice is ever completely safe.

What do you say? Are you ready to get off the couch, out the door, and into the glorious splendor of Wisconsin's winter wonderland? Perhaps now is the time to make tracks (big tracks, that is) to the nearest patch of snow and ice in your neck of the woods. Your heart, mind, senses and spirit will be glad you did.

Timothy Sweet writes from Clintonville and is President of the Friends of Rock Island State Park. He's enthusiastic about all seasons at the far-flung park off the tip of Door County.

Anita Carpenter views nature and her quilting with the same attention to detail. Her Wisconsin Beetles quilt shows the small creatures' natural colors, with slight artistic license. She and husband, Jerry, hunt for fabric swatches with the same concentration she calls on to keep an eye on plants, insects and other animals.

Piecing together nature

Naturalist Anita Carpenter's quilts of the outdoors are as colorful and keen as her powers of observation.

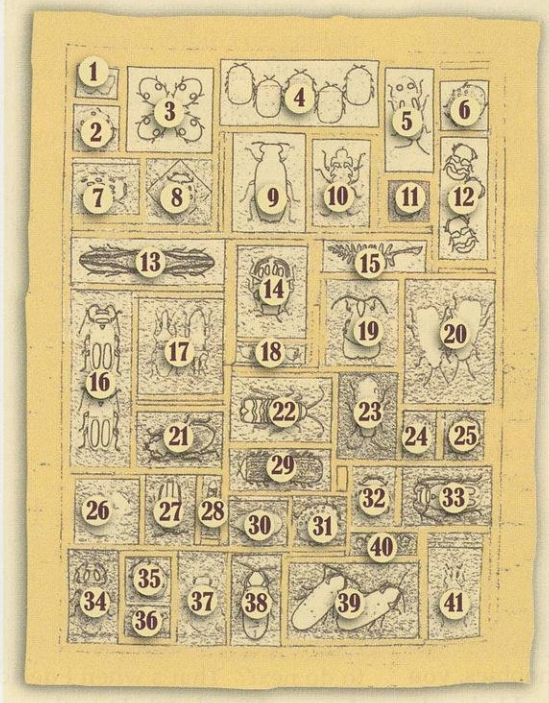
Story by David L. Sperling Photos by Robert Queen

For years, Anita Carpenter has shared the fruits of an inquisitive mind and a curious nature. Little did we know that the same writer who has taken our readers under tree bark, into snow banks, through thorns and nettles, up pines and into ponds in search of a closer look at birds, plants, insects and weather had another artistic side. Carpenter is also a deft needleworker who has found a distinct way to tell visual stories about the outdoors through crafting beautiful, colorful quilts.

"I've been sewing my whole life," Carpenter said. "My mother was a sewing instructor at the local technical school in Oshkosh, and she was a pretty demanding teacher. Even when we were in junior high school, she taught us what good edge-stitching should look like and how to use the features on sewing machines so we could add finishing touches to the projects and clothes we made. They looked really good and were well-made so they would last. After a while my skills got good enough that I could have made all of my clothes. I made dresses, skirts and the like when I was in high school and even into my college years. Then I got interested in other things and took a long sabbatical from my sewing."

Her break from sewing included delving deeply into the sciences, building a professional career as a pharmacist and feeding a passion for nature by "bird watching and butterfly chasing." A series of unrelated events brought about a new interest.

WISCONSIN BEETLES QUILT



1. *spring azure butterfly*
2. *ladybird beetle aka "ladybug"*
3. *ladybird beetles*
4. *Chrysomelid species (leaf beetles)*
5. *milkweed beetle*
6. *ladybird beetle*
7. *spotted cucumber beetle*
8. *ladybird beetle*
9. *blister beetle*
10. *tiger beetle*
11. *ladybird beetle*
12. *sap beetles*
13. *metallic wood-boring beetles*
14. *Chrysomelid beetle (leaf beetle)*
15. *Polypody fern*
16. *soldier beetle*
17. *snout beetle*
18. *acorns*
19. *net-winged beetle*
20. *flat bark beetles*
21. *ground beetle*
22. *long-horned beetle (locust borer)*
23. *tiger beetle*
24. *Amanita mushroom*
25. *Chrysomelid beetle (leaf beetle)*
26. *grapevine beetle*
27. *striped cucumber beetle*
28. *blue jay feather*
29. *Chrysomelid species (leaf beetles)*
30. *unidentified*
31. *ladybird beetle*
32. *ladybird beetle*
33. *soldier beetle*
34. *click beetle*
35. *ladybird beetle*
36. *question mark butterfly*
37. *tiger beetle*
38. *lightning bug*
39. *lightning bugs*
40. *bur oak leaves*
41. *snout beetle*

Anita has been sewing her whole life. Her mom was a sewing instructor in Oshkosh. Carpenter's interests in science led to a career as a pharmacist and an avocation as a naturalist. The *Wisconsin Butterflies* quilt above shows native Wisconsin species resting and nectaring on plant species they use interspersed with more traditional geometric log cabin quilt squares.

