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WISCONSIN NATURAL RESOURCES

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Taking better wildlife photos

What little fish tell us

New books and good reads

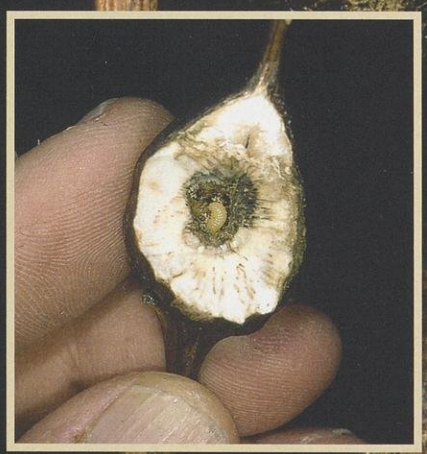
Special insert: Wisconsin shipwrecks and maritime trails poster

The gall of that fly!

Burrowed in a swollen plant stem, a tiny fly larva waits out winter.

Anita Carpenter

Finding insects on a cold, white winterscape is improbable, but not impossible. Minute snow fleas appear as black specks jumping on or hovering above freshly fallen snow. A mourning cloak butterfly floats about on an unseasonably warm day, seeking shelter as the temperature drops. Cecropia moth caterpillars are wrapped in slender brown cocoons attached to twigs.



DON BLEGEN

Galls form when insect larvae burrow into goldenrod stems in springtime. Plant cells grow and wall off the injured areas. The larvae chew out a small chamber in the center where they overwinter and pupate.

One insect that is easy to find overwinters as a dormant larva, the fruit fly, *Eurosta solidaginis*. Its home is inside a brown, marble-sized swelling midway up a Canada goldenrod stem. The bug's relationship with Canada goldenrod, *Solidago canadensis*, began last spring when a female fly deposited a single egg sometime in late May to early June on the young leaves growing at the tip of a goldenrod stem.

DON BLEGEN

continued on page 29

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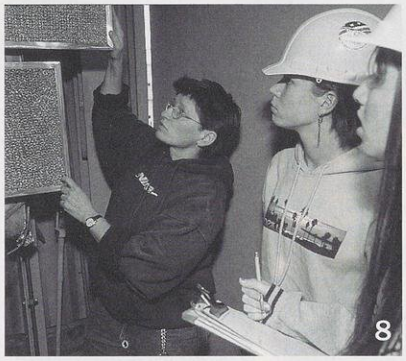
OCONOMOWOC HIGH SCHOOL


HERBERT J. LANGE


ROBERT QUEEN

FRONT COVER: Red fox *(Vulpes vulpes)*. Males pair up with females in winter and remain together until pups disperse in late summer. Learn animals' habits to increase chances of photographing them at different times of the year. See p. 17-21.
Herbert J. Lange, Hazel Green, Wis.

BACK COVER: Devil's Doorway is a must-see formation at Devil's Lake State Park. Other stunning quartzite formations, a "pygmy forest" and remnant prairies can be enjoyed at the East Bluff State Natural Area on the property.
Ray Mathis, McHenry, Ill.

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Contrasting foresters

CLOCKWISE FROM LEFT: Al Prey, Paul Pingrey, Harry Janz, Greg Matthews, Rick Livingston, Paul Stearns and Ray Hendrikse.

A brief look at forestry then and now in Sauk County.

Story by Greg Matthews, photos by Richard S. Wojciak

Recently, a group of men with a common interest gathered around a table at a Baraboo café and discussed how it used to be and how it is now for DNR foresters working in Sauk County. Participants were retired DNR (then Wisconsin Conservation Department) foresters Ray Hendrikse, Al Prey and Harry Janz. These three men all worked in Sauk County beginning in the 1950s, although Mr. Prey mainly worked in Columbia County, and later led DNR's forest pathology program. Joining them were Rick Livingston and Paul Stearns, current DNR foresters in Sauk County, and Paul Pingrey, who worked in the '90s as the DNR Sauk County forester and is now a private forestry specialist in the DNR Division of Forestry at Madison, coordinating training and programs for foresters who work with private landowners. I was asking the questions as public affairs manager for the agency's South Central Region.

Paul Pingrey, you are the impetus behind our get-together here. What prompted you?

PAUL PINGREY: It was an experience I had here with Harry. He dropped by one day to see me at my office when I worked in Sauk County. It was a typical day with phone call after phone call and people coming in one after the other. Poor Harry was left there standing and could hardly get a word in edgewise. Finally after the office cleared out, Harry shook his head and said, "Wow, it's sure a lot different than when I used to be here."

HARRY: That's right. Back when we were here, Ray would say, "Gee Harry, it's kind of slow right now. Maybe you should go out and drive up and down the road and knock on doors and see if anybody wants to plant some trees."

Once I stopped at a farm in Freedom Township and talked to the owner about putting his woods in the tax law. He was hesitant about the government getting control of his property.

AL: Harry came over to Columbia County every Wednesday and worked with me and I occasionally went over to Sauk County and worked with him on timber sales. In 1959, we planted a million trees in Columbia County.

That's one thing I'd like the older fellows to talk about. Most of the landowners back in your day were farmers, is that correct? You said that many were skeptical about the Department of Natural Resources.

AL: Yes, and when we started, we worked for the Wisconsin Conservation

Department. Until we arrived, there were only two foresters in southern Wisconsin. There was no [agency] infrastructure for working with private landowners and small woodlots. Professional state forestry concentrated on county forests, state forests, large blocks and fire control...all in the north. Ray was the first county forester in the south.

RAY: I was at Tomahawk at the time [1958] and was told that we're opening an office in Baraboo. I said, "Where's that?" And they said in Sauk County. I came to Sauk County and it got busy...we came to work at quarter to eight, we were out in the field by 9 – 9:30 a.m., so during the day we didn't have an answering service....Talk to my wife, she was the answering service and took a lot of phone calls.

RICK: Well, one thing has changed since then. We do have an answering machine, we have e-mail and we also have the forestry locator system and all those things compound the requests we get....That's not a complaint, that's just the way it is.

RAY: Up north the forestry program focused mainly on large land holdings and big corporate owners. They dealt with one person who controlled 100,000 acres. Down here, we didn't have any of that. Some landowners weren't about to cooperate with us. To get people to do a lot of things was very, very difficult.

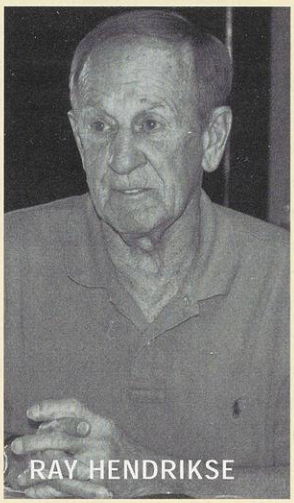
Were there not some people who bought into it right away?

RAY: Oh sure, sure, and some of those people who wanted to participate in sound forestry lived in other areas, but bought land here in Sauk County.

AL: What really got forestry started here in southern Wisconsin was the Cooperative Forest Management Act...a federal cost-share, tree-planting program that began, I believe, in 1947. At the same time the state was putting on timber harvest demonstrations to show farmers you could manage the woods like a crop that would give you a return and keep growing. That was one of the early efforts to teach a farmer to take care of woods, just like you would take care of the rest of your crops that were going to grow into something valuable.

HARRY: But you have to remember back in those days their timber was worth about $25 to $30 [per thousand board feet of red oak]. You weren't talking very much money. And if they were going to sacrifice maybe an acre, it would take ten acres of woods to pasture one heifer, but that was better to them than not getting any money.

The value of timber has changed so much now that you have to get a sense of the mindset. Nowadays, timber prices are pretty high, landowners know what board feet of lumber are, and most of the species are saleable. Back then farmers knew the value of a bushel of corn, they could talk about how many gallons of milk they expected the herd to produce, but we couldn't talk about board feet of trees to them. We had to explain how to convert that tree to board feet estimates to compare that value to what they might make on eggs or milk. You had to get that potential dollar value across to them, and it wasn't an easy sale because they didn't deal with trees that much.


RAY HENDRIKSE

"...after all we were dealing with people more than we were dealing with trees, and that's where the line needed to start."

RAY: That's right. The woods were more valuable to farmers for letting their cattle run and graze.

HARRY: Back in the first years that I was working, if someone bought a farm, usually it was a farmer, and if you asked him what was in his woods, he didn't know. He never walked in them...because that woods was only there. It didn't plant itself to annual agriculture.

So they pastured the woods and used them for firewood?

HARRY: Oh yeah, they made a pasture out of it, but the thing that really brought the cows out of the woods was economics. In other words, fencing got time consuming and expensive. And as the fences deteriorated, the farmers began growing green feed. They found they could green chop, give it to their cows more inexpensively with more nutrition than they could achieve by letting cows pasture in the woods. I think it was economics that took the cows out of the woods rather than what we were doing or recommending as foresters.

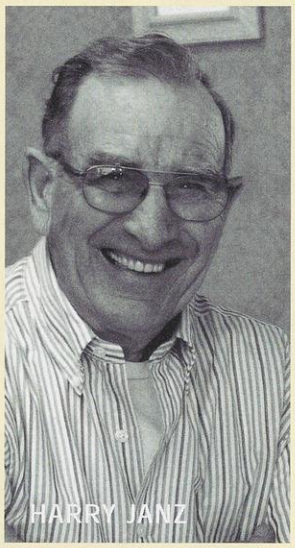
RAY: Farmers were not the only ones changing. There were changes in the Department of Natural Resources mindset, too. As foresters coming out of school, we were interested in growing trees and getting that tree canopy up. I didn't have much field experience and didn't appreciate that the farmers in southern Wisconsin were a whole different mix of people than I had known up north. I'd get out to their property and immediately ask, "Where are the woods?" Harry taught me that I needed to take a different approach. I needed to spend a little time showing an interest in the farmer, ask about his corn crop and his cattle. Harry taught me that if the farmer was in the barn, I ought to walk through and talk to him for a few minutes. Ask how his crops were doing, comment on some of the equipment and start a conversation, because after all we were dealing with people more than we were dealing with trees, and that's where the line needed to start."

We needed to establish a level of trust. And we had a lot of work to do to convince the landowners that those woodlots and trees might someday be valuable to them.

PAUL PINGREY: Attitudes change slowly, and so does our view of the land

itself. When I was here in Sauk County in 1997, I think it was the first time that a UW-Extension agent here determined that the average value of woodland exceeded the value of cropland.

PAUL STEARNS: Land patterns are changing now and people are buying woodland for a high price. Some of the marginal cropland and even good cropland is being converted to trees or grasslands.



"Back in the first years that I was working, if someone bought a farm, usually it was a farmer, and if you asked him what was in his woods, he didn't know."

RICK: There's been a real re-education here when we deal with farmers. When you talk about doing some kind of harvest, that's no problem now. They understand it, that trees can be a crop and cutting is something you need to do, or is appropriate to do. But when you deal with some of the new clientele now, the absentee landowners or some people who don't have a lot of experience in their woods or managing woods, it's a re-education process all over again.

That brings us to today, working with nonfarmers, the new demographics in this county. What are the needs and wants of these new landowners, compared to what these fellows were talking about with farmers 50 years ago?

RICK: Well, a lot of people don't know exactly what they have out there. Most of them are interested in a place to get away to and a place to recreate. They are interested in managing to protect the woods for wildlife and recreational benefits, and they don't look at their woods as a commodity. Quite often when you can explain to new landowners the benefits that they can get through timber management, they start to understand that they can actually manage their timber and still get those other values that they are looking for.

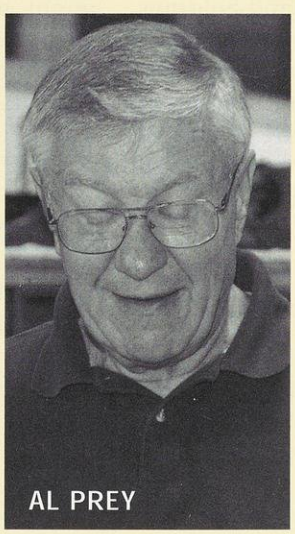
PAUL STEARNS: A lot of them are looking for that tax break [DNR's Managed Forest Law] and that's what gets us in the door first. But I think the one-on-one contact with the landowner is probably still as important as it ever was. We are just dealing with different people, often city folks now rather than farmers.

RAY: I agree. These moves back to the country are not about family income, it's more personal, and it takes personal attention. For some, the interest in rural land is a chance to go back to the feelings they had as kids. A lot of families moved from rural areas into an urban life. They miss privacy and the chance to be by themselves. But there are practical reasons why the new landowners need our help, too.

PAUL STEARNS: When Harry was talking before, I was thinking he might be leading into talking about land values, because that has really been a driver for us in the last ten years. Land prices are so high and the tax on forest land has become so extreme that foresters don't have to knock on doors any more for business. As I said, initially people come to learn about tax breaks under the Managed Forest Law (MFL). I don't know how many MFLs you did on average when you were here in Sauk County, maybe 25 to 30, but that business has quadrupled. We are well over 115 to 120 MFL assessments this year. It's a lot of business, but I look at that as opportunity because it gets us out onto property, making contact with owners and working with them.

RICK: I don't know, I see a lot of similarities in some ways. We're still dealing with people as much as we are dealing with trees, but there has been a change in the experiences of the people we're dealing with now. Not as many people these days had the luxury of being born and raised on a rural landscape. We now work with a lot more absentee landowners, and I suppose this rural land is a luxury for them as well. Like our traditional clients, they are smart. But a lot of them also have money, so they are game to do more habitat management and long-term forestry, even though it is going to cost them more now instead of getting a more immediate return.

Other aspects of the job are the same. You still have to get out there in the woods and do the on-the-ground evaluation of whatever you are looking at. I hope that doesn't change. We are advancing more and more electronically all the time. There are lots of tools to be more exact in the field, but I still think that being out there on the ground is still the most important task. Forestry and landowner assistance is a hands-on profession.



"What really got forestry started here in southern Wisconsin was the Cooperative Forest Management Act...a federal cost-share, tree-planting program that began, I believe, in 1947."

RAY: DNR's role is a little different now. Even as recently as the mid '70s and '80s, when I was in the field with my supervisors, we looked at the volume of timber harvested and our markings as a measure of our accomplishments. In the last decade, that has really changed. Now we're looking at a whole broad range of services. Our DNR foresters have stepped away from setting up as many timber sales. We've realized that the private sector of consulting services can

set up those sales and represent the landowners' interests.

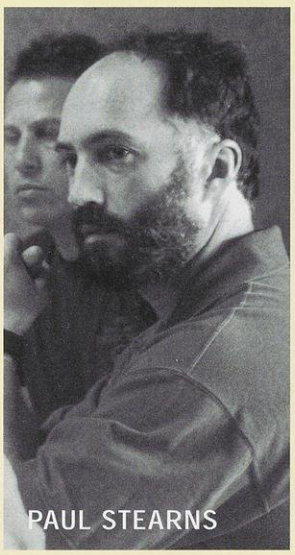
PAUL STEARNS: Now we measure more of our success by the inspections and "walk throughs" we do. Back in the 1980s, people thought this was one of the least valuable services we offered, but now that is turned completely around and it's considered one of our most valued pieces of advice. That walk through with the landowner provides objective advice about what they might expect from their timber and their property. We recognize that this is one of our most valued services.

Other parts of our clientele are relatively new. For instance, land trusts and conservancies own land now in Sauk County, and they are interested in managing that land to preserve many natural values more than ever. We work together with them for both educational projects and for sound land management. We help them enroll property in the Managed Forest Law and offer guidance. We also have contact with those who own the parcels next to conservancies, and they are interested in knowing what's going on in those parcels. Many of those neighbors will work with foundations and a host of other partners with strong interest in land management. We are in contact with the local Land Conservation Department on a weekly, if not daily basis. And there are other forestry organizations like the Woodland Owners Association and the Tree Farmers who are quite active with us and other property managers.

RAY: Another area of work that has changed is concern and knowledge about invasive species. We never had to touch that invasives issue when we worked down here.

RICK: I was just thinking that there are two types of "invasives" we deal with, and one of them is people! Talk about forest fragmentation! The continual parcelization of land as chunks of property get broken up into smaller and smaller pieces has a real impact on how you manage that land. The number of people you have to deal with is growing, and smaller parcels don't lend themselves to the same kinds of long-term plans you can set up on a larger landscape.

Then there is the other issue of invasive plants. Honeysuckle, buckthorn, multiflora rose, garlic mustard, wild parsnip: We didn't even talk about those things when I started working in Richland County. Now those plants are all over the place. Even when I was in Green County, we only dealt with a little of that. About two years ago when I went back to a soccer game in Green County with one of my kids I couldn't believe how much honeysuckle was along the roadsides and into the woods. And in other areas out here, I can't imagine how you get down to a trout stream and fish with all that wild parsnip around you.


PAUL STEARNS

"Now we measure more of our success by the inspections and 'walk throughs' we do. Back in the 1980s, people thought this was one of the least valuable services we offered, but now that is turned completely around and it's considered one of our most valued pieces of advice."

PAUL PINGREY: It's not just in the flora [plants] it's also in the fauna and fisheries now. The whole gamut of water quality, fisheries, parks, wildlife and forestry programs is dealing with invasive species. Just as in our forests, the danger is that invasive species simplify the system of plants that would normally be on the landscape. You just don't have the diversity of plants that you would otherwise see. Just yesterday, I was in that same woods we were just talking about. It is really rich in plant life, all the spring flowers were up right now and it was really pretty in there. But when we hit the area where the garlic mustard was, all you could see into the distance was a solid green island of this invasive plant and it simply crowded out everything else. It spreads so easily and seeds so easily, and it is spread by people and wildlife.

Then, of course, there are the "invasive" species that we spread ourselves intentionally because we thought these plants were so important for a host of wildlife, like hedgerows of multiflora rose or Autumn olive. We used to just plant it all the time. And those plants don't just go away. They persist so. Some were planted as ornamentals because they have lots of berries and the birds love them.

Another thing that's changed is the privatization of forestry. You know, the number of consultants that are out there now. Fifteen to 20 years ago there were hardly any, and now in Sauk County alone there are about a dozen, not including industrial farmers. It's a good thing in a sense, because more good timber is getting managed than we could ever do. We don't mark as much timber as we used to and I do miss that.

RAY: You're right. The new landowners don't necessarily have the attitude against government control, yet they have a consultant available to them who is using governmental regulations. But, yeah, it's changed a heck of a lot. I would love some day to go back and spend a week or two with Harry marking timber in Sauk County.

AL: And I miss going swimming at Devil's Lake after work. I used to come home at 5:30 and I would go to Devil's Lake, swim for half an hour and come home and have dinner, take my kids and go back to Devil's Lake and swim from 7:30 to 8:00. They went to bed, and I would take my dog and go back and swim again until 10:00.

RAY: Hey, I thought you were going to say you'd take your wife!

Greg Matthews is public affairs manager for DNR's South Central Region.

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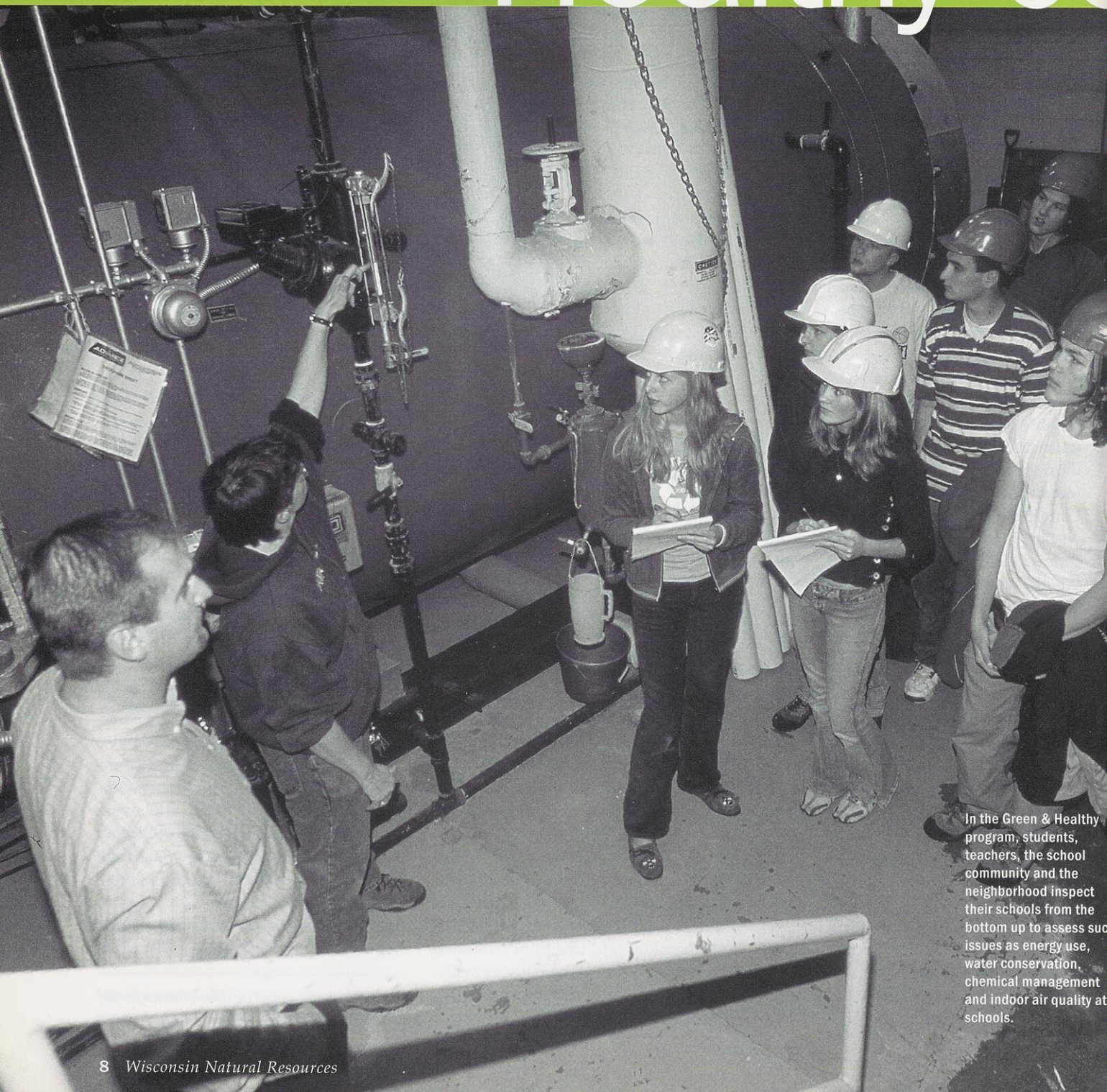


In the Green & Healthy program, students, teachers, the school community and the neighborhood inspect their schools from the bottom up to assess suc issues as energy use, water conservation, chemical management and indoor air quality at schools.

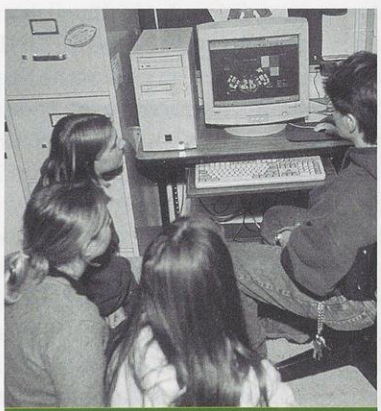
ools = mmunities

A voluntary environmental assessment program offers the right equation for students to examine their school grounds and learn about the community at large.

Joel Stone and Christal Campbell

It's often said schools are a microcosm of society. If that is true, Wisconsin is on the way to a sounder, safer future. Through the Green & Healthy Schools program, students, teachers, parents and communities are working together to save energy and make better use of natural resources on and around school premises. Efforts by participating schools to create a clean, wholesome environment for learning and growth have had positive spin-off effects, including lower school operation costs and, in one case, an improvement in local traffic flow.

Untangling a traffic snarl is certainly a worthy achievement, but the program's most valuable contribution is the number of students who gain firsthand experience of the complexities involved in managing resources and who learn how to bring about change through collective evaluation and action. The decisions and choices they must make and the actions they must take to have a Green & Healthy School mirror the situations they will face as tomorrow's citizens and leaders.



OCONOMOWOC HIGH SCHOOL

Examining how energy, water and other resources are used at school prompts similar looks throughout home communities.

The DePere Green Team is forming an action plan that will revamp the recycling program, promote hand washing to reduce disease spread, develop a composting program for the school district and work on transportation safety.

CHRISTINE FOSSEN-RADES

DePere digs deep for information

Christine Fossen-Rades, a teacher at DePere High School, says her school embarked on the Green & Healthy School program when Pat Meyer, building and grounds supervisor for the DePere School District, asked her environmental science class for help. "He wanted my students to give him ideas and sources of information on how to make future school buildings healthy, safe and environmentally friendly," she recalls. "Little did we realize what an impact his request would have."

Surprised and pleased by Mr. Meyer's request, her students were eager and ready to help. Through an Internet web search they discovered Wisconsin's Green & Healthy Schools, a three-step voluntary program developed by the Wisconsin Department of Natural Resources (DNR) and the Department of Public Instruction (DPI). The website offers guidance on how to evaluate a school and plan activities and projects to improve a school's resource use, buildings and grounds.

The students quickly realized the best way to test ideas to make future schools greener and healthier would be to use DePere High School as a Green & Healthy guinea pig. Within a few days they completed Step 1 of the program: Forming a Green & Healthy Team of students, teachers and other school staff. With the support of their principal, the team signed the pledge to become a Green & Healthy School.

Moving on to Step 2 — Discovery and Inventory — the team conducted a health, safety and environmental assessment of the school building and grounds, covering waste reduction and recycling, energy and water use, indoor air, mercury, chemicals, integrated pest management, transportation, facilities and grounds, and community service. "We spent a lot of time evaluating our school and it has taught me a lot," says senior Katie Hutjens. "Every time I walk into a room and the lights are on, I think about how much energy our school uses."

The team is now working on Step 3: Action and Implementation. DePere's action plan includes a Focus on Energy audit of their school; revamping the "commons" recycling program; promoting a "Did You Wash 'Em?" hand washing campaign; developing a district-wide kitchen composting program; and initiating a "Buckle-Up" transportation safety program. The school hopes to achieve official Green & Healthy status this year.

SALLY MICHALKO

Meadowbrook Elementary in Waukesha is on its way to being green and clean with more waste reduction and recycling from its lunch program. Ya gotta love the program name STARS — Students Together Addressing Real Stuff.

Ms. Fossen-Rades knew her students would be up to the task, but she was unprepared for the enthusiasm and support other individuals within the school district and community brought to the effort. "This opportunity has empowered my students to dig deep for information, and then to elicit change," she says. "I am very proud of them, and they are very proud of themselves. I am certain these new stewards of our environment and school will remain active citizens."

A program that's part of the community

Schools today want students to see themselves as members of the larger community outside school grounds. By becoming good stewards and taking care of their own property, students practice the habits that will keep the whole community clean, healthy, safe and enjoyable. Through teaching, application and community outreach, Green & Healthy Schools gets students involved in the decision making process.

Though it appears to be a new program, Green & Healthy Schools is really a compilation of many DNR and DPI initiatives. The goal of the program is to promote, encourage and recognize schools as community role models in conserving valuable natural resources and maintaining healthy and safe environments. The program is available to all public and private elementary, middle and high schools in Wisconsin.

Schools do have to meet certain requirements to become Green & Healthy Schools, but most of the requirements allow for flexibility and can be adjusted according to a school's unique circumstances. For instance, newer schools may be more energy efficient than older schools; some schools have well-developed grounds used as teaching tools while others do not; and

Paul Holland, MacKenzie Knapp and other students planted a prairie plot and this rain garden that collect roof runoff and slow stormwater at Spring Harbor Middle School in Madison.

DAVE ROPA

some schools have better recycling programs than others.

How different schools took up the challenge

Meadowbrook Elementary School in Waukesha has been working to become a Green & Healthy School since April 2004. The school already had a good community service program and a butterfly garden, but found areas for improvement. "Teams of teachers, parents and STARS (Students Together Addressing Real Stuff), with the help of school custodian Randy Rebro and Waukesha County Recycling Specialist Meribeth Sullivan, conducted the whole school assessments," says teacher Sally Michalko. "We discovered what types of health, safety and environmental practices were already in place and where we need to improve our efforts. So far, we've made the most progress in waste reduction, recycling and transportation."

"Many positive changes have taken place in the lunchroom," says Randy Rebro. "Recycle Raccoon, Waukesha County recycling mascot, and best friend Meribeth Sullivan made classroom visits to encourage waste-free packaging of lunch. Students and parents were surprised to see how much packaging is discarded and what could be recycled. Each day, two students serve as 'recycling supervisors' to show students which bins to use."

Parents involved in the transportation assessment formed a larger committee to grapple with traffic concerns at dismissal time. They studied traffic flow, parking problems, the bus pick-up site and the obstructed views by the driveway crosswalk. "Buses now pull up and park at the end of the school instead of the main entrance where they hampered crosswalk visibility, and students taking the bus now exit the school from a side door instead of clogging the main entrance," says Ms. Michalko. "A 'yellow island' was painted in the wide driveway to give students a halfway point for safe crossing, and portions of the curb were painted yellow as no-parking areas. Walking, biking and carpooling are encouraged."

In Madison, Spring Harbor Middle School is an environmental magnet school, but is it green and healthy? "Not completely," says G & H team leader and teacher Dave Ropa. "When Spring Harbor began its assessment, students realized that even for a school with a focus on the environment, there is always more that can be done."

Students and staff launched the school assessment process by examining the grounds and water use. The assessment checklists prompted a lot of questions, and the team developed a plan to modify or improve the way many of the school's resources were used. Spring Harbor was built in the late 1950s, and some of the old plumbing fixtures are not very efficient. Though the team couldn't change the fixtures, it did explore ways to reduce the amount of water used.

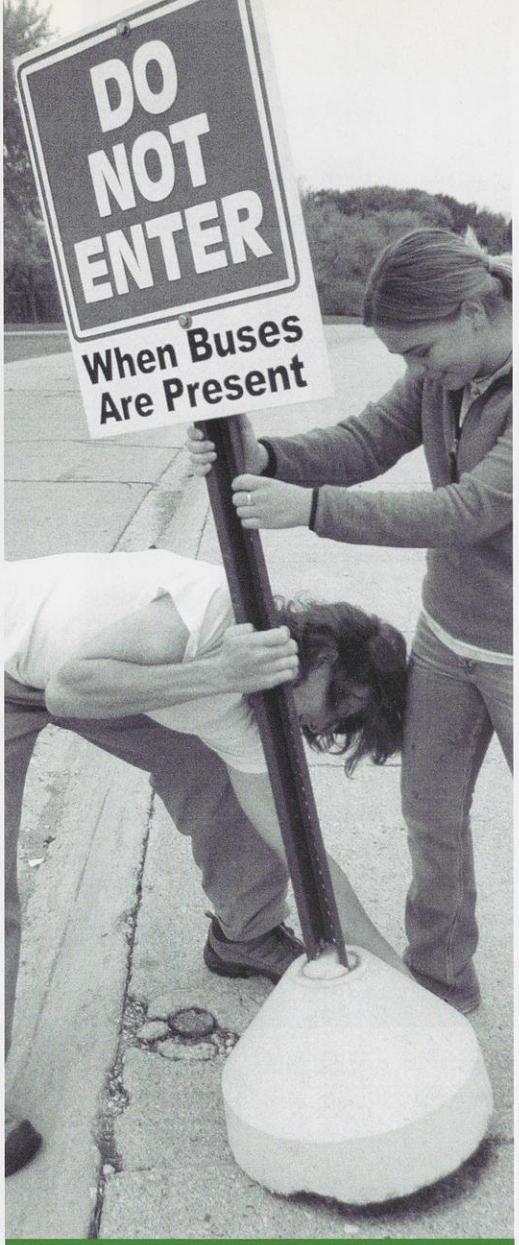
Students and staff were very encouraged by what they found on the school grounds. A 2,000-square-foot prairie garden and a 500-square-foot rain garden add diversity to the grounds. Using grant funds provided by the Leadership Greater Madison Team and the Madison Foundation for Public Schools, students designed the rain garden and planted native species to help reduce runoff into nearby Lake Mendota. The garden is a teaching tool: Students measure water infiltration rates in the rain garden and compare their data to a control site.

"Students were very proud of the extensive recycling program that had been put into place since the school's inception," says Mr. Ropa. "They share responsibility for collecting and transferring recyclable materials to the recycling container and make a concerted effort to use the correct containers. However, they discovered some students still don't recycle correctly. This caused them to begin work on a plan to re-educate students and staff about what can be recycled and where."

Spring Harbor is on track to complete assessments soon and hopes to share its experiences with other schools interested in making the effort to become green and healthy.

At Oconomowoc High School in Waukesha County, a senior got the

You get a whole different perspective inspecting schools to find and fix leaky plumbing as part of a water conservation audit.



Changing traffic patterns will get students on and off of buses more efficiently and reduce idling time.

OCONOMOWOC HIGH SCHOOL (BOTH PHOTOS)

school involved in the Green & Healthy School. "I found out about the program at the Governor's High School Conference on the Environment and brought it up to our Ecology Club advisor, Mr. Olander," says Tina Schuett (OHS '04). "I knew we had to do this, and it became a whole school effort." Many of Tina's classmates pitched in, and with strong backing from school administrators and support staff, the assessments were completed by graduation day.

Students inspected windows (over 700 of them) and lights for energy efficiency, pipes and faucets for leaks, and air vents for obstructions. Some students met with the school's bus company to explore more efficient routes and to discuss engines left idling when buses parked near the school.

"Our inspection heightened whole school awareness," observes student Heidi Hargarten. "Things often got fixed before our scheduled inspections or immediately after." The day before the parking lot and driveway inspection took place, some new directional signs showed up. Leaky faucets were repaired immediately after they were reported.

"Along with key project leaders and Matt Newmann, the director of buildings and grounds for the school district, some 40 to 50 students in all classes helped with the project," says teacher Mike Olander. "It touched a lot of students. It's also unusual to have seniors in their last semester give of their time in this way."

A new group of student leaders is carrying on. Charlie Boeke is trying to improve the school's recycling program and to reduce paper use. MacKenzie Kyle is interested in learning how regional road construction will affect a nearby local creek. Other students are seeking grants and support to address some of the more expensive problems they found. And all agree with fellow student Sarah Willey, who "really likes a healthy environment and keeping our school nice — a better place to be."

Raise the G&H flag

Participation in the Green & Healthy Schools program increases the sense of ownership students, teachers, staff and parents have in their schools. Together, they create a healthier, safer learning environment for all. Schools save money by reducing consumption and operating costs, conserving natural resources, getting more use of the school building and grounds as teaching tools, and increasing connections with the community.

After a school completes each step of the program, it receives a certificate and door stickers to recognize the effort. When a school fulfills all the requirements, it is presented with a large Green & Healthy School flag to celebrate and honor its success. As an added incentive, any school that becomes a Green & Healthy School before May 31, 2005 can apply for a one-time grant for up to $1,000 to help cover expenses incurred for the program.

Please visit the Green & Healthy Schools website at dnr.wi.gov/org/caer/ce/greenschools/ and encourage schools in your community to take part. For further information, contact Christal Campbell, DNR, (608/264-8976, christal.winter@dnr.state.wi.us) or Elizabeth Kane, DPI, (608/266-2803, elizabeth.kane@dpi.state.wi.us).

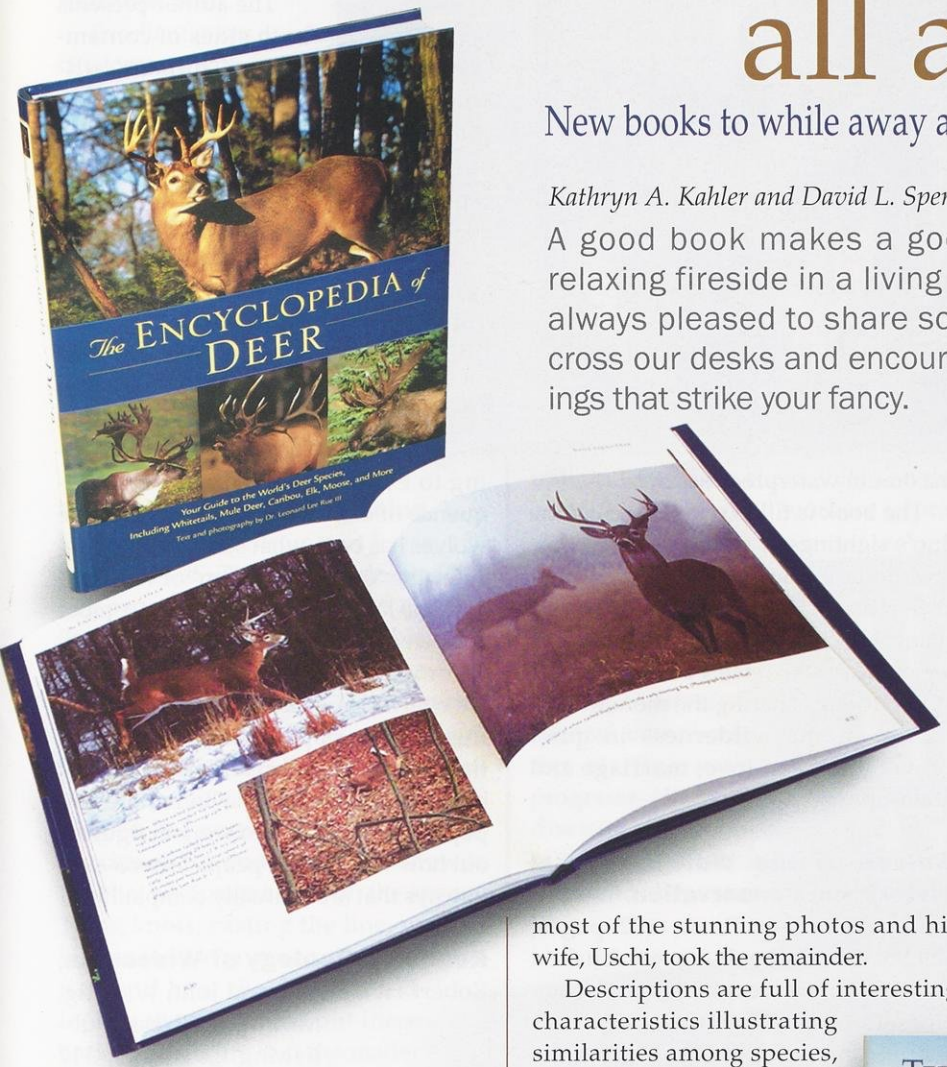
Joel Stone recently retired as DNR's recycling educator. Christal Campbell is a DNR environmental educator based in Madison.

Read all about it

New books to while away a winter night in good company.

Kathryn A. Kahler and David L. Sperling

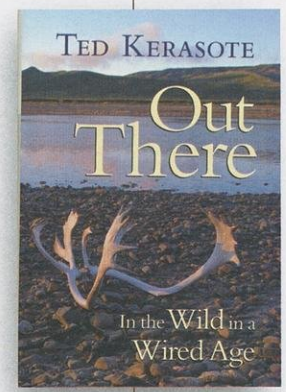
A good book makes a good companion whether you're relaxing fireside in a living room, cabin or campsite. We're always pleased to share some of the interesting titles that cross our desks and encourage you to check out these offerings that strike your fancy.