"We try to deliver a personal touch at the pharmacy where I've worked for many years," Carpenter said, "and back in the late 1990s a co-worker of mine who raises orchids had started displaying some flowers at the pharmacy. Our customers really liked seeing things other than medical supplies and medications. I started sewing up designs of snowmen, frogs and other seasonal things that we could put on display on the counter for a few months at a time. Our customers really liked them, and they'd comment 'Well, what are you going to do next?' Pretty soon I was doing seasonal wall hangings, like pumpkins at Halloween or heart stuff at Valentine's Day. Some of my customers asked, 'Why don't you go into quilting?'

"Well, I had seen what quilting can do to people. Like other hobbies, you can get obsessed with it, and I already had a fair number of obsessions," she chuckled. "I didn't want to become a person whose time was controlled by quilting, so I didn't take it too seriously. Then one day I was in a quilting store, and I saw a Halloween quilt that had panels with Halloween themes opposite log cabin quilt squares. I thought it looked kind of neat and that I could do something like that. At the time, I had been crocheting and sewing a lot of snowmen, and I thought I'd just try making a snowman wall hanging.

"I taught myself how to do those log cabin quilt squares, and I realized that quilting had its own vocabulary, just like any discipline, and it is very exacting. I had a lot to learn, but I eventually produced a snowman quilt and hung it up in the pharmacy. The response was positive and unbelievable. Once again my customers challenged me by asking, 'Well, what are you going to do next?' That's when I decided to do something that tied together some of my other interests, and I got the idea for my Wisconsin butterfly quilt. I've only been quilting for about five years, but I'd have to say that, like other quilters, I'm now possessed by another hobby," she laughed. "It just happened."

"I tried to take the summers off from quilting because I like to chase nature around in the warmer seasons and give talks to try and interest people in exploring nature for themselves. But now I do both my outdoor explorations *and* quilting."

We asked Carpenter if she combined both hobbies by taking some of her quilts along when she gives nature talks. She said, "I've done that. The audience seems to like the talks, but sometimes the quilts draw more attention," she laughed again. "That's OK with me because I view both as a teaching tool."

The quilts have to be seen in person to really be enjoyed. First of all, most of them are fairly large, and it's fascinating to take a close look at the different fabrics, textures and designs. Second, they are well-made and those of us who

In her *Forest Floor Mystery Quilt* the fallen leaves are the right color, shape and size for each species. Take a closer look to discover what crawls, slithers and walks around under leaves and on the ground in autumn. Can you find a spotted salamander? A garter snake? A Milbert's tortoiseshell butterfly and a question mark butterfly? Lady bugs? A walking stick insect? A trail of raccoon tracks? A blue jay feather?

This mushroom quilt was designed to interest children in taking a closer look at nature. It includes vines, butterflies, moths, flowers and caterpillars. See more of Ms. Carpenter's creations posted with this story on our website at wnrmag.com.

can barely twiddle opposable thumbs certainly appreciate the fine skills it takes to design and craft attractive artwork. Third, those who have a scientific bent will appreciate that these quilts warrant closer inspection and more careful observation.

Carpenter takes great care to select Wisconsin native species as her subject matter, and she selects fabrics that try to show the animals, plants and insects pictured in her works in their true colors. We had a chance to see and photograph nine of her quilts including some that focus on butterflies, flowers, beetles, fallen leaves on a forest floor, a huge mushroom quilt interwoven with other native plants and a weather quilt of a swirling hurricane pictured from above.

In Carpenter's hands and imaginative portrayals butterflies feed on the host plants they seek out in nature. Her depiction of fallen leaves accurately shows creatures, features and activities you might see in a close look of decomposing leaves on the forest floor. In her quilt patterns the leaves are the right color, shape, size and each is veined like the real leaves. The artwork invites the viewer to slow down and spend a little time looking at the detail that both nature and quilter built into the subject matter.

Part of the fun in composing such works of art is finding just the right fabrics for each piece.

"My husband, Jerry, and I strictly go to quilt stores to find good, quality materials in an array of colors. If you are going to spend hours and hours designing and piecing together quilts, it's worth it to invest in really good materials that will last," Carpenter said. "I search and search and search for just the right colors that will be colorful and accurate. I love talking to other quilters, too, because they all have their stories of finding that one swatch of fabric that is just right to match their vision of what something should look like. For instance, when I was doing that Wisconsin butterflies quilt, I just kept looking for the right shade of fabric to represent the lupine leaves that Karner blue butterflies feed on. We searched and searched, and in one store we saw this lady carrying a bolt of fabric around. As she passed by I just shouted out "That's it! That's the color I need." I knew right away that it was just the shade I wanted for those leaves, and thankfully there was all this extra material on the bolt when she was done.

"I really enjoy the creative process and the chance to first visualize then design and produce what I see in my head. I can't draw, so it's very satisfying when I can produce a piece that captures what I only see in my imagination. It grows as I go along," she said.

I just had to ask Anita if she displayed her works on her walls at home and how much room it must take to show them properly. Some are only a few feet square, but others are nearly the size of bed quilts!

"No," she said, "I'm not that kind of person. I just keep them rolled up in the closet. I'd rather see what's going on outside on my daily walks."

In Carpenter's renditions, accurate science and artful interpretation rest hand in glove. In her butterfly quilts, each of the delicate fliers are as accurate as possible, each wing is a separate piece of material, as is each spot or bar in the wing pattern. Also, the butterflies depicted are all feeding or crawling on native plants that they use. The Karner blue is on a lupine leaf. The swallowtail is nectaring on compass plant. The monarch is working over milkweed, and its chrysalid is hanging as it would when the caterpillar is undergoing metamorphosis. The tiger swallowtail

feeds on phlox, and the Milbert's tortoiseshell butterflies are on purple coneflower because that particular butterfly is an adult at the same time that the coneflowers are in full bloom.