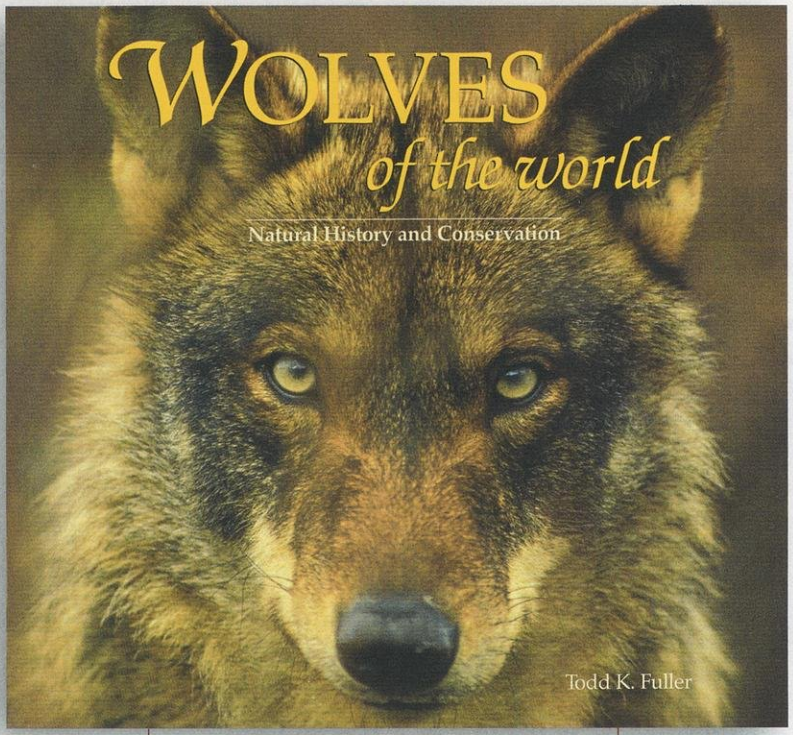
The Encyclopedia of Deer: Your guide to the world's deer species, including whitetails, mule deer, caribou, elk, moose, and more, Dr. Leonard Lee Rue III, Voyageur Press, 156 pages, $35. This beautiful, hardcover reference book covers 51 species of deer from the Cervidae and Moschidae families worldwide. Write-ups for each species — from the tiny pudu of Chile and Argentina, to the massive moose of Eurasia and North America — include range, description, habits, communication, breeding, birth and young, enemies and relationship with humans. The author, who is the most published wildlife photographer in North America, took most of the stunning photos and his wife, Uschi, took the remainder.

Descriptions are full of interesting characteristics illustrating similarities among species, and also what sets a species apart from all others. For example, all deer have four toes and walk on their toenails, making them unguligrade. Some share similar characteristics, such as the Chinese water deer and the tufted deer, which have tusks, or the fallow and red deer which retain their spots throughout life. But the Tharold's deer of Tibet has a number of physical features that mark it as distinct from all others, such as a section of hair on its brisket that points forward, giving the appearance of a small hump.

Coverage among species varies but includes at least one photo of each species. Most extensive coverage is given to species that are the most widely studied, and that means a full 17 pages are devoted to the white-tailed deer. The whitetail is the most adaptable deer in the world, has the largest range and lives under the most diverse conditions. There are 38 subspecies ranging from the boreal forests of Canada to Central and South America. Other species given wide play are elk, mule deer, moose and caribou. A fine glossary finishes off this handsome volume.



Out There: In the Wild in a Wired Age, Ted Kerasote, Voyageur Press, 159 pages, $16.95. This is a wonderful adventure story and a quick read. Noted outdoor writer Kerasote relates the story of a canoe trip on the Horton River in Canada's Northwest Territories. It's a mix of historical exploration and modern eco-tourism and is rich with contrasts between the two. The author and his friend Len, both skilled whitewater paddlers, decide to follow the same



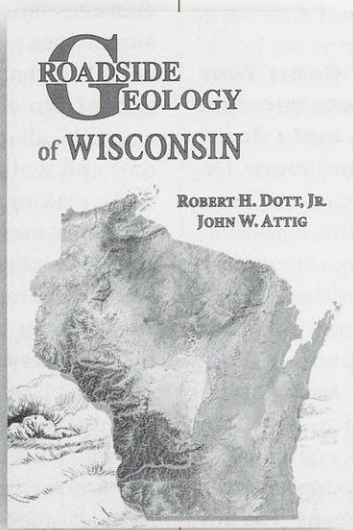
route as predecessors John Franklin and Vilhjalmur Stefansson who traveled the rugged land near the Arctic Circle in the early 1800s and 1900s respectively. Franklin and Stefansson's separate journeys went in search of useful knowledge about the flora, fauna and geography of the land; Kerasote and Len went in search of two weeks away from the daily grind of meetings, e-mail and cell phones. Well, one of them did anyway. Kerasote went in search of solitude, detachment and a desire to be one with nature. Len, married with two small children, sought adventure as much as his friend but believed the benefits of GPS technology, palm pilots and satellite phones made perfect sense to fulfill his parental and marital responsibilities. The two friends reached a respectful compromise, yet Kerasote felt a kind of betrayal in being wired in the wilderness, as conveyed in this description of how he felt after talking to a friend in Wyoming on the satphone: "Overhead the sky has filled with gauzy haze, and behind us the gyrfalcon begins to cry out again. Everything is the same — the river bearing us along, rarely seen wildlife upon its banks, the empty air like some restorative tonic — but everything is not the same. In this untouched place, I have a vague sense of pollution, which makes me feel silly, overreactive, and a bit precious. Nonetheless, the tainted feeling is there: I have strung a connection to the outside world."

But Kerasote acknowledges the benefits of modern technology when they meet an older couple on the river, a couple dressed in heavy cottons, wools and boots, with gear made of wood, cotton, wool, leather and canvas. By contrast, Kerasote and Len "looked like spacemen in yellow and green Gore-Tex parkas and form-fitting PFDs," and gear made of hypalon, fleece, pile and plastic — all lightweight and designed for maximum waterproof warmth.

The book is filled with stories of the duo's sightings of wildlife — musk ox, grizzlies, caribou, gyrfalcons, eagles — and wonderful descriptions of the changeable weather and geology of the region. Kerasote relates a magical story of two friends sharing the monumental silence of the wilderness in quiet conversations of love, marriage and philosophy.

Wolves of the World: Natural History and Conservation, Todd K. Fuller, Voyageur Press, 132 pages, $29.95. Dr. Fuller is an established authority on wolves and his book combines up-to-date facts and information with stunning full-page photos by 19 nature photographers. Readers are presented with comparisons between *Canis lupus* and other related canid species, including how their populations are distributed worldwide. Chapters on taxonomy, morphology, distribution, communication, land use, social behavior, populations, food, species interactions, humans and conservation offer an unbiased perspective of this species that was once, next to humans, the most widespread species of mammal on earth.

The author presents both sides of contemporary human attitudes toward wolves, which he describes as ranging from "adoration to repugnancy." The final chapter on the future of wolf populations is an insightful, objective account of how human attitudes and knowledge have changed over the last 70 years. According to Fuller, an "unintended consequence of efforts to protect and restore wolves has been what some people consider the 'over-promotion' of wolves," and has led to a realization that a more balanced view of wolves is necessary for any conservation effort to succeed. He concludes, "The solution to achieving viable populations of wolves throughout their historic range is not just to 'leave them alone' in remote, unpopulated areas, but to work at figuring out how wolves and people can co-exist in ways that are mutually compatible."



Roadside Geology of Wisconsin, Robert H. Dott, Jr., and John W. Attig, Mountain Press Publishing Company, 317 pages, $20. If you like to look at rock formations and dig out geologic history on your road trips, this book is a great reference to keep in your car. It opens with a condensed Geology 101 description of common kinds of geologic formations in Wisconsin. The rest of the book takes readers on a highway-by-highway tour across the state. The authors divide the state into distinct topographic regions and two

popular tourist regions — the Wisconsin Dells-Baraboo area and Door County peninsula. Within each region, they discuss geologic highlights along highway routes, giving special attention to state and county parks, forests and recreation areas.

Excellent maps overlay highway and city locators with such geologic features as bedrock, faults, glacial deposits and outwash plains. Equally good are the illustrations and photos of geologic features. Exhaustive research and a real love of the subject matter are evident in the authors' seemingly intimate knowledge of every mile of highway covered. Geologic descriptions are seasoned with historical accounts of specific regions, like mining the iron range near Hurley and the lead and zinc ores of southwestern Wisconsin.

Getting Started in Fly Fishing, Tom Fuller, Rugged Mountain Press, 180 pages, $14.95. This book is designed to get prospective fly anglers quickly "casting competently and catching fish on a fly with as little extraneous information as possible." The first two chapters cover the basic equipment, including rod, reel, line, leaders, tippets, flies, tools, waders, clothing, sunglasses and vests, all of which can be purchased for under $400, and how to use that equipment once on the stream. Tying knots, casting the line, wading into water, knowing where to fish and how the flies should look to the fish round out these basics and assure that the reader can get out on the stream within a day. The rest of the book is a learn-as-you-go guide devoted to the art and science of fly fishing, with chapters about casting problems and solutions, understanding and imitating what trout eat, and presenting flies to trout.

The author is a lifelong trout fisherman who credits this guide to his experiences teaching fly fishing in the Becoming an Outdoorswoman program where students learn the basics of casting and catching fish all in one day. The illustrations of knot tying, fly tying and casting are excellent and any novice on a budget will appreciate the honest recommendations of what's needed in a start-up kit.

Harvesting Urban Timber, Sam Sherrill, Linden Publishing, 224 pages, $25.95. This paperback will provide food for thought for community officials and other public land managers who keep looking for ways to make better use of wasted resources. As an outgrowth of community recycling or urban forestry programs, the author suggests more trees in the city might be salvaged for timber that could be used in either public works projects or by wood workers. He estimates that perhaps a third of the urban timber nationwide — between three to four billion board feet of lumber — might be salvaged for public projects like benches, steps, bleachers, shelter houses or trail bridges. These choice cuts also can be sold to local wood workers to provide a local source of quality wood at below retail cost.

Sherrill talks from experience, having advised several communities starting such programs. His book discusses how to judge the value of urban timber, and what to consider in felling trees and cutting timber safely in urban settings. This guidance might especially pique the interest of urban foresters, parks officials, golf course managers, cemetery administrators, waste managers and city planners who have to recoup costs for removing and replacing aged or damaged trees.

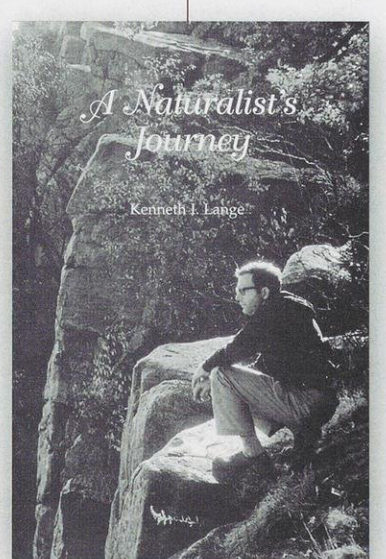
Examples show how such programs have developed in eight communities and how three states: New Jersey, Minnesota and California encourage local communities and private businesses to make better use of urban timber.

As a general education, there are also slews of exploded diagrams showing different ways to cut logs to get the maximum amount of usable timber.

A Naturalist's Journey, Kenneth I. Lange, New Past Press, 224 pages, $20.

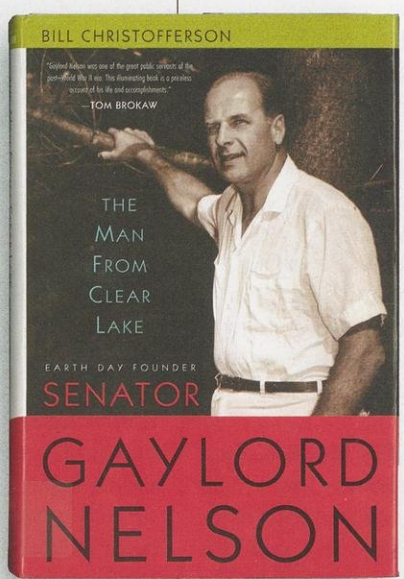
These essays took us on an unexpected journey. We met Ken Lange several times during his 30-year career as the first permanent naturalist at Devil's Lake State Park (1966-96). His hikes and talks breathed life into mixed discussions of the park's nature life and geology. We thought this would be another visit to the region's natural history, and certainly nature is interspersed in these pages where Lange shares insights drawn from more than 30 years of field notes. Through his eyes we appreciate turkey vultures, white pines and monarch butterflies. We learn that skunk cabbage is the first plant up each spring and witch-hazel is the last fall bloomer.

But Lange fills a much broader niche here by sharing the human nature and life stories of friends, colleagues and neighbors who filled his world during his first 30 years in Sauk County. These stories are only touched with the sadness that all those profiled have passed on. Still, the author gives us a strong sense of human character that shaped the region and the region that shaped the character of his acquaintances who lived from Sauk City to Baraboo from the 1920s through the early 90s. Lange eschews labels, and he shares profiles of multi-dimensional people who had happy moments and suffered personal tragedies, who loved people, but often lived out their lives without spouses or family. All had an abiding love of the land.



Here we meet Harold Kruse, an organic farmer and naturalist. We see Harvey Weidman in his WWI uniform and learn of his worldwide travels as a mining engineer and survivor of the Bataan Death March in WWII. We meet families of country fiddlers and hear the story of Chuck Naidl, the Sauk County "Snake Man," whose fascination and respect for snakes led to nationwide school presentations to share dignity and respect for these reptiles. We meet photographers, writers, historians and artists. We share a table with the gang at John's Coffee Shop where Lange took dinner for many years with a group of regulars. Through black and white photos sprinkled throughout the text, we get to see the faces and everyday garb of the people dignified in these remembrances.

It's an especially good read for people from rural southwestern Wisconsin who set roots in the hilly, forested farmsteads and towns shaped by this beautiful region.



The Man From Clear Lake, Bill Christofferson, The University of Wisconsin Press, 403 pages, $30. This authorized biography of revered Wisconsin legislator and conservationist Gaylord Nelson traces the roots and path of his political career as two-term governor, senator and chairman of the Wilderness Society. We learn of Nelson's Progressive roots, and the supportive nature of the Clear Lake community in Polk County. Nelson, now 88, grew up in the era before paved roads in the northern half of Wisconsin to see the full spectrum of land use changes including rural recovery, suburban sprawl, Interstate highway development and the rural home building boom.

It is instructive today to view the changes in Wisconsin through Nelson's eyes as the political climate shifted from 13 years of Progressive rule to 20 years of Republican leadership followed by the rebirth of the Democratic Party in the late 1940s. Reading about political battles in the 50s and 60s on deficit spending, state sales tax, highway construction and school aid formulas provides perspectives for current debate on these same issues and the health care battle to come. Despite a political front that resembles today's challenges where one party controls the Legislature and the other the Executive Branch, Nelson forged partnerships and compromise that created the Outdoor Action Recreation Plan that used a one-cent cigarette tax to pay for a 10-year, $50 million fund to buy public lands for outdoor recreation. The program was the progenitor of today's Stewardship Fund that is likewise preserving outstanding outdoor resources for public enjoyment.

We follow Nelson's career to the U.S. Senate and get a taste of what it was like to legislate during the Cold War, civil rights movement, and Vietnam years as well as learning some of the politics behind environmental battles to establish the Appalachian Trail, protect Wild and Scenic Rivers, preserve the Apostle Islands and ban DDT as well as his renowned work to establish Earth Day.

Nelson's story provides a model for current and future legislative leaders to forge meaningful policies and compromises that protect the public interest in such areas as groundwater and drinking water protection, Great Lakes protection, the explosion of a tourism economy, home development in forests and lakeshores, and the conglomeration of family farms to agribusiness.

Kathryn A. Kahler is production and circulation manager for Wisconsin Natural Resources magazine and David L. Sperling edits the publication.

DNR Service Centers by City

Antigo
223 E. Steinfest Rd.
Antigo, WI 54409
715-627-4317-phone
Office Hours
Tuesday through Friday,
8:15 a.m.-1:00 p.m. and 2:00-4:00 p.m.
(Closed Monday)

Ashland
2501 Golf Course Rd.
Ashland, WI 54806
715-685-2900-phone
Office Hours
Tuesday, Thursday, Friday
8:15 a.m.-1:00 p.m. and 2:00-4:00 p.m.
(Closed Monday & Wednesday)

Baldwin
890 Spruce St.
Baldwin, WI 54002
715-684-2914-phone
Office Hours
Tuesday through Friday,
8:15 a.m.-1:00 p.m. and 2:00-4:00 p.m.
(Closed Monday)

Black River Falls
910 Highway 54 E
Black River Falls, WI 54615
715-284-1400-phone
Office Hours
Tuesday through Friday,
8:15 a.m.-1:00 p.m. and 2:00-4:00 p.m.
(Closed Monday)

Cumberland
1341 2nd Ave., Box 397
Cumberland, WI 54829
715-822-3590-phone
Office Hours
Tuesday, Thursday, Friday
8:15 a.m.-1:00 p.m. and 2:00-4:00 p.m.
(Closed Monday & Wednesday)

Dodgeville
1500 N. Johns St.
Dodgeville WI 53533
608-935-3368-phone
Office Hours
Monday through Friday,
8:15 a.m.-1:00 p.m. and 2:00-4:00 p.m.

Eau Claire
1300 W. Clairemont Ave., Box 4001
Eau Claire, WI 54702-4001
715-839-3700-phone
Office Hours
Monday through Friday,
7:45 a.m. to 4:30 p.m.

Fitchburg
3911 Fish Hatchery Rd.
Fitchburg, WI 53711
608-275-3266-phone
608-275-3231-tdd
Office Hours
Monday through Friday,
7:45 a.m. to 4:30 p.m.

Green Bay
1125 N. Military Ave., Box 10448
Green Bay, WI 54307-0448
920-492-5800-phone
920-492-5812-tdd
Office Hours
Monday through Friday,
7:45 a.m. to 4:30 p.m.

Hayward
10220 N. Highway 27
Hayward, WI 54843
715-634-2688-phone
Office Hours
Tuesday through Friday,
8:15 a.m.-1:00 p.m. and 2:00-4:00 p.m.
(Closed Monday)

Horicon
N7725 Highway 28
Horicon, WI 53032-1060
920-387-7860-phone
Office Hours
Monday through Friday,
8:15 a.m.-1:00 p.m. and 2:00-4:00 p.m.

Janesville
2514 Morse St.
Janesville, WI 53545
608-743-4800-phone
608-743-4808-tdd
Office Hours
Tuesday through Friday,
8:15 a.m.-1:00 p.m. and 2:00-4:00 p.m.
(Closed Monday)

La Crosse
3550 Mormon Coulee Rd.
La Crosse, WI 54601
608-785-9000-phone
Office Hours
Tuesday through Friday,
8:15 a.m.-1:00 p.m. and 2:00-4:00 p.m.
(Closed Monday)

Ladysmith
N4103 Highway 27
Ladysmith, WI 54848
715-532-3911-phone
Office Hours
Tuesday, Thursday, Friday
8:15 a.m.-1:00 p.m. and 2:00-4:00 p.m.
(Closed Monday & Wednesday)

Madison
101 S. Webster St.
Madison, WI 53703
608-266-2621-phone
608-267-6897-tdd
Office Hours
Monday through Friday,
7:45 a.m. to 4:30 p.m.

Milwaukee
2300 N. Dr. Martin Luther King Jr. Dr.
Box 12436
Milwaukee, WI 53212
414-263-8500-phone
Office Hours
Monday through Friday,
7:45 a.m. to 4:30 p.m.