She had to take some liberties. "Most often, you'd see mourning cloak butterflies resting on leaves on woodland trails. But for quilting purposes, I needed to put it on a slightly lighter background." Another near-ground species, the common buckeye butterfly is resting on a strawberry plant. Usually you see them resting on the ground, so I depicted them on strawberries since they are also close to the ground. The clouded sulphur butterfly is shown resting on blades of grasses. Question mark butterflies often perch on branches and tree trunks, as in the quilt design.

If you look closely at the forest floor quilt, you will not only see the mixture of maples, beech and oak leaves but some of the animals that typically crawl around on leaves in autumn. Look closely, and you'll find a spotted salamander, a garter snake, two butterflies — a Milbert's tortoiseshell and close to the bunchberries near the center, a question mark butterfly. There are also walking sticks, ladybugs and raccoon tracks on the quilt. Follow the trail of muddy footprints from the lower left corner toward the upper right.

"I always like to put a little puzzle in each quilt to make people look even closer," Carpenter said. "It might be a leaf that for its shape is intentionally the wrong color. In my mushroom quilt, take a close look at the spots on the Amanita mushroom.

"That quilt was inspired by a quilting show sponsored by the Oshkosh Public Museum featuring quilts designed for children. I asked myself how I might incorporate a nature theme for children into a quilt. I thought that children have curiosity and imagination, so I decided to make a larger than life Amanita mushroom, like the big mushroom in *Alice in Wonderland*. I put lots of pieces in that quilt because I thought it might catch children's interest. If you search the quilt a bit, you can find some little butterflies, a luna moth to the right of the mushroom and its caterpillar on the left climbing up the purple coneflower stem. The mushroom gills are quilted in to provide some texture. On the lower left there is a trout lily with pansies, bottle gentian, a sensitive fern, gray-headed coneflowers and a wild cucumber vine. On the right, you can see Solomon's seal, (that's the group of white flowers), pink lady's-slipper orchid, a wood violet and some sunflowers. Nearer the top you can see a dragonfly and some little snails on top of the mushroom. I took a bit of liberty with those snails. I'd say we don't have spotted snails in Wisconsin. That was just a bit of whimsy for the kids. A close look at the spots on the mushroom reveals that one of them is actually a mustard white butterfly.

"The hurricane quilt is done in a style called crazy quilting. You start from a center point and build up strips of material in layers on the outside edge. We had had so many hurricanes back in 2005 that I became interested in watching them develop on The Weather Channel. This view from my television screen of Hurricane Wilma forming and churning through the Gulf of Mexico caught my attention. It developed into a Category 5 storm in October of that year, and made landfall in Mexico, Cuba and the U.S. I started with the blue dot, the eye of the hurricane where you could still see the blue Caribbean below. Then the Doppler radar image showed the most intense rain on the screen in red, then green, then light blue all giving way to the Gulf of Mexico at the outskirts. We hung this quilt up at the pharmacy, too, but very few people guessed that it depicted a hurricane. We had a lot of fun with that one."

Carpenter's later creations include an Everglades quilt showing some of the unusual trees, ferns, animals and insects she has seen on trips to Florida. The wildlife areas down there are fascinating, she said. A lot of them in "the river of grass" take visitors across elevated boardwalks where you can look closely at the lush subtropical vegetation. These "hammocks" are inspiring places to watch birds, butterflies and tree snails, and you get long vistas from high and long horizontal distances when the boardwalks run just above the water.

What's the next project for this scientific stitcher?

"I have about a dozen quilting ideas in my head. It's just a question of which one I will work on next. My science background makes me want to be accurate, whereas my creative side says relax and have some fun. I get a lot of my ideas when I walk to and from work or when I take the "long loop" for about three miles that goes along Miller's Bay and Lake Winnebago. You never know what might spark an idea for a column or a project," Carpenter said.

David L. Sperling edits Wisconsin Natural Resources *magazine.*

A BAKER'S DOZEN OF ARTFUL CREATIONS

Anita Carpenter's quilt projects to date:

Wisconsin Butterflies	**2003**	**46 x 54 inches**
Forest Floor Mystery Quilt	**2004**	**46 x 54 inches**
Wisconsin Beetles	**2005**	**54 x 70 inches**
Hurricane Wilma	**2005**	**23 x 24 inches**
Anita's Amanita	**2006**	**44 x 55 inches**
Sunflowers with Monarchs	**2006**	**18 x 18 inches**
Poppy with Pink-Edged Sulphur	**2006**	**18 x 16 inches**
Zuni Bears on Utah Sandstone	**2006**	**25 x 18 inches**
Julia on Passionflower	**2007**	**16 x 16 inches**
Moonflower and Mangrove Skipper	**2007**	**19 x 19 inches**
Everglades Tree Island Paradise*	**2007**	**53 x 65 inches**
Lady Bugs on Parade	**2007**	**32 x 23 inches**
Puddle Party	**2008**	**48 x 41 inches**

** featured in the 2008 Wisconsin Quilt Expo*

2008 Index

Each December we publish an annual index of our stories. A cumulative index of our stories 1977-2008 is also available on our website, wnrmag.com.

Readers Write

COMMENT ON A STORY?

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

SUCCESS ON PUBLIC HUNTING LAND

I started hunting public land 15 years ago. My success rate has steadily increased from my knowledge of how other hunters hunt. Generally most hunters hunt close to the road and only for a few hours. [You just need to take steps to move into the properties farther and travel lighter]. For instance, on most public land you have to put up and take down your tree stand daily. This adds a lot of work to hunting on public land. I use a portable tree stand made from a nylon strap that is quiet and lightweight. It also acts as a safety harness. It can be used for bow hunting and gun hunting, and it does not damage trees. I have also started using kayaks and canoes to paddle my way deeper into public swamps and woods.

My favorite bowhunting places on public land are state parks that allow bow hunting during gun season. In 2002, with the outbreak of CWD, state parks allowed bow hunting around campgrounds where gun hunting is not allowed. It was a challenge that I always wanted to attempt, shoot a buck with my bow during gun season. I was successful my first day, as I bagged a seven-point buck. I have shot six deer with my bow during gun season since that first day in November 2002. I love to hunt that state park.

Lane Furseth
Janesville

WHERE ARE THE WARNINGS?

Where are the fish consumption warnings in the *Hook into a good time* article (August 2008), or did I miss them? People I know who grew up fishing on Lake Michigan say their mantra is "Eat small fish, and not very often." But the fish portrayed in the article are large, and therefore more likely to be PCB-contaminated.

Colleen F. Moore
Madison

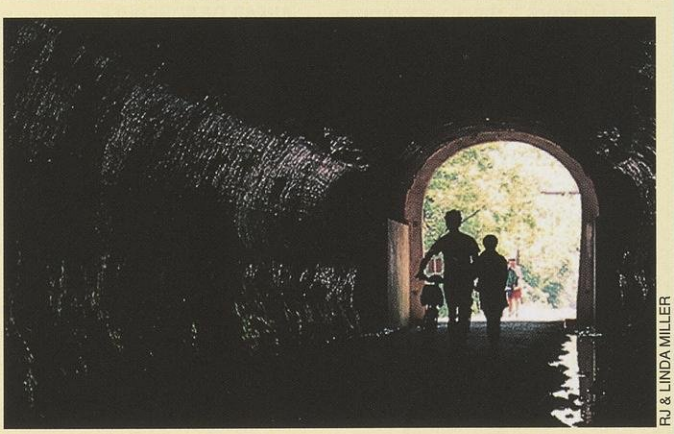
Fishing and eating one's catch are both fine Wisconsin traditions. The writer is correct that all anglers should heed health advice and choose which fish to eat in which quantities. Women in their child-bearing years and young children are most susceptible to accumulating contaminants. Safe eating guidelines for inland waters and specific advice to enjoy fish while minimizing exposure to mercury and PCB-contaminated fish are posted at the DNR website at dnr.wi.gov/fish/consumption. They are also listed on pages 14-15 of the general fishing regulations.

OPEN SEASON ON CROWS?

I recently watched two crows go after a mourning dove nest. They took each little bird out of the nest one at a time and sat on the limb and tore them to pieces. Now that the mourning dove is considered a Wisconsin game bird, I suggest a year-long open season on crows with a bounty to be decided later on. I would like to hear other bird hunters' opinions on this, for or against.

Pat McQuillan
Eau Claire

UPDATES



RJ & LINDA MILLER

ELROY-SPARTA IN THE TRAIL HALL OF FAME

In September the Elroy-Sparta State Trail was honored as a national Hall of Fame Trail by the Rails-to-Trails Conservancy, the nationwide advocate for preserving unused rail corridors and converting them to trails that promote healthy exercise. These trails link communities and encourage visitors and residents alike to explore the natural and cultural attributes of the communities along these corridors.

The Elroy-Sparta State Trail is a real beauty — 32 miles of bicycling trails in Juneau and Monroe counties with modest

Continued →

 Continued from page 27

UPDATES

grades that cut across woodlands, pastures and swooping hills of western Wisconsin. The trail goes past Amish and organic farmsteads, and forms a continuous ribbon of 101 trail-miles by linking together the Great River State Trail, the La Crosse River State Trail and the 400 State Trail.

The crowning features of the Elroy-Sparta Trail (aside from the hospitality you will find in six trailside communities) are three tunnels blasted and cut through the hills in 1873 to keep the railroad running. Tunnel #1 is slightly over a quarter-mile long between Kendall and Wilton. Tunnel #2 is of equal length between Wilton and Norwalk and the big dig, Tunnel #3, is nearly three-quarters of a mile long between Norwalk and Sparta. All three tunnels have doors on either end that were used to trap in the 45 degree heat during the frigid winter months. Back in the late 1800s, gatekeepers tended the doors all winter, opening them up to 50 times a day to accommodate traffic. Today, the doors remain open from the first of May until November for your traveling enjoyment.

In 1965 Wisconsin was the first state to convert abandoned railway beds into recreational trails promoting hiking, biking, snowmobiling and some ATV use. Wisconsin has one of the largest recreational trail systems in the country with 42 named trails and nearly 10,000 miles of roadways rated suitable for bicycle touring.