DNR Service Centers by City

Oshkosh
625 E. County Road Y, Suite 700
Oshkosh, WI 54901
920-424-3050-phone
Office Hours
Tuesday through Friday
8:15 a.m.-1:00 p.m. and 2:00-4:00 p.m.
(Closed Monday)

Park Falls
875 S. 4th Ave., Box 220
Park Falls, WI 54552
715-762-3204-phone
Office Hours
Tuesday, Thursday, Friday
8:15 a.m.-1:00 p.m. and 2:00-4:00 p.m.
(Closed Monday & Wednesday)

Peshtigo
101 N. Ogden Rd., Box 208
Peshtigo, WI 54157
715-582-5000-phone
Office Hours
Tuesday through Friday
8:15 a.m.-1:00 p.m. and 2:00-4:00 p.m.
(Closed Monday)

Plymouth
1155 Pilgrim Rd.
Plymouth, WI 53073
920-892-8756-phone
Office Hours
Monday through Friday,
8:15 a.m.-1:00 p.m. and 2:00-4:00 p.m.

Poynette
W7303 County Highway CS
Poynette, WI 53955
608-635-8110-phone
Office Hours
Tuesday through Friday,
8:15 a.m.-1:00 p.m. and 2:00-4:00 p.m.
(Closed Monday)

Rhinelander
107 Sutliff Ave.
Rhinelander, WI 54501
715-365-8900-phone
Office Hours
Monday through Friday,
7:45 a.m. to 4:30 p.m.

Spooner
810 W. Maple St.
Spooner, WI 54801
715-635-2101-phone
715-635-4001-tdd
Office Hours
Monday through Friday,
7:45 a.m. to 4:30 p.m.

Sturgeon Bay
110 S. Neenah Ave.
Sturgeon Bay, WI 54235-2718
920-746-2860-phone
Office Hours
Tuesday through Friday,
8:15 a.m.-1:00 p.m. and 2:00-4:00 p.m.
(Closed Monday)

Sturtevant
9531 Rayne Rd., Suite 4
Sturtevant, WI 53177
262-884-2300-phone
262-884-2304-tdd
Office Hours
Tuesday through Friday,
8:15 a.m.-1:00 p.m. and 2:00-4:00 p.m.
(Closed Monday)

Superior
1401 Tower Ave.
Superior, WI 54880
715-392-7988-phone
Office Hours
Tuesday through Friday,
8:15 a.m.-1:00 p.m. and 2:00-4:00 p.m.
(Closed Monday)

Waukesha
141 NW Barstow St., Room 180
Waukesha, WI 53188
262-574-2100-phone
Office Hours
Monday through Friday,
7:45 a.m. to 4:30 p.m.

Wausau
5301 Rib Mountain Rd.
Wausau, WI 54401
715-359-4522-phone
Office Hours
Tuesday, Thursday, Friday,
8:15 a.m.-1:00 p.m. and 2:00-4:00 p.m.
(Closed Monday & Wednesday)

Wautoma
427 E. Tower Dr., Suite 100
Wautoma, WI 54982
920-787-4686-phone
Office Hours
Tuesday through Friday,
8:15 a.m.-1:00 p.m. and 2:00-4:00 p.m.
(Closed Monday)

Wisconsin Rapids
473 Griffith St.
Wisconsin Rapids, WI 54494
715-421-7800-phone
Office Hours
Tuesday, Thursday, Friday,
8:15 a.m.-1:00 p.m. and 2:00-4:00 p.m.
(Closed Monday & Wednesday)

Woodruff
8770 Highway J
Woodruff, WI 54568
715-356-5211-phone
Office Hours
Tuesday through Friday,
8:15 a.m.-1:00 p.m. and 2:00-4:00 p.m.
(Closed Monday)

A SPECIAL REPORT FROM
WISCONSIN NATURAL RESOURCES

Welcome Aboard

Discovering Wisconsin's Maritime Trails

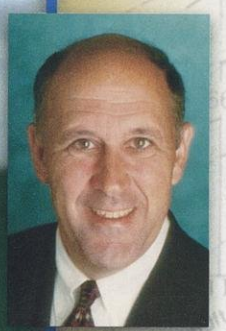
Above and below the waves

Shipwrecks, survivals and stories.

Dear Readers:

As a Wisconsin history buff and co-chair of the Council of Great Lakes Governors, the subject of maritime trails is of great personal and professional interest to me.

The Great Lakes and the treasures they keep in their depths are part of our identity. The stories of the Great Lakes are of exploration, awe-inspiring natural resources, hardship and bravery. Visitors to our remarkable Manitowoc Maritime Museum can hear the tale of a terrible winter storm that swept across Lake Superior, devouring the schooner *Lucerne* and leaving no survivors. The Great Lakes are a tremendous asset to our region's future, too, with great potential for tourism and engaging youth and adults alike in nautical history.



Work and recreation on the Great Lakes have left an impressive trail of maritime cultural resources along Wisconsin's Great Lakes shorelines. The Wisconsin Historical Society established the Maritime Trails program to foster wider public appreciation of the state's rich maritime past and encourage preservation of these unique historic sites — shipwrecks, lighthouses and historic waterfronts.

The trails also underscore the importance of preserving and restoring these cultural treasures. The Great Lakes Governors recognize the need for an overarching plan that identifies specific restoration goals, establishes priorities, specifies measures of success, and serves as a coordinating focus for the many federal, state and local programs directed at Great Lakes restoration. Our priorities reflect broad goals such as habitat restoration and control of invasive species, which pose a serious threat to the Great Lakes and the treasures found above and below the water.

I am honored to introduce the story of Wisconsin's Maritime Trails. On these pages you'll explore efforts to teach the historical value of shipwrecks, the environmental conditions that lead to their preservation, and tales of gallant ships and crews. You will climb the winding steps of lighthouses and you will visit National Historical landmarks.

Smooth sailing,

Jim Doyle
Wisconsin Governor

A diver helps survey the Reynolds Pier site at Jacksonport in Door County. Reynolds Pier was built in 1869 in front of what is now Lakeside Town Park and was used to ship lumber throughout the Great Lakes until it was damaged beyond repair by ice in 1938. Several ships also sank offshore here in the late 1800s.

TAMARA THOMSEN

From his desk at the State Archaeology Lab in Madison, State Underwater Archaeologist Keith Meverden answers e-mail questions from around the world about Wisconsin's submerged archaeological sites.

"Just look closely at the state flag and you will see how important Wisconsin's maritime history is," Meverden says. "You will see a sailor and an anchor."

Wisconsin has 1,000 miles of Great Lakes shoreline, and exploration, industry, commerce and passenger travel on water have greatly impacted Wisconsin's development.

Since 1987, the Wisconsin Historical Society (WHS) has been studying and protecting the underwater archaeological resources that lie beneath the state's lakes, rivers and Great Lakes' shoreline. With its partners — public institutions, private business and volunteers — WHS has investigated more than 80 sites throughout the state.

These efforts also have resulted in placing 22 Wisconsin shipwrecks on the National Register of Historic Places and are helping define areas for consideration as state maritime trails and national marine sanctuaries. Wisconsin underwater history includes remnants from logging and ice harvesting industries and Wisconsin has records of more than 700 ships that sank in Lake Michigan and Lake Superior.

The Wisconsin Maritime Trails system, an interpretative trail that one can visit above and below the waves, includes lighthouses, docks, shipwrecks and museums. Some shipwrecks are located in shallow waters of Sturgeon Bay and the Apostle Islands, where landlubbers can view them.

WISCONSIN HISTORICAL SOCIETY

DNR FILE PHOTO

TOP: Industry, commerce and passenger travel on water shaped Wisconsin's maritime history. ABOVE: Shipwreck remnants and a historical marker are found at Bullhead Park in Sturgeon Bay.

Through websites, interpretive signage, public presentations and shipwreck moorings, the Wisconsin Maritime Trails system encourages divers, snorkelers, boaters, maritime enthusiasts and tourists to visit these cultural resources. A collaborative effort among the Wisconsin Historical Society, Wisconsin Coastal Management Program and the University of Wisconsin Sea Grant Institute, the Maritime Trails initiative also seeks to document, preserve and protect the state's submerged archaeological sites.

The trails system is divided into four areas: Lake Superior Trail, Door County/Green Bay Trail, Middle Lake Michigan Trail and the Lower Lake Michigan Trail.

"We are increasing the accessibility of our submerged resources for all of the state residents to enjoy, and maybe inspire further interest in tourism and conservation," says Paul Lothary, an avid diver from Fort Atkinson.

The online searchable Maritime Trails Resource Database and Wisconsin Shipwreck Database are great places to learn more about Wisconsin's shipwrecks.

Shipwrecks are at the heart of the trails, Meverden explains. The Maritime Trails program actively works to protect these historic sites. Shipwreck mooring buoys encourage visitation and safe diving, while also protecting sites from anchor damage. The WHS also conducts archaeological surveys on shipwrecks.

Illegal treasure hunting threatens many of our submerged cultural resources.

Title to Wisconsin's historic shipwrecks is held in public trust by the State of Wisconsin. Wisconsin law prohibits unauthorized disturbance or removal of artifacts, cargo, structure or human remains. Report shipwreck looting at (800) TIP-WDNR.

"The Wisconsin Maritime Trails database is very comprehensive," Meverden says, "but it is always expanding as additional research is conducted and discoveries are made."

For information on Wisconsin's Maritime Trails, contact the Wisconsin Historical Society's Maritime Preservation and Archaeology Program at (608) 221-5909 or email: underwater@whs.wisc.edu.

Ghosts of our coasts

Exploring shipwrecks.

The cold and fresh waters of Lakes Michigan and Superior — free of the salt that corrodes ocean vessels — have preserved hundreds of shipwrecks.

Yet the frigid water also challenges archaeologists who require special equipment such as dry suits, heavy gloves and hoods. In the Great Lakes, underwater archaeologists usually work in water that is 40 to 60 degrees as they explore shipwrecks.

"These are underwater museums," says Keith Meverden, State Underwater Archaeologist, "that tell us about the lives of the people who worked, lived and sometimes died on the Great Lakes."

If shipwreck exploration intrigues you, the best place to begin your adventure is at www.wisconsinshipwrecks.org. On the site, divers will find dive guides, maps, mooring locations and important safety tips. Those preferring to stay dry can watch videos of wreck dives, catch up on research and post questions to underwater explorers.

In 1987, the Wisconsin Historical Society (WHS) started studying the state's shipwrecks to create a historical inventory. Since then, WHS has surveyed, mapped and documented more than 80 sites with the help of volunteers, many of whom belong to the Wisconsin Underwater Archaeology Association and the Great Lakes Shipwreck Research Foundation.

But there is more work to do. Historical records document more than 700 shipwrecks in Wisconsin territorial waters (only about 150 have been located to date).

Paul Lothary, a diver and Maritime Trails volunteer, has helped with shipwreck documentation in the Apostle Islands.

"I was surprised at how intact the wrecks were," Lothary says.

Documenting a shipwreck is an intense process. Sites are found sometimes by accident and other times by using sonar or an underwater metal detector called a magnetometer.

The first survey dive may include laying a baseline along the vessel. This baseline is a reference point when mapping the site. Divers often divide a shipwreck into small sections and record the ship parts or artifacts within each area. Breathing air under pressure limits the amount of time divers can stay underwater. Lothary's work included operating a Diver Propulsion Vehicle, an underwater "scooter," that extends diving range.

Documenting a wreck can take days to weeks depending on the weather and underwater visibility.

Sketches along with underwater video and photos, precise measurements and a site map form a more complete picture of a shipwreck. Archaeologists rarely remove artifacts from shipwrecks unless a special artifact is taken for study or a museum. Conservation requires time and expense.

"This is important work," Lothary says, "because it runs along the line of out of sight, out of mind. But these are important pieces of our heritage."

Lothary works with Tamara Thomsen, owner of Diversions Scuba in Madison. Thomsen has written numerous articles on underwater exploration and published many underwater photographs.

Thomsen has worked on the Wisconsin Maritime Trails for two years but also was a diver for the famed *USS Monitor* project. The *Monitor* National Marine Sanctuary protects the wreck of the Civil War armored turret gunboat *USS Monitor*, best known for its battle with the Confederate ironclad *Virginia* in 1862. Later that year, the gunboat was caught in a storm off the coast of Cape Hatteras, North Carolina. On December 31 it foundered and sank. Her wreck was discovered in 1974 and was designated as our nation's first marine sanctuary in 1975.

"Many people used to go to towns and visit places like Manitowoc and Two Rivers on vacation and yet didn't know these are important places in our state's maritime history," she says. "The Wisconsin Maritime Trails work helps put it in perspective."

Challenges to preserving Great Lakes shipwrecks include looting, zebra mussels and damage from anchors. WHS works with the Department of Natural Resources to enforce shipwreck laws, but most divers are policing themselves.

Mooring buoys also have been installed by WHS at several shipwrecks to help divers find and protect the sites by allowing dive boats to tie directly to the buoys instead of dragging anchors to locate wrecks. Recreational divers may use the lines attached to the buoys for a safe descent to the wrecks.

Shipwreck divers are told to "take only pictures and leave only bubbles."

From captains to ghostly keepers

The mysteries and men that power maritime lore.

LARRY NIELSEN

While the shipwrecks tend to be the sweethearts of armchair adventurers and divers alike, it is often the captain and crew who commanded those doomed vessels or in more cases, saw ships to safety, that make the most intriguing stories.

Edmund Fitzgerald

On November 10, 1975, in the most famous — and infamous — shipwreck in Great Lakes history, the *Edmund Fitzgerald* sank about 17 miles off Whitefish Point, Michigan in a treacherous storm. Its crew was lost in the icy waters of Lake Superior and later memorialized in a 1976 song by Gordon Lightfoot.

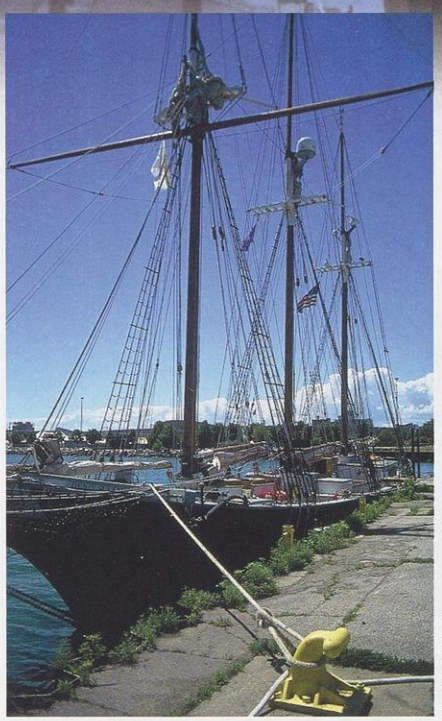
While the *Fitzgerald* is not located in Wisconsin waters, its legend intrigues worldwide believers of the "witch of November," the strong gales that doomed many ships on Lake Superior.

SS Milwaukee

Fall 1929 has gone down in Great Lakes maritime history as one of the roughest seasons on record. At a time when the stock market was plunging, business interest on the Great Lakes was hit again by stormy waters.

The *SS Milwaukee* was a car ferry that traveled from Michigan to Wisconsin. Its skipper was Captain John "Heavy Weather" McKay.

Heavy Weather's luck ran out, however, on October 29, 1929 when a fierce storm claimed the *SS Milwaukee* and its crew. Sixteen people died.



ROBERT QUEEN

TOP: Tall and isolated towers on stormy shorelines, lighthouses are natural settings for ghost stories. BOTTOM: The *Denis Sullivan* in Milwaukee is named after a prominent 19th century Great Lakes sailor.

S/V Denis Sullivan

So significant were schooners to Milwaukee's maritime heritage that Pier Wisconsin, a nonprofit organization, commissioned a schooner to be built as a floating classroom and link between Milwaukee and the Great Lakes.

In 2000, the *S/V Denis Sullivan* was constructed on site. The tall ship is a rare glimpse of days gone by and is named after a prominent 19th century Great Lakes sailor and businessman, Captain Denis Sullivan.

Sullivan was born in Dublin, Ireland in 1849 and as a child immigrated with his family to Dunnville, Ontario near Lake Erie. He began sailing when just 17, and in 1873 settled in Milwaukee. Sullivan later formed his own company in Chicago and became a valued member of the Chicago Harbor Commission and the Chicago Board of Trade. He died in 1918.

Things that go bump in the night

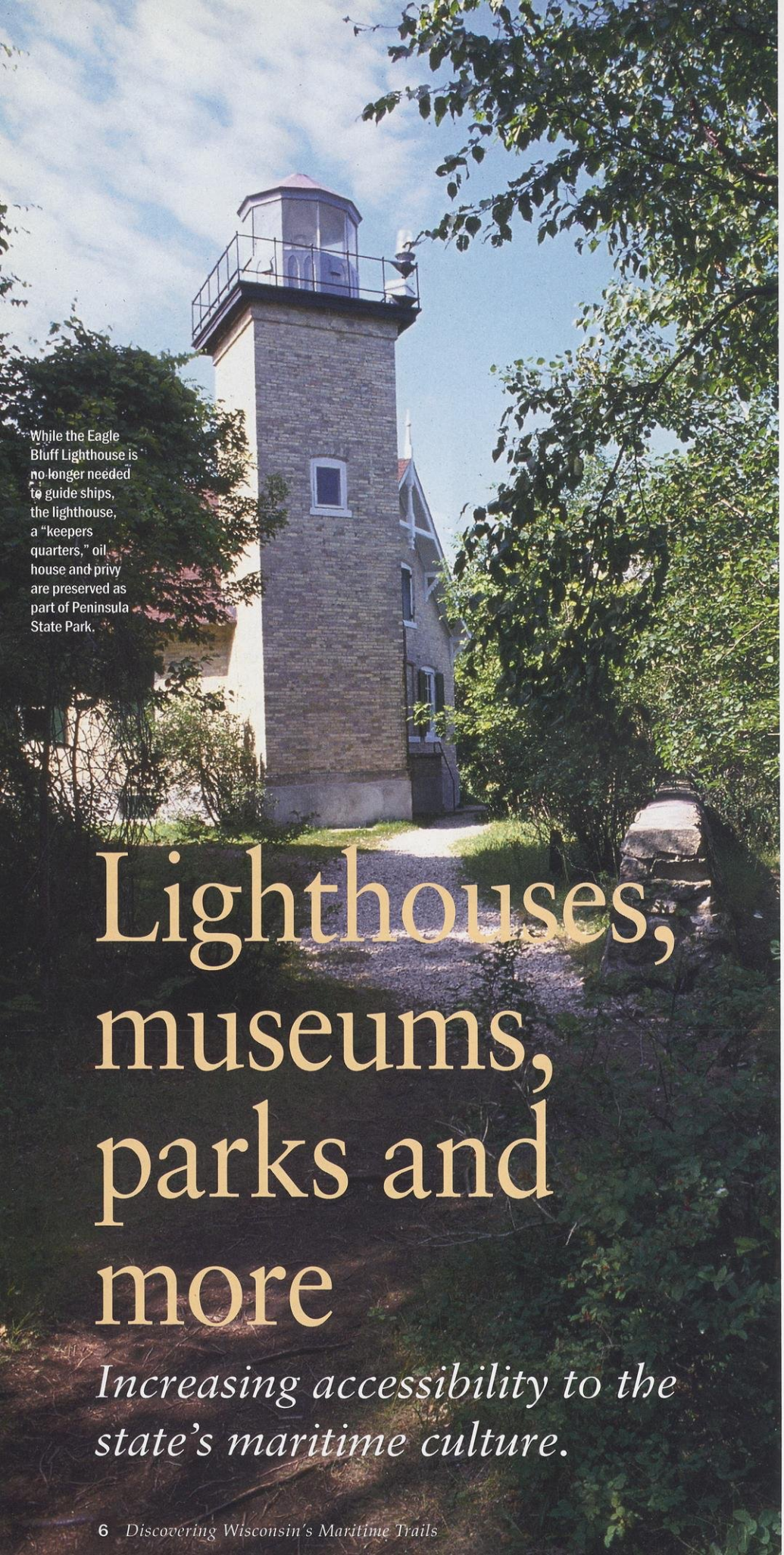
Lighthouse keepers hold a reputation for being extremely dedicated and sometimes eccentric. So dedicated are they, in fact, that in some cases they are thought to never leave their posts even after death.