WISCONSIN A TOP-RANKED BICYCLING STATE

Wisconsin has been ranked the second best bicycling state in the country by the League of American Bicyclists.

"The League's survey measured factors like quality roads, safety, use of available federal funding and policy favorable to cyclists. But there's little doubt in my mind that if scenery, clean air, clean water and wildlife viewing opportunities were also included as cycling attributes, Wisconsin would top out in those categories, too," added DNR Secretary Matt Frank.

The survey is the first of expected annual rankings of states and is part of the League's Bicycle Friendly State program, supported in part by Trek Bicycle Corporation, Waterloo. Two other upper Midwestern states made the top ten with Minnesota ranked fifth and Illinois eighth.

To plan a leisurely, self-guided bicycling tour in Wisconsin, go to www.travelwisconsin.com and check the calendar of events, read the information on the Great Outdoors, or order a *Wisconsin Biking Guide*. Travelers also can call 800-432-TRIP (8747).

WISCONSIN RIVER FLOOD DEBRIS REMOVED AT LESS COST AND AHEAD OF SCHEDULE

More than 120 tons of debris along a 20-mile stretch of the Wisconsin River downstream of Lake Delton was removed by mid-September following extensive flooding in June. DNR Secretary Matt Frank noted that hard work by volunteers spearheaded by the nonprofit group Living Lands and Waters of East Moline, Ill., landowners and government agencies made that reach of the river much safer for navigation weeks ahead of projected cleanup schedules.

About 97 percent of the debris consisted of wood from walls, trusses, flooring and metal from five homes on Lake Delton that collapsed into the water.

On June 9, raging floodwaters cut a new channel from Lake Delton to the Wisconsin River, destroyed a county road and drained 600 million gallons of water from the 267-acre man-made lake in less than two hours. The new channel was 700 feet long, 370 feet wide and 30 feet deep.

ALISA LOPEZ

Five homes and more than 120 tons of debris washed into the Wisconsin River downstream of Lake Delton during June's floods.

TED AMMAN

Contractors, government crews and community volunteers removed almost all of the debris by hand.

The cleanup project was coordinated with the Department of Natural Resources, Columbia and Sauk counties, the village of Lake Delton, the Friends of the Lower Wisconsin, the Wisconsin Public Service Corporation, the Federal Emergency Management Agency and Wisconsin Emergency Management.

Thirty-one community volunteers, many helping for three days or more during the 24-day cleanup, removed 99 percent of the debris by hand. Fully half of the woody debris (7,000 pounds) and all 632 pounds of metal removed from the river were recycled.

The Department of Natural Resources is seeking reimbursement for at least 75 percent of the $92,430 cleanup cost from the federal government. Wisconsin Emergency Management will cover half of the remaining costs, and the remainder will be split four ways among the Village of Lake Delton, DNR and Sauk and Columbia counties.

Together we delivered cleanup weeks ahead of schedule, saving a quarter million dollars from initial projections thanks to volunteers, and an economical contract with the nonprofit group, said DNR Secretary Frank. "The floodwaters are gone but our work is ongoing to help communities rebuild," Frank noted. "We're inspecting dams, assisting wastewater treatment plants, and working with the Department of Transportation and the Village of Lake Delton to restore the lake, road and surrounding area," he said.

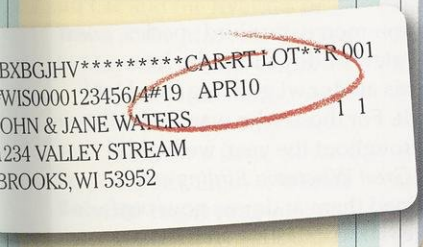
CORRECTION & ADDITION

A beautiful photo of a stream in autumn on page 4 of our October insert on the Stewardship Fund identified as the Pine River is actually Otter Creek in the Baraboo Hills of Sauk County. The photograph was taken by Steve Meyer.

Our October story listing help for family forest owners should have included the Wisconsin Woodland Owners Association, which for 30 years has served as an educational association to assist private woodland owners in managing their land sustainably. WWOA publishes a quarterly magazine and newsletter, sponsors workshops and conferences statewide, and has local chapters that host walks and field days. Its website, wisconsinwoodlands.org, contains a wealth of information to assist woodland owners in making good decisions for their land.

HOW LONG DOES YOUR SUBSCRIPTION RUN?

You can check how long your subscription runs by taking a look at your mailing label on the back cover. Your subscription runs through the issue shown at the end of the second line. In this example, the last issue is April 2010.

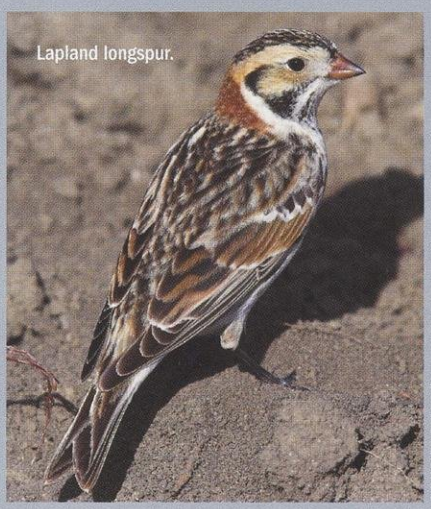


Winter wanderers

Continued from page 2

A kestrel flies over causing the flock to scatter and quickly disappear. I rediscover them around the next corner and stop to look once again. The larks are skittish, as usual, and as individual birds fly before me, I notice three seven-inch chunky white birds with black wingtips — snow buntings.

The buntings, *Plectrophenax nivalis*, are a special sight in winter. These arctic visitors sport winter plumage of earth-toned backs and forage for seeds on the ground. Like the horned larks, snow buntings are jumpy and will quickly retreat to the fields to escape. There they are impossible to find as they run among the clods. If they take flight, their white and black wing pattern is easy to identify. To see a large flock flying, turning and tipping as one, their black wingtips flashing against the white background or blue sky is a real gift in winter. Snow buntings will remain with us until March or April. Later in winter the feathers on the males' backs change from brown to black in preparation for a summer on the tundra.


Lapland longspur.

DOUG BACKLUND

Horned larks. Snow buntings. Whenever I see them, I always look closely for a third species I find most challenging to locate — Lapland longspurs. They are a lot like the snow buntings, but no black wingtips. I spot a few. It's been years since I've seen them.

The Lapland longspurs look a lot like fat house sparrows with buff colors and a subtle rufous face patch. This is their winter plumage, which we normally see. The adult male's breeding plumage is stunning with a yellow conical bill, yellow eyeline, black cap, face, chin, breast, and a rufous nape on the neck. We rarely get to see these bold colors as the longspurs depart for the arctic before their colors change.

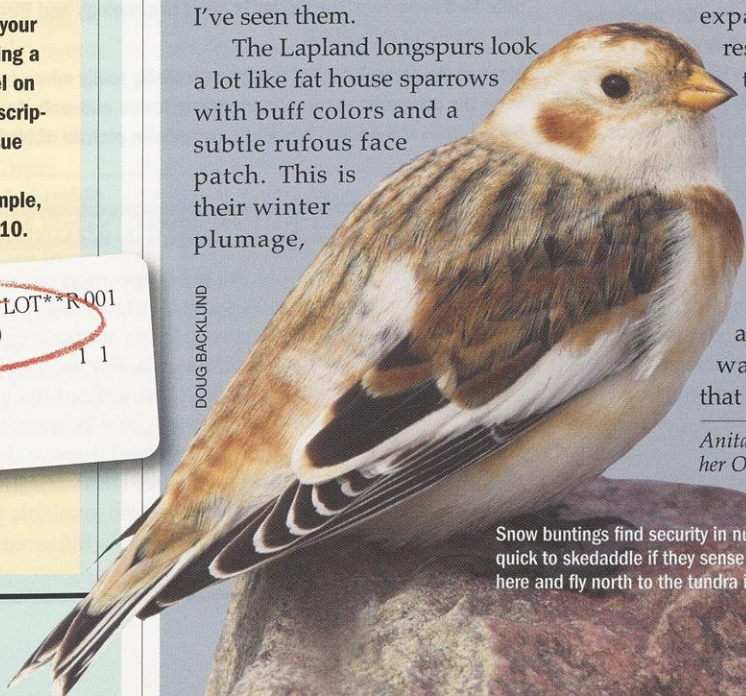
A flock of longspurs does not fly in as tight a formation as the snow buntings. Rather, each bird moves on its own undulating flight path. Collectively the flock looks like popping corn as it bounces along, up and down. When migrating, Lapland longspurs fly high overhead, and many birdwatchers hear their mechanical rattle flight calls rather than see the birds.

The Lapland longspur, *Calcarius lapponicus*, is one of four longspur species found in the United States, but the only one likely to visit Wisconsin. "Longspur" refers to a long nail on the hind toe, and "Lapland" was a common term that European taxonomists used to describe birds that nested in the arctic.

Like horned larks and snow buntings, the Lapland longspurs wander about in winter, frequently in company of the other two species. Search for them in open fields, beaches and near airports, wherever expansive, flat exposed lands might resemble their arctic home. Some years they are numerous, and other years devilishly difficult to find.

What a day this turned out to be. First, the largest horned lark flock I've ever seen, then the snow buntings and a close look at Lapland longspurs. Later, on the way home I'd find a flock of 400 snow buntings and three rough-legged hawks; a great way to start the winter birding season that dawned so slowly that morning.

Anita Carpenter loves her winter birding trips from her Oshkosh home.


DOUG BACKLUND

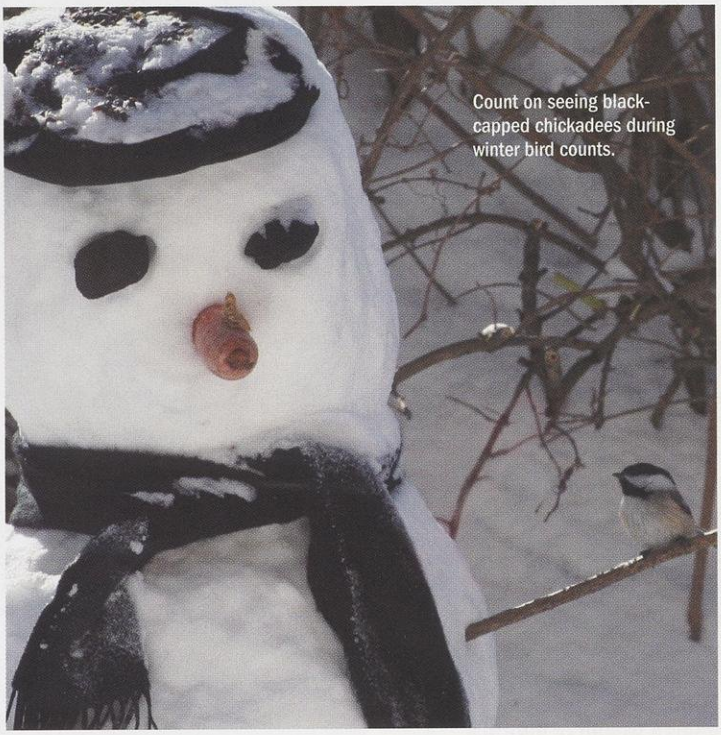
Snow buntings find security in numbers in winter. Big flocks are quick to skedaddle if they sense a nearby predator. They winter here and fly north to the tundra in spring.