Among the stories of eerie apparitions reported in the documentary, "Haunted Lighthouses of The Great Lakes" (Southport Video Productions) are:

- A friendly spirit at the Chambers Island Lighthouse on Lake Michigan reportedly released from its earthly bond through the prayers of a visiting nun.
- A kindly ghost at Lake Superior's Split Rock Lighthouse who retrieved and returned the wallet left behind by a tourist.
- The diligent keeper of the Old Presque Isle Lighthouse on Lake Huron who turns the lights on for passing ships even though the wiring to the lamp has been removed.

In his book, "Gone Missing," Wisconsin folk tale author Dennis Boyer recounts supposed supernatural brushes in harbor taverns, on car ferries and within lighthouses.

But it is the Apostle Islands that supplies the prime fodder for Great Lakes maritime folklore as the islands are rumored to house dozens of sad characters who linger on land and along the water's edge long after their last fishing nets were cast.



While the Eagle Bluff Lighthouse is no longer needed to guide ships, the lighthouse, a "keepers quarters," oil house and privy are preserved as part of Peninsula State Park.

ROBERT QUEEN

Lighthouses, museums, parks and more

Increasing accessibility to the state's maritime culture.

When the wind and waves roared, Great Lakes lightkeepers jumped to duty keeping beacons burning and fog horns sounding. At night, the revolving lights of these towering lantern rooms showed sailors entrances to harbors and warned of hazardous rocks.

But today, many of these beacons also are boosting tourism in Wisconsin reincarnated as museums, bed and breakfasts and the focal points of parks.

In fact, nearly 50 lighthouses line Wisconsin's Great Lakes coastline and Door County has more lighthouses — many over a century old — than any other county in the United States. Add to that museums, parks and interpretive signs to point out submerged artifacts and you have multiple gateways to the lakeshore's maritime history.

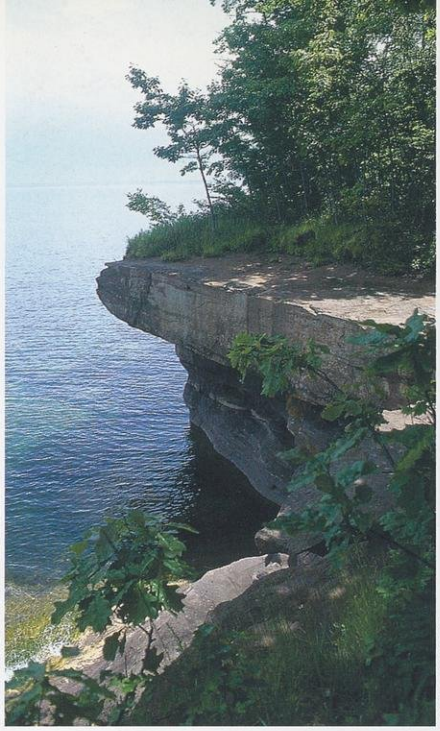
"Accessibility is an important goal of Wisconsin's Maritime Trails," says State Underwater Archaeologist Keith Meverden. "A lot of the shoreline signage provides resources for non-divers too."

Leaving the lights on

Although many lighthouses no longer have full-time keepers and there is no state lighthouse preservation society, several local lighthouse societies are at work in Wisconsin.

Many of the lighthouses located along Wisconsin's Great Lakes shoreline were built during the 19th century and were vital to the shipping, fishing, logging and mining industries. Beginning in the 1840s, the U.S. Lighthouse Service, today's U.S. Coast Guard, began building lighthouses to make travel on Lake Michigan safer. Today, tourism is a prime reason people still climb the tightly spiraling stairs to many of these lantern rooms.

In 2003, the Wisconsin Maritime Museum presented its first annual Lakeshore Maritime Heritage Festival and Lighthouse Walk. The tour included five area lighthouses from Manitowoc to Algoma. The event was born after looking at the popularity of such tours offered in Door County and Michigan. The Cana Island Lighthouse



ROBERT QUEEN

ROBERT QUEEN

LEFT: Big Bay State Park on Madeline Island features sandstone bluffs, caves and a 1.5-mile beach. ABOVE: The Wisconsin Maritime Museum is home to the *USS Cobia*, a World War II submarine.

in Door County annually attracts 40,000 visitors.

Museums

While exploring the Wisconsin Maritime Trails, escape the seagulls and step inside to discover maritime history at any of more than a dozen museums.

The **Wisconsin Maritime Museum** in Manitowoc was founded in 1970 as the Manitowoc Submarine Memorial Association and has grown into one of the largest maritime museums in the Midwest. It is devoted to the history of the ships of Lake Michigan and its collection includes permanent galleries and the *USS Cobia*, a World War II submarine that is moored along the Manitowoc River.

The **Wisconsin Marine Historical Society** and many other groups make extensive use of the Milwaukee Public Library's **Great Lakes Marine Collection** at 814 W. Wisconsin Ave. The cornerstone of the Great Lakes Ship Files is the Herman G. Runge Collection, acquired by the library in 1959. Runge devoted 70 years of his life to collecting and preserving information on Great Lakes marine activities. His collection contains about 17,000 photographs of Great Lakes ships.

Pier Wisconsin in Milwaukee houses the three-masted schooner *Denis Sullivan*, which offers hands-on learning dockside and aboard the *Sullivan*.

The **Wisconsin Marine Historical Society**, located in Milwaukee, is dedicated to discovering, collecting, recording and preserving Great Lakes maritime history. Visit www.wmhs.org where a new addition to the Society's website is a Great Lakes Genealogy section.

The Rogers Street Fishing Village and Great Lakes Coast Guard Museum in Manitowoc chronicles 167 years of commercial fishing in the area. Famous shipwrecks are recounted along with the stories of the heroes who fought to rescue the crews.

The Apostle Islands National Lakeshore on Manitou Island features tours of a historic fish camp. This is one of 45 archaeological sites found in the Apostle Islands and its website at www.nps.gov/apis/home.htm is a virtual visitors center.

The **Bayfield Maritime Museum** covers more than 150 years of maritime history including information about commercial fishing, boatbuilding traditions, lighthouses, sailor crafts, shipwrecks and more.

The **Canal Park Museum** of the Corps of Engineers overlooks the harbor entrance to the twin harbors at Duluth, Minnesota and Superior, Wisconsin. Stand on the second floor overlook and watch the Great Lakes' largest ore carriers stream in.

The **Door County Maritime Museum** was founded in 1969 by a group of Gills Rock commercial fishermen.

The **Ship's Wheel Gallery and Nautical Museum** at Kewaunee, features local harbor history, World War II artifacts, a Potowatomi display, Great Lakes shipwrecks, a 100-year-old Great Lakes schooner model and works by maritime artists.

The ***SS Meteor* Museum** in Superior features the world's only remaining whaleback freighter, launched in Superior in 1896. It is permanently berthed on Barker's Island.

The Madeline Island Historical Museum at La Pointe features an Old Sailor's Home. This is the former site of the American Fur Company trading post.

The **Port Washington Maritime Heritage Center** features a nautical museum but also serves as a reception and community meeting space. The **Historic Maritime Harborwalk** guides visitors around Port Washington including the restored 1860s Light Station. Signage points to the final resting place of the *Niagara* sidewheel steamer that caught fire and sank off the shore of Port Washington in 1856.

Last year, the University of Wisconsin-Superior's **Jim Dan Hill Library** received the Governor's Award for Archival Achievement for its work in preserving and organizing thousands of documents, photographs and books chronicling the maritime history of Lake Superior. The Lake Superior Marine Museum Association began the collection in 1973. For more information visit library.uwsuper.edu.

"The goal of Wisconsin's Maritime Trails is to put shipwrecks within a larger context with lighthouses, harbors, museums and parks," Meverden says. "The Trails show how these ships fit into the broader state culture and economy."

WHSARCHIVES

Captain Santa and The Christmas Tree Ship

The loss of "The Christmas Tree Ship," while not one of the most spectacular Great Lakes disasters, has remained a favorite story of Wisconsin maritime historians for more than 90 years not only because of its unusual cargo, but because of its kindhearted captain.

Every year, just before Thanksgiving, Captain Herman Schuenemann's 127-foot schooner, built in Milwaukee and officially christened the *Rouse Simmons*, made its way down Lake Michigan from the Upper Peninsula with a deck brimming with fresh-cut Christmas trees to be sold in Chicago.

Schuenemann, who earned the nickname "Captain Santa," sold the trees for 50 cents to $1, but also gave trees away to needy families, churches and orphanages. The schooner's anticipated arrival at the Chicago Clark Street neighborhood was a seasonal tradition.

"To step aboard the ship was a magical experience," explains Rochelle Pennington, an author who has spent years researching Captain Santa's story.

But November storms can be very violent and unforgiving on the Great Lakes, and on November 22, 1912, the ship was loaded with more than 5,000 Christmas trees when it got caught in a winter storm and sank off the coast of Two Rivers, Wisconsin.

Seventeen men were believed to have died in the icy waters. While their bodies were never recovered, a decade after the sinking, Schuenemann's wallet was discovered in a fishing net.

After the *Rouse Simmons* sank, Schuenemann's wife, Barbara, and their daughters ran their own Christmas Tree Ship.

"Captain Schuenemann went down with the ship, but everything he believed in was alive on the shore," Pennington says.

In 1971, diver G. Kent Bellrichard used sonar to locate the *Rouse Simmons*. Its hold and deck were found still brimming with Christmas trees, though many had lost their needles. Also found were shot glasses, a lightbulb that still works and medicine bottles.

Songs, paintings, poems, a musical and even a wine have been dedicated to the memory of the *Rouse Simmons*, and for years, sailors have reported seeing a ghostlike *Rouse Simmons* in the moonlight with its tattered sails battling the winds and waves.

Pennington says mariner's lore points to bad omens — signs that the ship was doomed to go down.

It was rumored that as they were loading trees on the ship in Michigan, rats were seen fleeing the ship. When the ship left Chicago it had an unlucky number — 13 — men aboard. The ship also left on a Friday and many sailors refuse to sail a voyage that begins on a Friday. The *Rouse Simmons* also had already developed a reputation for being unseaworthy and two years earlier had to be towed by a car ferry.

And when divers found the ship, they also found a horseshoe hanging by one nail, "with its luck spilling out," Pennington says.

Today, Schuenemann's tombstone fittingly features an engraved Christmas tree.

LINKS TO UNDERWATER TREASURES

- **Wisconsin's Maritime Trails:** www.maritimetrails.org/
- **Wisconsin's Great Lakes Shipwrecks:** www.wisconsinshipwrecks.org/
- **Wisconsin Historical Society:** www.wisconsinhistory.org/shipwrecks/learn/wisconsin.asp
- **Wisconsin Marine Historical Society:** www.wmhs.org/
- **Association for Great Lakes Maritime History:** www.aglmh.org/
- **Wisconsin Archaeological Society:** www.uwm.edu/Org/WAS
- **Great Lakes Shipwreck Preservation Society:** www.glsps.org/glsps_home.htm

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Cover photo by: Wisconsin Historical Society

Wisconsin's Maritime Trails

SHORE TO SHIP DISCOVERIES FOR DIVERS AND NONDIVERS ALIKE.

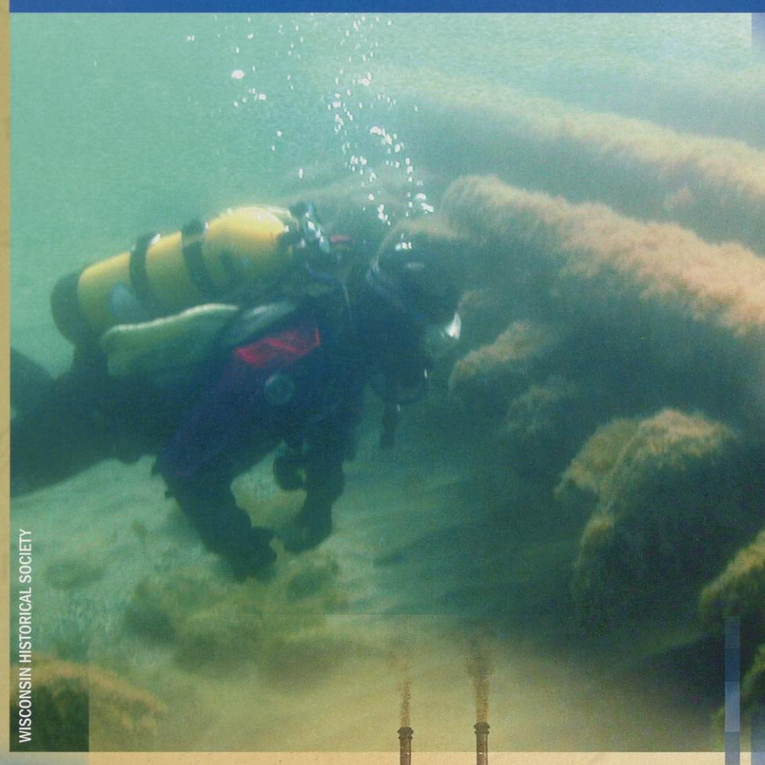
From hundreds of shipwrecks to lighthouses, museums, waterfront parks and more, Wisconsin houses an impressive trail of maritime attractions.

To encourage preservation and wider appreciation for the state's maritime history, the Wisconsin Historical Society has established the Wisconsin Maritime Trails program.

The program includes four trails: Lake Superior Trail, Door County/Green Bay Trail, Middle Lake Michigan Trail and the Lower Lake Michigan Trail. These trails do not progress from point to point but encompass four stretches of Wisconsin's Great Lakes coastline.

The trails have something for everyone from divers to snorkelers, boaters and tourists who never have to leave the shore or get wet to learn more about Wisconsin's maritime heritage. These sites are cultural resources that have scientific, historical, educational and recreational values. They also are fragile and non-renewable. Underwater archaeology gives those whose lives were lost sailing the Great Lakes a voice.

On the back of this poster, you will find a listing of sites included in Wisconsin's Maritime Trails.



WISCONSIN HISTORICAL SOCIETY

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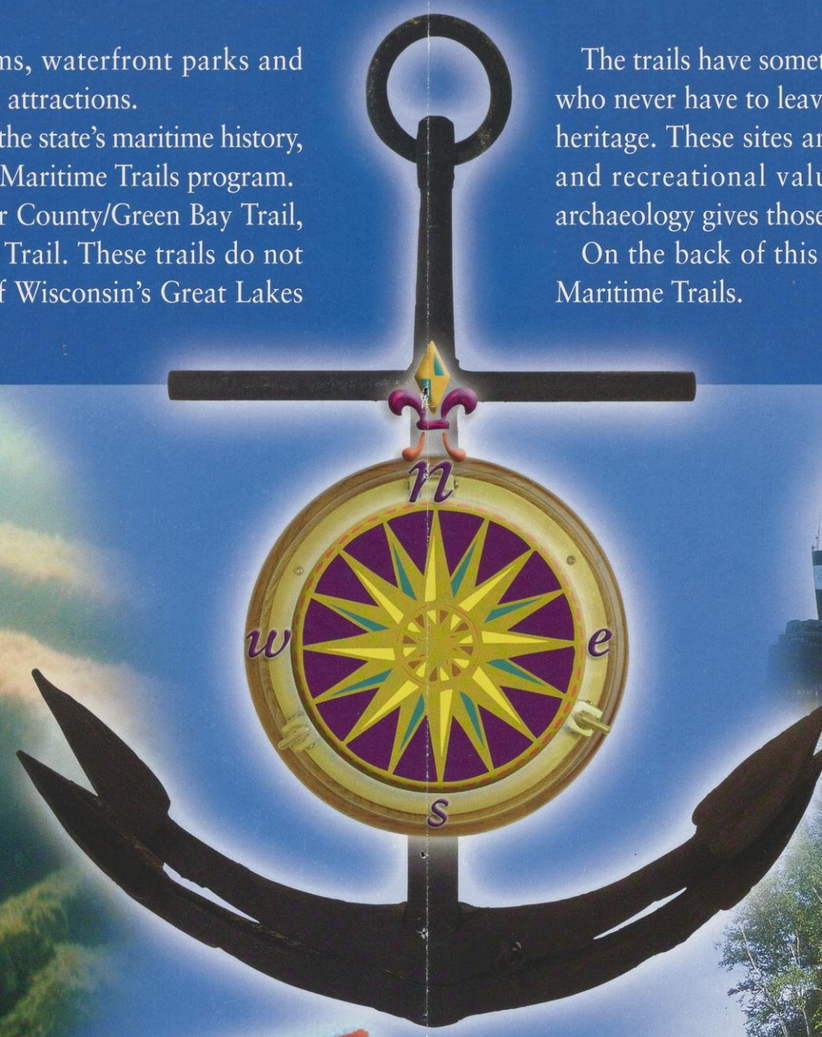
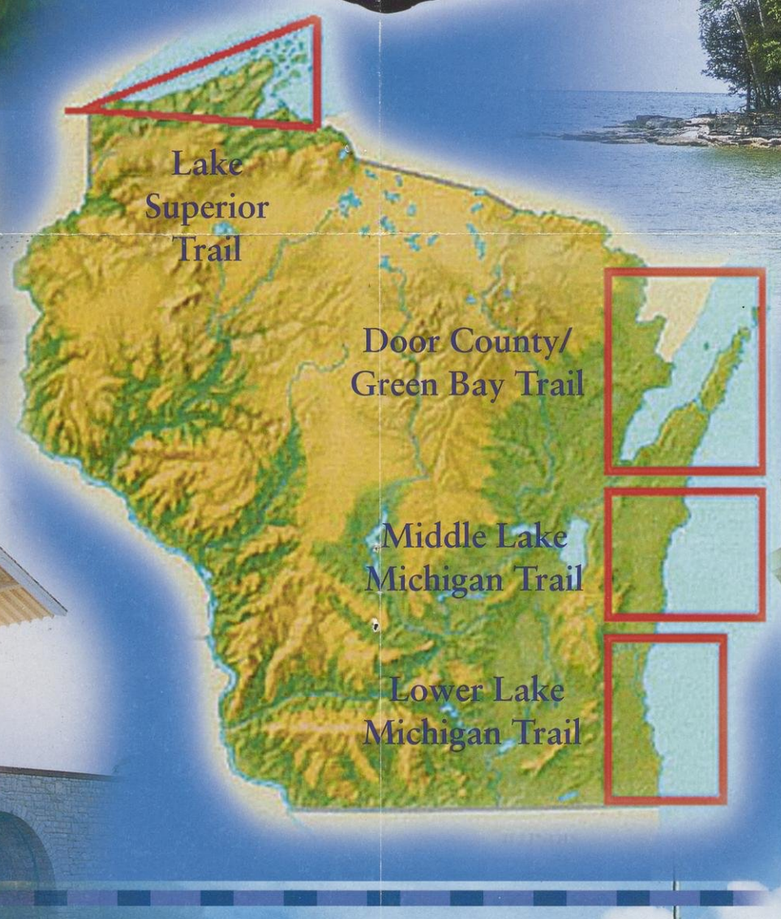
STABER W. REESE





ROBERT QUEEN

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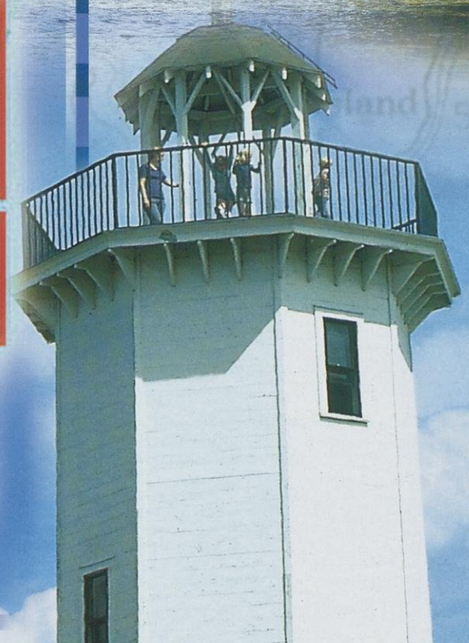
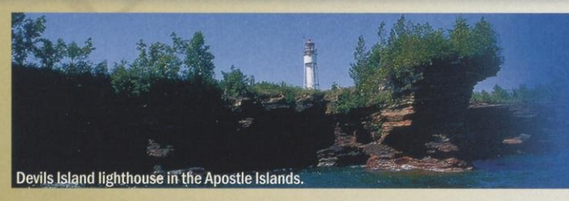


DEAN TVEDT

CLOCKWISE FROM TOP AND RIGHT OF ANCHOR: The *S.S. Badger* sails between Manitowoc, Wisconsin and Ludington, Michigan. • Newport Beach State Park, northeast of Ellison Bay, is located along 11 miles of Lake Michigan shoreline and offers a quiet alternative to bustling Door County. • Climb to the top of this lighthouse for a great view of Lake Winnebago and Lakeside Park in the City of Fond du Lac. • Take the ferry to Rock Island off the tip of the Door County peninsula in Lake Michigan and discover unique stone buildings, such as this boathouse, built by a wealthy inventor who owned the island between 1910 and 1945. • Ghosts of our coasts. • Historical records indicate that there are about 700 shipwrecks in Lake Superior and Lake Michigan.