Count the flocks

It's cocoa-sipping weather and whether you are more inclined to watch wildlife through the window or slip on a hat and coat and get outdoors, there's a way to meet your needs and level of enthusiasm. It's sort of like exercise. Some want to start slow, and just walk at their own pace. Some want to jog. Others want to log their run time, head for a gym, hit a treadmill and vary the incline to test their inclination. Still others get into company and competition starting with fun runs, 5K foot races and work up to marathon running and Ironman competitions.

In the wildlife watching world, some start by looking out the picture window or by taking winter walks. Maybe you will get a few field guides to identify tracks, note birds' field markings and work up to a pair of binoculars. Perhaps the next step is getting a CD of bird calls and observing bird behavior in fields, forests or city parks.

To share the enthusiasm and get some company, others go on guided birding hikes then take part in bird-watching programs with varying levels of commitment. Here are three popular programs where birders of a feather flock together in winter. All these programs are designed to use the collective powers of observation of birders nationwide (or worldwide) to give bird researchers a snapshot of bird populations and distributions at a given point in time.



Count on seeing black-capped chickadees during winter bird counts.

LARRY CLEMENS, GLADSTONE, MI

■ **The Great Backyard Bird Count, sponsored by the Cornell Lab of Ornithology and the National Audubon Society, will run from February 13–16 this winter. Birders can take as little as 15 minutes a day or as long as you like during the four-day event. Simply watch one place or several places for a set period of time and record the highest number of each bird species that you count in each location. Also record the location, time of day, weather, and send your results online to the website gbbc.birdsource.org/gbbcApps/input.**

STEPHEN J. LANG

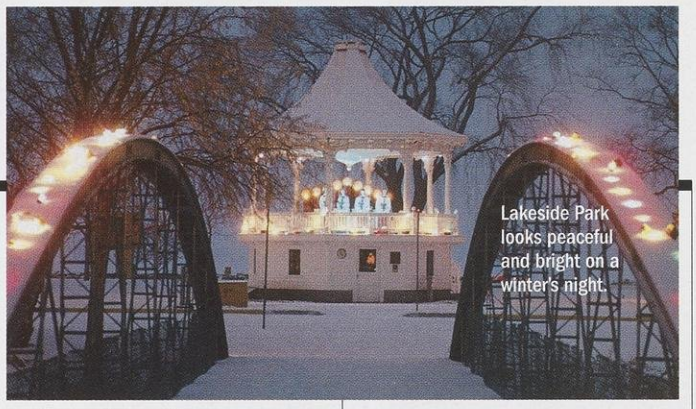
■ **The Christmas Bird Count is a one-day early winter census of wild birds conducted some time between December 14 and January 5 this year. Birders join a group and designate a 15-mile-radius circle within which the viewers attempt to identify and count every bird they can see or hear on that one day. This is a fine opportunity for fledgling birders to join experienced hands, learning to identify birds by sight, flight, song and other distinguishing characteristics. This bird count, in its 109th season, started in 1900. It is the longest-running citizen science program to compile records used to estimate bird populations and distributions worldwide. To join the program and find a "compiler" nearest you who organizes the birding field groups, contact the National Audubon Society site at www.audubon.org/bird/cbc/.**

■ **For those of you with a bit more of the marathoner spirit, consider signing up for Project Feeder Watch. From mid-November through early April each year these birders visit hotspots in back yards, nature centers, local ponds, parks and woods to make weekly or biweekly observations that are submitted on forms or in online reports. The data are compiled and used by ornithologists to mark population trends, document spreading diseases, highlight irruptions into unusual ranges, form long-term range changes as well as note the foods and environmental factors that attract birds to an area. The reporting website: www.birds.cornell.edu/pfw/ provides tips on how to estimate flock sizes and note bird behaviors. The Cornell Lab of Ornithology and Bird Studies Canada join forces for this effort.**

Most of the formal birding programs include really minor registration fees to keep the programs running by providing forms and websites to compile data from across the nation, forming a composite picture of birding activities.

FREE BIRDING INFORMATION

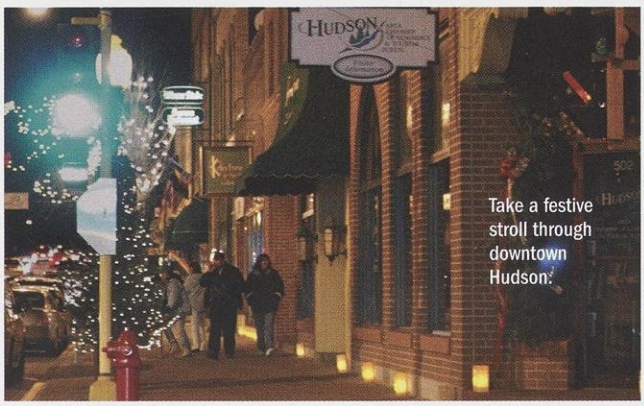
For an online checklist to the more common native bird species you can expect to see in Wisconsin, view or download the free PDF file, Checklist of Wisconsin Birds at dnr.wi.gov/org/land/er/publications/GWBNT/checklist.pdf. For those who want to hit the road to find best bets for birding throughout the year, we highly recommend the five-booklet series *Great Wisconsin Birding and Nature Trail* viewing guides. Download them at dnr.wi.gov/org/land/er/birds/trail.htm. The pocket-sized checklist and glovebox-sized viewing guides are also available free of charge through DNR service centers, Wisconsin information centers and through travelwisconsin.com.



FOND DU LAC AREA CONVENTION AND VISITORS BUREAU

Nights and lights

It's only natural that as we approach and pass the winter solstice, we look forward to events that are uplifting and illuminating. Every culture's got 'em. Whether celebrated with fires, candles, twinkle lights or LEDs, a little sparkle warms our spirits and spreads a little cheer. Traveler is in the mood to share the warm glow of a little light on a dark night.



HUDSON AREA CHAMBER OF COMMERCE & TOURISM BUREAU

Take a **downtown stroll** along Second Street in the heart of Hudson, for instance, on Friday, December 5 and you'll find the streets aglow with luminaria candles, the odor of roasting chestnuts wafting down the alleys and carriage rides past the festive shops. 1-800-657-6775. Similar events will light up communities across the state that weekend including the **Festival of the Trees** in Whitehall, Trempealeau County, the **Lakeside Park Holiday Lights** in Fond du Lac and the **Avenue of Trees** at the Mayville Pavilion in Mayville, Dodge County.

For us nature buffs, winter weather provides ample reasons to follow a flame down a favored path. Enjoy a **Winter Solstice Night Hike** on Friday, December 19 at the Kettle Moraine State Forest-Northern Unit in Campbellsport. A mile of one of the ski trails winding through the woods will be lined with luminaria. Come join us from 7-8:30 p.m. for a hike that culminates with a bonfire, some hot cider and fresh cookies. Recommended for anyone six years or older due to the length and undulating terrain. Vehicles parked at the trailhead need valid state parks stickers. (920) 533-8322.

If you warm up to the idea of candlelight strolls, skiing or snowshoe tromps but you are already booked for the 19th, check out the **seasonal listings of candlelight tours** at DNR managed parks and forests at dnr.wi.gov/org/caer/ce/news/candlelight.htm. The listings are updated throughout the year so you can move from the bracing chill of shuffling through crystalline snow on a moonlit night, to the earthy odors of a spring hike, a sultry amble along a sandy beach or the crispy crunch of an evening hike through falling leaves.

Start the New Year with a bang and sizzle at the midnight **Skyrockers Fireworks at the Bluff** from Grandad Bluff on Dec. 31 in La Crosse. Depending on your point of view, you can take in the show along the river valley from the bluff, on a sledding hill, a ski trail or even while ice-fishing the Mississippi River. If you just can't keep your lids open to ring in 2009, there's a 6 p.m. show for kids and the young at heart. Details at (608) 782-2366.

Kitty-corner across the state you could make a reservation in Egg Harbor for a **candlelight horseback ride** on the afternoon of New Year's Eve from 4-6 p.m. through the woods of Door County. Hit the trails, then warm up with some warm cider or a stiffer libation around the fireplace. Contact Kurtz Corral Riding Stable, County Road I in Egg Harbor, (920) 743-6742.

Had enough of the dim lit mood and want to get back to the bright lights? How about doing some high flying New Year's Day at the **Cool Fool Kite Festival** at Veteran's Park in Milwaukee? Buggy rides and an ice sculpture demonstration join the tight strings near the Lake Michigan shoreline. (414) 305-3145, www.giftofwings.com.

RJ & LINDA MILLER

THOMAS J. SENATORI

Let the warm glow of a candlelit hike thaw your spirit on a cold night.

Wisconsin, naturally

FERN DELL GORGE
STATE NATURAL AREA

Notable: This small, scenic gorge cut into the Cambrian sandstone south of Mirror Lake is noted for its rich diversity of northern and southern plant species, including several ferns. Maidenhair, Goldie's, interrupted, bulblet, lady, polypody, northern beech, oak, and silvery spleenwort ferns grow here on the vertical cliff faces and the gorge bottom. White pine, red pine and oaks dominate the forest above the chasm.

How to get there: Within Mirror Lake State Park. From the intersection of I-90/94 and State Highway 12 south of Lake Delton (Sauk County), go east (south) on 12 about a half-mile, then west on Fern Dell Road 2.2 miles. Park on the road shoulder and walk north into the unsigned natural area. A state park sticker is required for entry. See dnr.wi.gov/org/land/er/sna/sna407.htm for a map and more information.