Devils Island lighthouse in the Apostle Islands.

ROBERT QUEEN

Visit Wisconsin's Maritime Trails

www.maritimetrails.org/visit.cfm

MAP PROVIDED BY WISCONSIN HISTORICAL SOCIETY

LAKE SUPERIOR TRAIL (BAYFIELD, ASHLAND, DOUGLAS, IRON AND SAWYER COUNTIES):

NAME	CITY	PHONE	COUNTY	CATEGORY
Apostle Islands Cruise Service	Bayfield	(800) 323-7619	Bayfield	Boat Tours
Apostle Islands National Lakeshore	Bayfield	(715) 779-3397	Bayfield	22 Island Archipelago
Ashland Breakwater Light	Ashland	no phone	Ashland	Lighthouse
Ashland Historical Society Museum	Ashland	(715) 682-4911	Ashland	Museum
Ashland Memorial Park	Ashland	(800) 284-9484	Ashland	Waterfront Park
Bayfield Commercial Fishermen's Memorial	Bayfield	(715) 779-5958	Bayfield	Monument
Bayfield Heritage Center	Bayfield	(715) 779-5958	Bayfield	Museum
Bayfield Maritime Museum	Bayfield	(715) 779-9919 seasonal (Memorial Day to Labor Day) and (715) 779-3925 off-season	Bayfield	Museum
Big Bay State Park	Bayfield	(715) 747-6425	Ashland	Waterfront Park
Big Top Chautauqua	Washburn	(888) 244-8368	Bayfield	Tent/Theater
Devils Island Lighthouse	Apostle Islands/ Devils Island	(715) 779-3397	Ashland	Lighthouse
Lucerne	Apostle Islands	no phone	Ashland	WHS Shipwreck Buoy Marker
Madeline Island Historical Museum	La Pointe	(715) 747-2415	Ashland	Museum
Michigan Island Lighthouses	Apostle Islands/ Michigan Island	(715) 779-3398	Ashland	Lighthouse
National Freshwater Fishing Hall of Fame	Hayward	(715) 634-4440	Sawyer	Museum
Noquebay	Apostle Islands/ Stockton Island	no phone	Ashland	WHS Shipwreck Buoy Marker
Osaugie Waterfront Trail	Superior	(715) 392-2773	Douglas	Trail
Outer Island Lighthouse	Apostle Islands/ Outer Island	(715) 779-3397	Ashland	Lighthouse
Port Wing Heritage Hall	Port Wing	(715) 774-3624 or (715) 774-3536	Bayfield	Museum
Pretoria	Apostle Islands/ Outer Island Shoals	no phone	Ashland	WHS Shipwreck Buoy Marker
Raspberry Island Lighthouse	Apostle Islands/ Raspberry Island	(715) 779-3397	Bayfield	Lighthouse
SS Meteor	Superior	(715) 394-5712	Douglas	Historic Vessel
Sand Island Lighthouse	Apostle Islands/ Sand Island	(715) 779-3397	Bayfield	Lighthouse
Sevona	Apostle Islands/ Sand Island Shoals	no phone	Bayfield	WHS Shipwreck Buoy Marker
Soo Line Ore Dock	Ashland	no phone	Ashland	Historic Waterfront
Washburn Historic Waterfront	Washburn	(800) 253-4495	Bayfield	Historic Marker
Washburn Historical Museum	Washburn	(715) 373-5591	Bayfield	Museum
Washburn Waterfront Walking Trail	Washburn	(800) 253-4495	Bayfield	Historic Waterfront
Wisconsin Point Light (Superior Entry)	Superior	no phone	Douglas	Lighthouse

DOOR COUNTY/GREEN BAY TRAIL (MARINETTE, OCONTO, BROWN, DOOR AND KEWAUNEE COUNTIES):

NAME	CITY	PHONE	COUNTY	CATEGORY
Algoma North Pierhead Light	Algoma	(800) 498-4888	Kewaunee	Lighthouse
Anderson Dock and Museum	Ephraim	(920) 854-9688	Door	Museum
Bailey's Harbor Lighthouse	Bailey's Harbor	(800) 527-3529	Door	Lighthouse
Bailey's Harbor Range Lights	Bailey's Harbor	(920) 839-2802	Door	Lighthouse
Beyer Home Museum	Oconto	(920) 834-6206	Oconto	Museum
Bullhead Point Historic Marker	Sturgeon Bay	(608) 221-5909	Door	Historic Marker
Bullhead Point Site	Sturgeon Bay	no phone	Door	WHS Shipwreck Buoy Marker
Cana Island Lighthouse	Bailey's Harbor	(920) 743-5958	Door	Lighthouse
Carrington	Hat Island Reef	no phone	Door	WHS Shipwreck Buoy Marker
Chambers Island Lighthouse	Chambers Island	(920) 868-3100	Door	Lighthouse
Cherubusco	North Bay	no phone	Door	WHS Shipwreck Buoy Marker
Christina Nilsson	Bailey's Harbor	no phone	Door	WHS Shipwreck Buoy Marker and onshore Historic Marker
Door County Maritime Museum	Sturgeon Bay	(920) 743-5958	Door	Museum
Eagle Bluff Lighthouse	Ephraim	(920) 839-2377	Door	Lighthouse
Fleetwing Historic Marker	Liberty Grove	no phone	Door	Historic Marker
Frank O'Connor	North Bay	no phone	Door	WHS Shipwreck Buoy Marker
Frank O'Connor Historic Marker	Bailey's Harbor	no phone	Door	Historic Marker
Gills Rock Maritime Museum	Gills Rock	(920) 854-1844 or (920) 743-5958 off season	Door	Museum
Grassy Island Range Lights	Green Bay	no phone	Brown	Lighthouse
Heritage Hill State Park	Green Bay	(920) 448-5150 or (800) 721-5150	Brown	Museum
Jackson Harbor Maritime Museum	Washington Island	(920) 847-2179 or (920) 847-2522	Door	Maritime Museum
Jacobsen Museum	Washington Island	(920) 847-2179	Door	Museum
Kewaunee County Historical Museum	Kewaunee	(920) 388-7176 (Memorial Day to Labor Day) or (920) 388-3858 off-season	Kewaunee	Museum
Kewaunee Pierhead Light	Kewaunee	no phone	Kewaunee	Lighthouse
Louisiana Historic Marker	Washington Island	no phone	Door	Historic Marker
Marinette County Historical Society Museum	Marinette	(715) 732-0831	Marinette	Museum
Meridian	Sister Island	no phone	Door	WHS Shipwreck Buoy Marker
Mueller Stern	Sturgeon Bay	no phone	Door	Other/On and Off-Shore Remains
Neville Public Museum	Green Bay	(920) 448-4460	Brown	Museum
Newport State Park	Ellison Bay	(920) 854-2500	Door	Waterfront Park
Peninsula State Park	Fish Creek	(920) 868-3258	Door	Waterfront Park
Peshtigo Reef Lighthouse	Peshtigo	no phone	Marinette	Lighthouse
Pilot Island Historic Marker	Gills Rock	no phone	Door	Historic Marker
Pilot Island Lighthouse	Death's Door Passage	(920) 854-2606	Door	Lighthouse
Pilot Island Site	Pilot Island	no phone	Door	WHS Shipwreck Buoy Marker
Plum Island Range Lights	Death's Door Passage	(920) 854-2606	Door	Lighthouse
Potawatomi State Park	Sturgeon Bay	(920) 746-2890	Door	Waterfront Park

DOOR COUNTY/GREEN BAY TRAIL (MARINETTE, OCONTO, BROWN, DOOR AND KEWAUNEE COUNTIES): *continued*

NAME	CITY	PHONE	COUNTY	CATEGORY
Potawatomi Lighthouse	Rock Island	(920) 847-2235 summer	Door	Lighthouse
Rock Island State Park	Washington Island	(920) 847-2235	Door	Waterfront Park
Sherwood Point Lighthouse	West of Sturgeon Bay	no phone	Door	Lighthouse
Sturgeon Bay Canal and North Pierhead Lighthouse	Sturgeon Bay	(920) 743-3366	Door	Lighthouse
Washington Island Ferry	Washington Island	(800) 223-2094	Door	Ferry
Whitefish Dunes State Park	Sturgeon Bay	(920) 823-2400	Door	Waterfront Park

MIDDLE LAKE MICHIGAN TRAIL (KEWAUNEE, MANITOWOC, SHEBOYGAN AND OZAUKEE COUNTIES):

NAME	CITY	PHONE	COUNTY	CATEGORY
Car Ferry *Badger*	Manitowoc	(888) 337-7948	Manitowoc	Historic Vessel
Challenge Keel	Sheboygan	(920) 451-4080	Sheboygan	Interpretive sign and part of the Challenge Keel
Daniel Lyons	Algoma	no phone	Kewaunee	WHS Shipwreck Buoy Marker
Francis Hinton	Manitowoc	no phone	Manitowoc	WHS Shipwreck Buoy Marker
Harrington Beach State Park	Belgium	(262) 285-3015	Ozaukee	Waterfront Park
Hetty Taylor	Sheboygan	no phone	Sheboygan	WHS Shipwreck Buoy Marker
Kohler-Andrae State Park	Sheboygan	(920) 451-4080	Sheboygan	Waterfront Park
Lottie Cooper	Sheboygan	no phone	Sheboygan	Archaeological Site/ Wreckage Display
Manitowoc Breakwater Lighthouse	Manitowoc	no phone	Manitowoc	Lighthouse
Manitowoc-Two Rivers Mariners' Trail	Manitowoc-Two Rivers	no phone	Manitowoc	Waterfront Trail
Niagara	Belgium	no phone	Ozaukee	WHS Shipwreck Buoy Marker
Niagara Historic Marker	Port Washington	no phone	Ozaukee	Historic Marker
Point Beach State Forest	Two Rivers	no phone	Manitowoc	Waterfront Park
Port Washington Fishermen's Memorial	Port Washington	(262) 376-3190	Ozaukee	Memorial
Port Washington Light Station	Port Washington	(262) 284-7240	Ozaukee	Lighthouse
Port Washington Maritime Heritage Center	Port Washington	no phone	Ozaukee	Museum
Port Washington Pierhead Lighthouse	Port Washington	no phone	Ozaukee	Lighthouse
Rawley Point Lighthouse	Two Rivers	no phone	Manitowoc	Lighthouse
Rogers Street Fishing Village	Two Rivers	(920) 793-5905	Manitowoc	Museum
Selah Chamberlain	Sheboygan	no phone	Sheboygan	WHS Shipwreck Buoy Marker
Sheboygan Breakwater Lighthouse	Sheboygan	no phone	Sheboygan	Lighthouse
Smith Brothers Fish Net House	Port Washington	(800) 719-4881	Ozaukee	Historical Building
Toledo Anchor Memorial	Port Washington	(262) 376-3190	Ozaukee	Anchor
Tug *Ludington*	Kewaunee	(920) 388-5000	Kewaunee	Historic Vessel
Two Rivers North Pierhead Light	Two Rivers	(920) 793-5905	Manitowoc	Lighthouse
Wisconsin Maritime Museum	Manitowoc	(920) 684-0218 or (866) 724-2356	Manitowoc	Museum

LOWER LAKE MICHIGAN TRAIL (MILWAUKEE, RACINE, AND KENOSHA COUNTIES):

NAME	CITY	PHONE	COUNTY	CATEGORY
Appomattox	Shorewood	no phone	Milwaukee	WHS Shipwreck Buoy Marker
Denis Sullivan	Milwaukee	(414) 276-7700	Milwaukee	Historic Replica
Dredge 906	Milwaukee	no phone	Milwaukee	WHS Shipwreck Buoy Marker
Kate Kelly	Racine	no phone	Racine	WHS Shipwreck Buoy Marker
Kenosha (Southport) Lighthouse	Kenosha	(262) 654-5770	Kenosha	Lighthouse
Kenosha North Pierhead Light	Kenosha	(262) 654-5770	Kenosha	Lighthouse
Kenosha Public Museum	Kenosha	(262) 653-4140	Kenosha	Museum
Lumberman	Oak Creek	no phone	Milwaukee	WHS Shipwreck Buoy Marker
Milwaukee Breakwater Lighthouse	Milwaukee	no phone	Milwaukee	Lighthouse
Milwaukee Pierhead Light	Milwaukee	no phone	Milwaukee	Lighthouse
Milwaukee Public Library Marine Collection	Milwaukee	(414) 286-3000	Milwaukee	Archival Collection
Milwaukee Public Museum	Milwaukee	(414) 278-2702	Milwaukee	Museum
Navy Memorial Park	Kenosha	no phone	Kenosha	Waterfront Park
North Point (Milwaukee) Lighthouse	Milwaukee	no phone	Milwaukee	Lighthouse
Pier Wisconsin	Milwaukee	(414) 276-7700	Milwaukee	Home Base of *Denis Sullivan* (Wisconsin's Floating Classroom and Ambassador Flagship)
Racine Heritage Museum	Racine	(262) 636-3926	Racine	Museum
Racine North Breakwater Light	Racine	no phone	Racine	Lighthouse
Racine Reef Light	Racine	no phone	Racine	Lighthouse
Tug *Islay*	Milwaukee	(414) 382-1709	Milwaukee	Historic Vessel
Wind Point Lighthouse	Wind Point	(262) 639-3777	Racine	Lighthouse

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CP FOR OUR PATRONS

NEWS FOR CONSERVATION PATRON LICENSE HOLDERS AND POTENTIAL PATRONS

Wisconsin CONSERVATION PATRON

Four ways to purchase

Thanks for your interest in renewing or buying a hunting, fishing or Conservation Patron license. These licenses expire each year on March 31st.

The Wisconsin Department of Natural Resources offers four convenient ways to quickly buy recreational licenses starting March 10, 2005. Choose an option:

Attention current CP customers

Please choose one of these four options to renew your CP license in 2005. You will not receive a separate mailing to renew your CP license.

1 Buy online

Buy online. Visit **dnr.wi.gov** on the Internet to purchase recreational licenses online. From the main page, click in the left column on the "Licenses, Permits & Registrations" heading. Then look for the "Online Services" heading and choose the first entry, "Hunting and Fishing License Sales." That brings you to the Online Licensing Center, choose "Purchase a License" option. After you verify your name, address and a few other simple questions, you can start your online shopping. The very first option on the form under the "Combination" heading is the Conservation Patron license.

Online orders need to be billed to MasterCard or Visa credit cards for a $3 handling fee. Make sure your computer is hooked up to a printer before purchasing your licenses so you can print your receipt. Your tags will be mailed.

2 Call us

Call us. Purchasing a license by phone is a snap. Call toll-free 1-877-WI LICENSE (1-877-945-4236). Phone orders can be billed to either Visa or MasterCard for a $3 handling fee. At the end of your transaction, you will receive an authorization number that provides immediate license privileges during open seasons, except those that require a carcass tag.

3 Visit us

Visit us. Recreational licenses can be purchased at more than 1,500 sporting goods stores, merchants and resorts as well as at DNR offices. Don't know where the nearest DNR Service Center is located? The location, phone number and office hours of each center are listed on a short strip between pages 16-17 of this issue. You can also find a listing online at **dnr.wi.gov/org/caer/cs** under the heading DNR Locations. You can search by county or city for DNR offices and businesses that sell recreational licenses.

4 Buy by mail

Buy by mail. For Conservation Patrons who still prefer to renew their CP license through the mail, fill out the form on the reverse side and mail it to: DNR - Attn: Conservation Patron Renewal, P.O. Box 7924, Madison, WI 53707-7924. Be sure to include the $3 handling fee in your check that is made payable to DNR, or pay by MasterCard or Visa credit card. Allow 4-6 weeks to process mailed applications to renew a CP license.

Wisconsin Department of Natural Resources
Attn: Conservation Patron Renewal Coordinator
P.O. Box 7924
Madison, WI 53707-7924

www.dnr.wi.gov
Patron Coordinator: (608) 266-7030

WISCONSIN DEPT. OF NATURAL RESOURCES

2005 Wisconsin Conservation Patron License Renewal Application

Form 9400-356R Rev. 1/05

Resident — $140.00 Nonresident — $600 Junior Resident/Nonresident CP (12–17 years old) — $75.00

Notice: Information collected on this form is required for any application filed under Chapter 29, Wis. Stats., and may be used for eligibility for approvals, participation in surveys, law enforcement and other secondary purposes. Credit card data will be kept confidential and will only be used to process this license request, under S.29.024 (2g), Wis. Stats.
☐ Check here if you want personal identifiers collected on this form withheld from disclosure on any list of 10 or more individuals that the DNR is requested to provide to another person (s.23.45, Wis. Stats.)

Name (Last–First–Middle) (Please print or type) DNR Customer# required

Street Address

City, State, Zip Code County of Residence Daytime Telephone Number

Date of Birth (Mo–Day–Yr) Eye Color Hair Color Weight Height Sex (M–F)

Please answer the following questions: (Circle your answer)

Yes No 1. Do you wish to make a contribution to the Fish & Wildlife Fund? If yes, enter amount $ _____

Yes No 2. Do you wish to make a donation to food pantry venison processing? If yes, enter amount $_____

Yes No 3. Do you intend to hunt ANY migratory birds? If yes, you must complete **Section A – HIP Certification** (required annually for questions 4 and 5 below)

Yes No 4. Do you want an Early Season Canada Goose permit?

Yes No 5. Do you want to hunt the Regular Canada Goose Season? If yes, choose ONE of the following:

- ☐ Exterior Goose Zone (permit will be received with Conservation Patron license)
- ☐ Horicon or Collins Zone (complete the application in your Patron packet)
- ☐ Undecided (complete the application in your Patron packet)

Yes No 6. Residents only: Do you intend to trap? If yes, indicate which of the qualifications you meet:

- ☐ Trapper Education graduate
- ☐ Previously purchased a license, which authorized trapping prior to 1992
- ☐ I actively engage in farming (per s. 102.4(3), Wis. Stats.)

Section A — HIP Certification

Circle the quantity of birds bagged last year (for each species):

	Quantity Bagged			
Ducks	Did Not Hunt	0	1–10	>10
Geese	Did Not Hunt	0	1–10	>10
Woodcock	Did Not Hunt	0	1–30	>30
Mourning Doves	Did Not Hunt	0	1–30	>30
Coots/Snipe	Did Not Hunt		Hunted	
Rails/Gallinules	Did Not Hunt		Hunted	

Conservation Patron license:

Resident ($140.00)	$ _____
Nonresident ($600.00)	$ _____
Jr. Res/Nonres ($75.00)	$ _____
Fish & Wildlife Fund Contribution	$ _____
Food Pantry Venison Donation	$ _____
Application handling fee	$ 3.00
Total Amount Due	$ _____

Payment: Credit card information will be kept confidential and only used to process this license request.

Make checks payable to "DNR" or please charge my: ☐ Visa ☐ MasterCard Expiration Date: _____

Card Number ___ ___ ___ ___ - ___ ___ ___ ___ - ___ ___ ___ ___ - ___ ___ ___

I hereby certify that I have complied with all of the laws regulating the issuance and purchase of this license and that my license privileges are not otherwise revoked.

Signature of Applicant _____ Date Signed: _____

Mail to: DNR–Attn: Conservation Patron Renewal, P.O. Box 7924, Madison, WI 53707-7924

GET THE PICTURE

Tips to improve your wildlife photos or get started in a new hobby.

Story and photos by Herbert J. Lange

I waited patiently for close to two hours in my camouflaged minivan for the red fox pups to appear, but there was no sign of them. I began to think the vixen had moved them. That's how it often happens. You spend a lot of time waiting, watching, judging the light conditions and being prepared for those brief moments when the animals are nearby, the light is right, your camera equipment is at the right settings and you are ready to shoot photos.

I was about to leave when three pups appeared with an adult male (a "dog"). The pups tried to nurse from him, but he kept pushing them away. A minute later the female ("vixen") appeared with nine more pups. Of the thousands of litters that I have observed, this was the largest! They played for an hour about 60 feet from my van. This was a perfect range for me.

Spend enough field time and you'll find fox dens in old woodchuck holes, in fields or streambanks.

Get comfortable with camera equipment before any field shoots

Over the years I've experimented with a variety of camera body and lens combinations in taking wildlife photos. For this kind of field shoot, I use a camera equipped with a 600 mm lens and a 114 teleconverter, the foxes were magnified 17 times.

Lens choice depends on the weather, the light conditions and the distance from my subject. Most people think that with a large telephoto lens, one can take quality photos miles away from your subject. Not so. Long lenses in low-light conditions can yield real junk. You have to capture enough light and get subjects close to get quality. I've learned over many years that some of my best shots came when I could achieve 17 or 24 times normal magnification so my subject remained in sharp focus. Even at these magnifications, I need to be within 70 feet of my subjects on a nice clear day to get crisp images. If I am photographing flying eagles, I use a 400 mm lens and I need to maneuver to get those birds within 30 feet. If I can set up blinds and get closer to my subjects, or if the light conditions are changing, I also pack 200 mm and 300 mm lenses so I can adjust to the situation.

Just like during my hunting days, seeing animals up close is no accident. You have to put in your field

TOP:
Great horned owlets *(Bubo virginianus)*

LEFT:
Saw-whet ow
(Aegolius acadicus)

time, learn animals' habits throughout the year, learn to read the natural signs that animals leave, and figure out how to place and conceal yourself at the right time in the right place. For instance, I've learned to use several kinds of blinds to conceal myself in the field. When photographing some animals that live pretty near the roadside, a car or truck can make a really good blind. You can cover the vehicle with camouflage material and equip your camera with a window mount that will hold your camera and lens nice and steady. That window mount is one of my most valuable pieces of equipment.

To minimize camera movement, you also want to get out of the wind, protect your camera equipment from the elements and conceal yourself from your wild subjects. That means you will probably need to make or buy some camera blinds that you can set up quietly and quickly. When I am photographing eagles in winter, I often place myself near the ice's edge so I can see the eagles feeding and searching the open water for an easy meal of carrion. For those situations, ice fishing tents make dandy camera blinds. On the other hand, if I am photographing upland species on farmland, I have a blind that resembles a large hay bale. It's great for concealing me and I can move inside it a bit without being noticed by my subject. In open farm country, I place that blind several yards from the subject and gradually move it closer. My biggest problem in leaving blinds for several days near the subject species is not animals, it's the possibility that the blind may be stolen.

A tripod is also extremely important when using long telephoto lenses. I use one 95 percent of the time because I have learned that no one is steady enough to hand hold long lenses at most shutter speeds. This is especially true when you need to open up f-stops and use slightly slower shutter speeds to capture animal photographs at dawn and dusk. You need to prepare for those shots and you need steady support from a tripod even if you have very steady hands. Some shots also require cable releases because your finger can move a long lens ever so slightly and ruin the sharp focus on a subject. This is especially important when taking photos early in the morning, in late

Wood duck *(Aix sponsa)*

afternoon or evening when low light conditions require much longer exposures.

As for film stock, I recommend experimenting with several to see which ones produce consistent results for the conditions when you like to shoot. I am currently shooting Fuji-chrome slide films, particularly the Velvia 100, Provia 100 and Sensia 100. I like the rich tones in these slower speed films. Several of the Kodak films are also very good. Personally, I do not use print film or electronic digital images. Many outdoor magazines still prefer slides because they are sharper, easy to use and they can reproduce those colors faithfully at any size. Print films and digital images often cannot be enlarged as much as slides without losing color quality or definition. Learn the preference of the markets you are shooting for. If you are taking images for card or print sales, experiment to find which

Cardinal
(Cardinalis cardinalis)

Red-bellied woodpecker
(Centurus carolinus)

film stocks or electronic settings produce consistent, crisp results for you.

Know your subjects

I don't choose to photograph animals in game farms, zoos or park settings. Therefore, it is extremely important for me to learn the daily and seasonal habits of the mammals and birds that I am trying to photograph. Reading about animals can certainly help you get started, but there is no substitute for spending time outdoors seeing where animals congregate and watching them closely. For instance, I believe that adult red foxes are best photographed from November through January when their coats are lush, bright and they stand out from the background. Pictures of vixens with pups should be taken from April through May. On the other hand, gray foxes can be photographed in a longer season from October through March and their pups are born around April 15th. A litter of gray foxes is harder to locate. Over the years I have found only five litters and obtained a few good images each time. I learned that the gray fox is relatively territorial, easy to call in and tape recordings of other gray foxes drive them crazy! Just don't overuse this technique.

Other animals are difficult to photograph because they are mostly nocturnal, like owls, flying squirrels and the like. I have enjoyed the challenge of photographing great horned, barred and saw-whet owls, none of which build their own nests or add leaves and branches to existing nests or cavities. I've noticed that the great horned owls like to use abandoned eagle, owl, squirrel or crow's nests as well as tree cavities. I especially like searching about in March and April when the owlets are just old enough to come out and perch in areas where I can get close enough for some wonderful pictures.

Don't put your camera away in winter. Stark lighting conditions can create dramatic photos. Some bird species only come this far south during winter and many come in a lot closer to feeding and watering stations as natural foods get more scarce.

Winter is also a great time to photograph bald eagles as they fish the open waters below locks and dams where dead or injured fish are easy pickings. Similarly, you can often find eagles in farm country feeding on carrion.

Also meet some of the folks at local DNR stations, US Fish and Wildlife offices, foresters, farmers and staff from nearby US Army Corps of Engineers offices. People who work outdoors in rural settings regularly are usually more than willing to discuss what animals they have recently seen, and where and when they have seen them. They can often suggest times of year and locations to see animals close up in large numbers as they naturally congregate on mating and migration runs. And don't overlook the opportunity to talk with other avid wildlife watchers. Birding groups in particular hold trips year-round and maintain hotlines that describe exactly when and where members are seeing different species. Many of these wildlife watchers are also photographers you can learn from as you become more skilled and more experienced.

I took up photography about 40 years ago, and I am still learning new ways and new approaches for photographing wild species. I find photography much more difficult than hunting because I have to get much closer to my subjects as I want to have my animal subjects fill up the frame. In my 40 years with a camera, many people have asked me to teach them aspects of wildlife photography, and I've helped a few get started. Whether you approach it as a hobby, side business or possible livelihood, wildlife photography is an exacting, competitive field. It's worth the effort and brings pleasure in many ways through capturing and sharing the unique visions you can see outdoors, like the remarkable sight of a fox tending to a dozen pups at once.

Herbert J. Lange's mammal and bird photos have appeared in Wisconsin Natural Resources for more than 25 years. He lives in Hazel Green, in southwestern Wisconsin but travels throughout the state and Midwest taking images.

SHORESIDE

Shrinking populations of tiny two- to three-inch fish warn how shoreland development likely damages the habitat that aquatic life depends upon.

Lisa Gaumnitz

Pugnose shiner. Banded killifish. Least darter. Small fish with bodacious names and diminutive public profiles. Though anglers readily recognize the panfish and game fish species that make fine eating, few people recognize the many minnow-sized species that form the broad biological base of aquatic communities and food chains.

"These fish are little known, ignored or invisible to most people, but they are essential to lakes, streams, game fish and the anglers who pursue them," says Dave Marshall, a DNR water resources management biologist.

Some fish species are fast disappearing from Wisconsin waters, even from lakes with the best water quality.

PHOTOS BY ROBERT QUEEN

Many lakes still contain strong populations of small panfish, but fisheries biologists have noticed that nongame fish are becoming increasingly rare in lakes where shoreland and shoreline vegetation are altered by development.

SENTINELS

"We sampled small streams a few years ago and weren't too surprised to find declines in populations of small forage fish where there were water quality abuses from urban and agricultural land uses," Marshall says, "but we didn't expect to see that small fish populations are declining in lakes where the water quality is considered good. When you start seeing a decline in [fish species] diversity that isn't related to water quality, then you start looking at habitat. It could be a number of factors, but the primary change over time has been shoreline habitat."

Species that adapted and evolved over thousands if not millions of years, survived several ice ages, and moved into new habitats are now succumbing in the blink of an eye in geologic time as humans replace their natural shoreline habitats with piers, seawalls and sandy beaches.

"Maintaining a diversity of fish is a sign of lake health," says John Lyons, a longtime DNR fisheries researcher. Their decline signals bigger problems for the ecosystem, for game fish populations that rely on small fish for food, and for people who enjoy Wisconsin's most popular and lucrative outdoor sport — fishing.

There are deeper moral concerns that Wisconsin is losing its ichthyological treasures. These fish display an incredible palette of colors, genetic variation and niches, Lyons says.

"We have an ethical responsibility to maintain them," he says. "They're part of our heritage, and whether they play an obvious function or not, as stewards of the land we have an obligation to see they survive if it can be shown we're responsible for their demise."

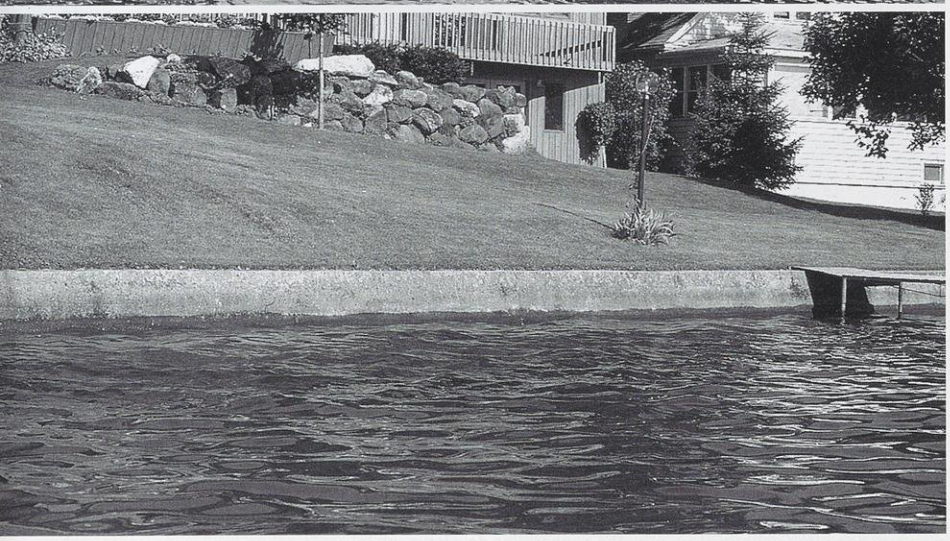
Updating 30-year-old surveys

On a warm June day torn between the threat of rain and brilliant sunshine, Marshall, Lyons and crew arrive for a

TOP: Researchers measure water depth, sample plant life, collect fish, note the lakebed composition and measure light intensity to document changes in fish diversity over time.

BOTTOM; Many of these same lakes were last sampled 30 years ago in a similar survey. Preliminary results indicate both fish populations and species diversity are dropping as shorelines become more developed.

DAVID MARSHALL



DAVID MARSHALL

TOP: Boat props can stir up and dislodge shoreland vegetation. Moreover, docked boats and piers shade the shallow waters. Fewer aquatic plant species survive this shading, and remaining plants may grow more sparsely.

BOTTOM: Similarly, when manicured lawns and seawalls replace natural shorelines, stormwater flows more quickly carrying nutrients into the waters. The solid walls reflect the energy from waves back into the water that can dislodge vegetation and stir up bottom sediments. Researchers are measuring how these actions change the plant and fish life in the water.

day that will focus on the fate of small native fishes.

Lyons is bringing together new information that he and other biologists have gathered in the last 20 years. A federal grant is helping him fill in gaps about the current status, distribution and abundance of fish in Wisconsin. His particular quarries today are the rare, small fish species that inhabit shallow water habitats.

Marshall's research grew from work to develop lake management plans for Rock Lake and Lake Ripley in Jefferson County. Surveys of the lakes' nearshore areas revealed that native and rare fish populations plummeted over the past 30 years despite stable water quality.

He and other team members want to see if other lakes with good water quality show the same trends. They'll explore possible links to shoreline development and piers in particular. Studies in Massachusetts and other states suggest that docks directly threaten aquatic plants that are key to fish survival and growth. Marshall's Rock and Ripley lake studies suggest that the growing number and larger sizes of piers in Wisconsin's inland waters are reducing aquatic plant and small fish populations.

On a shoestring budget, the two men recruited Laura Stremick-Thompson, DNR fish biologist for Jefferson County, Steve Galarneau, DNR water biologist, a crew of DNR staff, and professionals from other cooperating institutions to survey native, nongame fish populations on 13 lakes in southeastern Wisconsin last summer. They selected lakes with good or fairly good water quality that also had marl lakebeds. Marl forms a sticky, gray, clay bottom that contains lots of calcium carbonate, which helps buffer water quality from pollution. All 13 lakes were previously sampled in the mid-1970s and had relatively high numbers of rare fish species.

No one has checked the fish diversity on these lakes since the 1970s surveys, Lyons says. "Are these species still here and in what numbers?"

GENEVA LAKE

Today, Lyons and Marshall hope to learn the answer for Geneva Lake. For decades this Walworth County lake has been ringed with large estates, manicured, highly landscaped lawns and terraced bluffs. Geneva Lake is hardly anyone's idea of pristine, but nature has maintained good water quality here over time because the lake is fed by groundwater, has no inlets, and drains a very small land area — roughly 2.5 acres of land for every acre of lake according to the Geneva Lake Environmental Agency. That compares favorably to nearby Lake Delavan, with a 19 to 1 ratio, so Geneva receives considerably less polluted runoff than many other lakes with larger watersheds.

To cover the 17 sampling stations on the 5,400-acre lake, the crews split into three groups. Lyons and Marshall get help from Frank Veraldis, of the U.S. Army Corps of Engineers in Chicago, and Philip Willink of the Field Museum of Chicago.

The group's first two survey sites or "stations" are Riviera Beach in downtown Lake Geneva and along the shoreline at Big Foot Beach State Park.

Using the same type of fishing gear used a quarter-century earlier, Lyons and Willink measure out 100 meters parallel to the shore and unfurl a long seine net. They walk the net around the perimeter of the sampling site then drag the net toward shore and each other into a tight circle, creating a bag to capture any fish. Marshall busily scrib-

bles notes about the lake bottom material and about other habitat features. Both sites have sandy bottom materials, no rooted aquatic plants, no downed trees, and little of the habitat little fish like.

The two men bring the net together, and all start picking through the weeds for fish. Nothing moves. "The third time's the charm," Lyons tells the crew. "Think positive."

He's right. The third station the crew reaches by boat yields fish to sort, count and record, as do the fourth, fifth and sixth sampling sites.

The sixth sampling site suggests the trends the study seeks. In the 1970s, this site yielded 15 species including rainbow darters, banded killifish and least darters — all sensitive, rare species dependent on aquatic plants. Today, the crew must make two hauls at the site because the shoreline is broken by a pier with 15 slips. The area now has no aquatic plants, no overhanging cover, no downed logs — and only eight species of fish, none of which are rare or sensitive to shoreline habitat changes.

Overall lakewide results are similarly bleak. Though the other two sampling crews found pockets with more diverse species, the total haul on Geneva Lake is 17 native species compared to 29 at the same sites in the 1970s.

Across all 13 study lakes, an average of 14.4 native species are found in 2004, compared to 19.2 in the 1970s; nongame species dropped from 11.8 to 8.2; rare fish dropped from 5.5 to 3.3 species. Lyons cautions that the differences on a particular lake could reflect some sampling errors and natural fluctuations. However, it is significant that the researchers looked at a broad group of lakes and found the same patterns of declining fish species and numbers.

"The results are indicative of larger problems," Lyons says. "It's a heads-up that things are heading in the wrong direction."

These small fish species are key food sources for some game fish species, particularly during the first summer of their life, he says. If the small fish are lost, populations of their predators will suffer, and all game fish species will be affected because they'll be competing for a smaller number of remaining forage species.

Researchers compare the plant growth, plant diversity and light intensity near piers and under docks to measure how other aquatic life is affected by shoreline development

Teasing out the causes

As the 2004 field season wound down, Marshall, Lyons and others were starting to crunch numbers and conduct other analyses to help untangle why native fish are vanishing from Wisconsin waters. Their findings may well reflect continental and global trends.

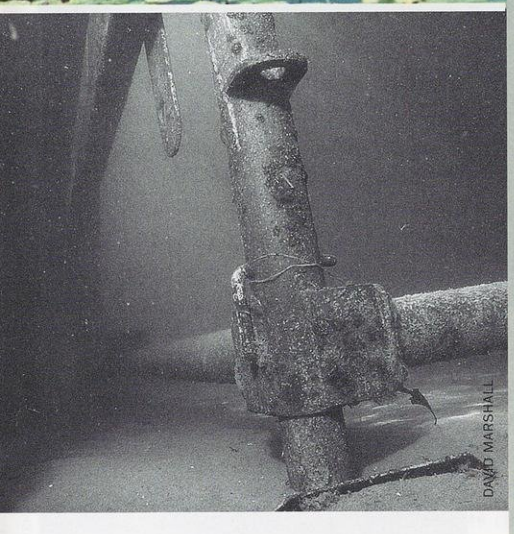
Fish species are disappearing from the world's lakes and streams at an alarming rate; in North America, 30 to 35 percent of fish species are considered at risk. Habitat alterations are the leading cause of fish extinctions, followed by the introduction of nonnative species, overfishing and pollution, according to an oft-referenced 1999 report in the Journal of Conservation Biology.

Research in Wisconsin, Minnesota, Iowa and elsewhere over the last 15 years documents that native plants, fish, frogs, songbirds and other species are suffering as a result of overdevelopment and improperly done development along the water's edge.

Finding evidence that links a specific change on the shoreline to a population drop of a particular fish species has been more difficult because shoreline "development" encompasses so many different activities.

For instance, when seawalls are installed, these retaining walls often replace a mixture of cattails, bulrushes and other plants, rocks, logs and undercut banks that a variety of fish need for food, spawning and hiding places. Waves bouncing off these walls also reflect a lot of energy back into the water, scouring the lake bottoms. It's much more difficult for aquatic plants to take hold and root in more turbulent waters. Further, turtles, ducks, frogs and other wildlife find it difficult to move from water onto land with a wall

SANFORD ENGELL



DAVID MARSHALL

TOP: These results will be compared to results under natural shorelines on the same lakes.

BOTTOM: Shade from the dock above greatly reduces plant growth and fish cover in some areas.

blocking their way.

In other projects, bulldozers and other heavy equipment that "grade" or clear a site for construction and reshape bluffs or shorelands can allow dirt to spill into the water, smothering fish eggs and interfering with feeding by fish and other wildlife.

Riprap — large rocks piled along shorelines — cover fallen and overhanging trees and aquatic plants that provide food, spawning and hiding places for fish, and nesting areas for loons and other birds.

Piers with boats docked at them shade out the rooted aquatic plants that serve as the spawning grounds, pantries, nurseries and hiding places for a variety of fish, including small nongame fish, at some or all stages of their lives.

Research wrapping up on Lake Ripley and Rock Lake in Jefferson

Some of the neat rare fish

Laura Stremick-Thompson

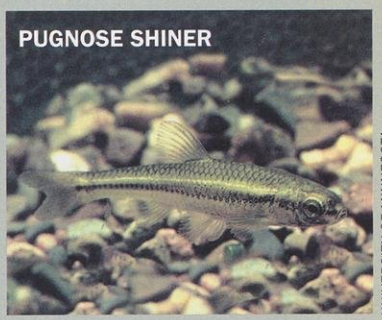
PUGNOSE SHINER: This herbivore grazes on plants like filamentous green algae. It is timid and secretive. When a school is threatened, these shiners immediately drop to the bottom and conceal themselves in the densest vegetation, so they are also tough to collect with conventional sampling gear.

BROOK SILVERSIDE: This fish spawns one time in its first year and dies shortly thereafter. It is the only species of silversides found in Wisconsin.

BOWFIN: One species (*Amia calva*) is known in Wisconsin and North America. The bowfin is a primitive fish, a lone survivor of a large family found only as fossils in the rocks of Europe and the United States. The male provides parental care, building the nest and protecting the eggs and newly hatched fry. The newly hatched fry form a "fry ball," a large mass of small fry swimming close together. If one becomes separated from the male parent, it will swim in close circles until the parent returns. Male bowfin are well known for their fierce protection of the young and will throw themselves out of the water towards a perceived threat that may be on the shoreline. Bowfins have a gas bladder they can use as a primitive lung, and can survive prolonged periods of low oxygen by becoming air-breathers.

STARHEAD TOPMINNOW: This minnow escapes predation from largemouth bass by jumping onto the bank and remaining there for several minutes before jumping back into the water. Studies suggest starheads can orient themselves with respect to the sun in order to return to their original habitat, even if they have to jump over land.

LEAST DARTER: One of only two darter species where the female is larger than the male. Males establish well-developed territories in heavy vegetation. The male develops "breeding tubercles" on all underside pelvis fins and some anal fin spines that are thought to help maintain spawning position on the female. Average length: 1.2 inches!



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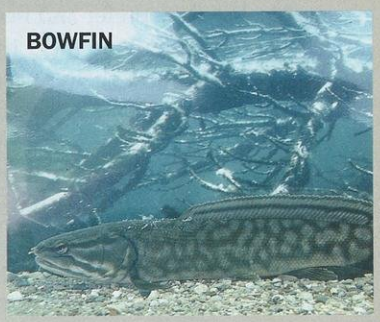
DAVID MARSHALL



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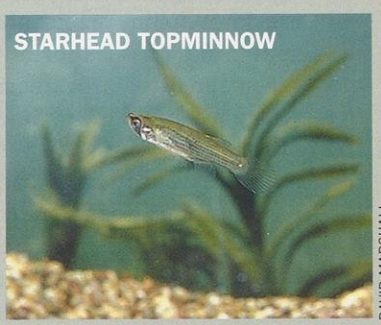

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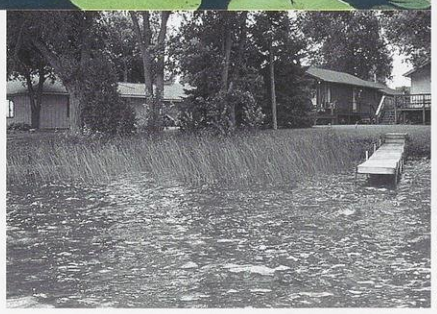


DAVID MARSHALL

TOP: Aquatic plant, insect and animals are sampled at the same locations over time to note changes from development.

BOTTOM: Small docks can also be installed in ways to minimize disturbance to natural vegetation.

County shows that fish will seek shelter under piers if no other refuge is available, but they prefer and need a variety of aquatic plants to meet their spawning, feeding and shelter needs. To measure the impact of piers on fish, investigators used snorkeling gear and light meters to measure the light intensity underwater, comparing the space under piers to open water areas. They also compared plant, fish and aquatic bug populations under piers, in open waters and in designated "sensitive areas" that are known important sites for fish spawning. "It's important to protect those sensitive areas because that's where we found the broadest diversity of fish," says Patricia Cicero, one of the Jefferson County researchers. Preliminary findings document that shading under piers is significant, reduces plant growth and shifts the plant communities to shade-tolerant species.

Another concern with piers, Marshall says, is that they are not just narrow floating rectangles along the shore. They are several feet wide, they often have extending decks and the boats moored alongside also create shade. The average piers on Lake Ripley were 546.4 square feet and 370.2 square feet on Rock Lake.

Marshall and Lyons acknowledge that other factors beyond shoreline development and piers may play a role in the fishes' demise. For example, exotic invasive species such as zebra mussels remove algae that's an important component of the food web and can disrupt the ecosystem. But zebra mussels aren't present or a dominant feature in many of the study lakes where fish diversity is declining, they note.

The researchers' counts of piers from 2004 show that study lakes with greater densities of piers per mile of shoreline showed the steepest declines in rare fish species and in the number of different fish species, Marshall notes.

"Something as common as lakefront piers, once they become abundant, are no longer a benign thing," he says. "Piers are not the sole problem, but piers are part of the problem."

Marshall and Lyons hope their results will be a wake up call for Wisconsin citizens and government. Ten fish species are already listed as endangered in Wisconsin, another 11 are considered threatened, and some of them, like the pugnose shiner, are in trouble everywhere in their range.

"Wisconsin's population of pugnose shiners is as good as anywhere else," Lyons says. "If we don't protect it, who will? "

Marshall hopes the research and survey work will attract the interest and attention of citizen advisory groups as state rules on shoreland development are revised. He hopes that sensitivity to developing in a manner that maintains natural shorelines can keep pugnose shiners, banded killifish and least darters from a watery grave.

"I was lucky from the ages of eight to 13 to have a rich life exploring the underwater habitat and watching the diversity of minnows and different fish," Marshall reflects. "Future generations are being robbed of a really interesting feature of lakes — their biodiversity."

Lisa Gaumnitz is public affairs manager for DNR's water programs.

The gall of that fly!

Continued from page 2

After three to four days, the egg hatched and the young larva bored its way through and into the growing stem. The plant responded by increasing cell production at the injured site and formed a gall. The young gall was stem-colored (green) or may have been reddish-green like a young apple.

As the gall grew, the larva ate out a pocket in the gall's center, forming a chamber in which to live, overwinter, and pupate. Throughout summer, the barrel-shaped white larva fed on the inside of the gall, molted twice and continued to grow, reaching a "gigantic" size of 4 to 6 mm by early October. Since the adult fly has no chewing mouth parts, the larva prepared for its spring exit by chewing a tunnel out to the gall's surface, but leaving a thin "epidermis" over the outer opening. On a brown, winter gall, you'll see the exit tunnel marked by a pinhead-sized dark spot on the gall's equator.

To survive winter, the mature larva entered a resting stage or diapause as a third instar larva. To prepare for the sub-freezing conditions, colder temperatures induced the larva to convert glycogen into glycerol and sorbitol, effective antifreezes, that reduced the water content in its body so ice crystals could not form and cause cell injury.

If ice anglers cruising for bait don't collect the gall, the larva will awaken from its dormancy in spring and pupate inside the gall. The adult fruit fly will crawl along the tunnel then inflate and deflate a balloon-like structure between its eyes to force open the thin covering and escape.

Newly emerged flies are about 6.5 mm long, slightly smaller than houseflies. Males are smaller than females. Their translucent wings are mottled with brown splotches. Adults do not feed and typically live about ten days. During that short time the flies mate, females lay eggs only on young Canada goldenrod stems, and the cycle begins anew.

Wander the snowy fields and collect a few goldenrod ball galls. Carefully cut one open and find its dormant occupant. Place other galls in a jar and wait for the inhabitants to emerge. Although the hardened gall seems adequate to protect the larva inside, the larva can be parasitized when the gall is young, tender and growing. Two species of small parasitic wasps in the chalcid family can deposit their eggs through the growing gall tissue right into the fly larvae. The following spring, a tiny black wasp may emerge rather than a fruit fly.

Some Canada goldenrod stems have two ball galls instead of the usual single ball gall. This occurs when two different female fruit flies each lay one egg on the stem tip or the same female lays two eggs at different times. Usually the upper gall is smaller and is more often parasitized.

In your search, you may notice galls with different shapes on Canada goldenrod. A moth larva, *Gnorimoschema gallesolidaginis*, likely formed the elliptical stem gall. This insect does not overwinter in the gall. Look for its tiny exit hole. A closely bunched cluster of leaves formed in the terminal bud was caused by another type of fly or midge, *Rhopalomyia solidaginis*; it's called the goldenrod bunch gall.

Ubiquitous Canada goldenrods support many insects with diverse life cycles, but none is more interesting than a tiny fruit fly that lives most of its life encased within its stem. For only ten days, the fruit fly experiences the freedom of flight and the warmth of a Wisconsin sun before its dependents burrow back into the Canada goldenrod's inner sanctum.

Anita Carpenter watches the goldenrod stems rustle on winter walks near her Oshkosh home.

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@dnr.state.wi.us

DON'T PICK THE FLOWERS!

I was reading the article on "Nature's dry bouquets," by Barbara Estabrook (August 2004), and something caught my attention. On page 22, in the middle column, she talks about gathering flowers. It reads, "City dwellers may find they are welcome to gather flowers at county or state parks, but never assume you can pick any plants without first asking park personnel." To my knowledge, Code NR 45.04 states that you can only harvest edible fruits, nuts, wild mushrooms and wild asparagus. Wildflowers are a no, no! You may want to check into this. We (DNR Service Center, Woodruff) answer a lot of questions regarding the Northern Highland State Forest, and that is a topic that comes up often.

Rosalie M. Richter
Woodruff

Bruce Chevis and Jason Fritz with DNR's Bureau of Parks and Recreation respond: In fact, it is illegal by Wisconsin Administrative Code to pick any flowers on state lands under the management of the Department of Natural Resources. This would include state parks, forests, trails and recreation areas, natural areas, and wildlife areas. With the millions of people that enjoy these areas each year, if even a small percentage pick flowers it would have a significant effect on the habitat.

The reasons for prohibiting the cutting and removal of flowers (even dried flowers) are based on one of the basic reasons that we have state parks: to preserve natural flora, fauna, geological features, and archaeological/cultural sites to allow all our citizens the opportunity to observe, learn, and enjoy them now and in the future. Every flower cut down is one that the next park visitor will not be able to see and enjoy.

Cutting dried flowers in the fall concerns us because many flowers will not drop their seeds until the fall or winter. Thus, a cut flower will reduce the number of flowers sprouting next spring. Also, readers should be aware that the roadsides within the boundaries of state properties are normally considered state property and the same "no cutting" rules apply. The state often spends significant time and funds to plant roadsides with wildflowers to increase natural beauty while reducing maintenance. Those flowers play important roles in our parks. And, as always, if readers have specific questions about a state property, they should contact that property directly. If in doubt, ask!

READERS *write*

MORE CARS OR MORE DEER?

Regarding the charts on page 18 ("Deer in the headlights," October 2004), wouldn't we expect the increase as shown in the top chart because of the increase in average daily traffic counts on all roads in Wisconsin? The chart would probably drop down, left to right, if traffic counts were taken into account, wouldn't it? Check with the Wisconsin DOT, cities, counties, and so forth about traffic counts on the Interstate roads, other federal highways, state trunk highways, county trunk highways and town roads. Possibly a third chart should have been shown with the increase in traffic over the years versus people injured or killed. It appears that after this deer season, the number of deer will be decreased and the problem of deer crashes reduced. This was a very timely message in this article.

Wilbur L. Clark
Tomah

According to studies done in several Midwest states, a number of factors influence the probability of deer crashes at a particular location. Aside from traffic volume, as you suggest, are such factors as vehicle speed, roadway features and visibility, adjacent land type/use/activity, vegetative cover, human population and deer population. A paper by UW-Madison Prof. Keith Knapp and graduate student Xin Yi reports that deer population and amount of vehicle travel are the two biggest factors affecting deer-vehicle crashes.

BIG CHIP INFO

I found your website by looking for information on the Chippewa Flowage. I came across Mr. Larsen's article from 1997 ("A meander through the Big Chip," October 1997) and really enjoyed it. The story was very well written and informative.

Our group of guys has been fishing since 1984 and we're always looking for new places. We found the Chippewa Flowage on the map and I think we're going to give it a try next year if we can get reservations.

Rich Ward
Lexington, KY

Rich, I'd bet that a call or visit to the Wisconsin Dept. of Tourism site would help you. The toll-free phone number is 1-800-432-TRIPS (8747). The website is www.travelwisconsin.com. You can search by area for places to stay, other attractions, package vacation deals, and so on. The Chippewa Flowage is southeast of Hayward, so I'd bet that the Sawyer County and Hayward chambers of commerce would have publications that list resorts, hotel rates and other amenities for your group. The tourism sites and service center can help you reach those groups as well.

WHO OWNS SHIPWRECKS?

The question of who owns abandoned shipwrecks, cargoes and artifacts found in a state's territorial waters of the Great Lakes and oceans has been addressed by Congress on several occasions. It has been resolved in favor of the state in whose waters the submerged objects are located, but it is based on older law.

English common law rules that "title and dominion of all lands and objects found therein below the high water mark" belonged to the King of England. This rule became part of American common law subsequent to the Revolution and applies equally to all 50 states [Shively v. Bowlby, 152 U.S. 1 (1894)].

The Northwest Ordinance of 1787 gave what is now Wisconsin, Michigan, Illinois, Indiana and Ohio title to their respective bottom lands of lakes Superior, Michigan, Huron and Erie. The U.S. Supreme Court subsequently determined that the Great Lakes were factually and legally "inland seas" and subject to federal admiralty jurisdiction.

The Submerged Lands Act of 1953 gave states title to bottom lands within territorial waters to be held in an active trust for the benefit of all citizens.

Congress's latest declaration of ownership of objects on a state's seabed was the Abandoned Shipwreck Act of 1987 that directed where a shipwreck situated on a state's submerged lands has been abandoned and deserted by its owner [thus relinquishing ownership] the state has title to the shipwreck. The wreck site is to be managed by the state for educational and recreational benefit of the public. The courts have ruled that it is within a state's obligations to encourage the diving public to view, explore, study and enjoy our American shipwrecks. However, damaging, stealing from or otherwise injuring historic wrecks is violative of federal law and the laws of many states.

A U.S. Court of Appeals case for the Seventh Circuit last June affirmed that the State of Wisconsin owned the historic shipwreck *MV Roscinco* off Kenosha in Lake Michigan and bolstered state efforts to protect the wreck from looting by treasure and artifact hunters as well as commercial salvors. Wisconsin successfully argued that wrecks are publicly owned and neither wrecks nor their artifacts can be privately held. The decision restricts only divers who are selfish or greedy. The beneficiaries are the thousands of divers who respect shipwrecks as valuable cultural resources and who take nothing but pictures and leave nothing but bubbles.

Hank Whipple
Madison

UPDATE

BAVARIAN GREEN

A delegation of Wisconsin business leaders and state agency representatives visited Bavaria last October to observe "green" initiatives in that German state. The group — which included Wisconsin printers, builders and power company managers — saw firsthand how environmental initiatives can make good economic sense. Wisconsin builders observed alternatives to commercial air conditioning, such as passive solar systems, heavy blinds and double-hinged windows to catch breezes, and sod roofs that reduce runoff, cut heat absorption, and add oxygen to the environment. Printers learned new methods for cooling presses by using circulating groundwater, and other energy-saving practices. Initiatives at the household level included home insulation techniques that keep annual heating costs at $150, and garbage that's separated six ways for recycling. Bavaria's environmental advances stem from a more collaborative approach between regulators and industry, similar to Wisconsin's new "Green Tier" legislation signed into law last April. The "Green Tier" law provides incentives to environmentally responsible businesses, including regulatory flexibility and permit streamlining. The law also allows qualified businesses to commit to superior environmental performance in exchange for some latitude in how they achieve their environmental goals.

Let the show begin!

It always happens around this time of year. There you are, wrench in hand, fussing over that ancient snowblower and hoping you can get the blasted thing to last just a few more weeks. *Just a few more weeks,* you think, *oh please don't let me strip this nut, just a few more weeks and I can put this old beast away for another season, I wonder how the walleye fishing is going to be this year...* and of course you do strip the nut, but by this time it doesn't matter because you are lost in a hazy daydream of warmer times and more congenial climes to come.

Might as well indulge that dream while you shovel by hand for the next few weeks.

Visit one of the following trade shows to feed your fantasy:

41st Annual Original Milwaukee RV & Camper Show

February 17 - 20, 2005
Wisconsin State Fair Grounds, Milwaukee
www.milwaukeervshow.com

If your days of pitching a pup tent are over, check out the latest in recreational vehicles — pop-up campers, truck campers, travel trailers, fifth wheels and motor homes. More than 100 exhibitors from all around Wisconsin will have RVs on display. You can pick up vacation destination ideas, compare travel notes with other outdoor enthusiasts, find spare parts and try out new gadgets for your home away from home.

16th Annual Milwaukee Boat Show

February 18 - 20, 2005
Midwest Airlines Center, Milwaukee
www.showspan.com/mbs/

Already in Milwaukee for the RV Show? Go all the way and stop in at the Boat Show, too. See more than 300 boats, from small fishing boats and personal watercraft to cruisers and motor yachts, ski and bass boats, pontoon boats, runabouts, deckboats — if it floats, it will be there. Be sure to attend the boating safety seminars and learn how to read the skies and prepare for foul weather from experts at the National Weather Service.

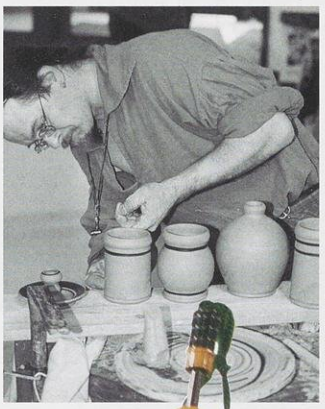
MILWAUKEE BOAT SHOW

19th Annual Madison Fishing Expo

February 25-27, 2005
Alliant Energy Center, Madison
www.madfishexpo.com

This is the year to toss those rusty lures and spruce up your tackle box with new offerings from leading manufacturers and local dealers. Get free fishing advice from Great Lakes, muskie, smallmouth bass and walleye experts. Join a seminar on introducing the joys of fishing to kids. An added hook: All of the show's proceeds are donated to fund fishing habitat restoration, education and recreation projects throughout South Central Wisconsin.

MADISON FISHING EXPO



BRIAN BRADLEY

20th Annual Echoes of the Past Historical Trade Fair

February 26 - 27, 2005
Winnebago County Fair Grounds, Oshkosh
www.bradleycompany ofthefox.com/main.html

Need a new leather jerkin? How about an adze? Balls for your musket, perhaps? You'll find supplies for the early American way of life — suitable for historical re-enactors, muzzle-loading enthusiasts and people who like to say "They sure don't make 'em like that anymore" — at this trade fair. Look for historical clothing, books, patterns, tinware, pewter, beads, leather, fur, forged iron, pottery, firearms, knives and more representing periods from the mid-1700s through the 1860s. Enjoy food, demonstrations, period fashion programs, and musical entertainment.

BRIAN BRADLEY

East Bluff State Natural Area

Notable: Devil's Doorway, one of the signature rock formations at Devil's Lake State Park, is composed of angular blocks of Baraboo quartzite sitting atop a 400' bluff. The East Bluff State Natural Area within the park includes several such formations, as well as a unique "pygmy forest" of stunted hickory and ash trees. Also found here are remnant dry prairie, bedrock glade and oak forest.

How to get there: Within Devil's Lake State Park, about four miles south of Baraboo in Sauk County. The East Bluff Trail and Balanced Rock Trail, accessible from the south shore parking area, lead through the natural area. A state park admission fee is charged.