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WISCONSIN

NATURAL RESOURCES

April 1996 \$3.00




Sandhills and spring mud

Raising frogs and toads

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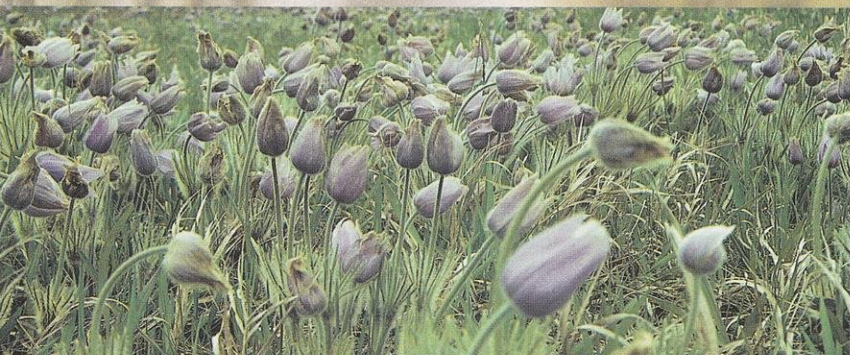


A gentle sign of spring

Anita Carpenter

Only isolated snow patches remain as spring warms the prairie soil. In early April, ground-loving pasque flowers respond and grace the slowly-greening land with fuzzy lavender blossoms.

Pasque flowers, *Anemone patens*, are not easy plants to find. Their two-inch blue to lavender, sometimes white, flowers hug the dry prairie soil at a time when we're unlikely to be searching for flowering plants. The beautiful blooms may be found in native prairies, along sandy country roads or tucked in crevices on the southern exposure of dry rocky bluffs. The flowers bloom before the leaves appear. When the blossoms fade, the deeply cut, lacy leaves expand and the flowering stalk elongates. Its sinewy remnants arch in the wind. The conspicuous plumes are now easy to spot, but you're at least a month too late to smell its blossoms.



BUREAU OF ENDANGERED RESOURCES

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WISCONSIN NATURAL RESOURCES

April 1996

Volume 20, Number 2



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BACK COVER: Sandhill Cranes (*Grus canadensis*) at Necedah National Wildlife Refuge.

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All about amphibians

Whether collecting eggs, or looking under logs for wrigglers and hoppers, it's fun to poke around the pond for frogs, toads and salamanders.

Dreux J. Watermolen



DON BLEGEN

(above) Spring mating season is the ideal time to visit small ponds and puddles to see amphibians, like these wood frogs, and their varied egg masses.

(right) Gray treefrogs breed later.

Ah spring! For tree or toad, the sap is running, there's love in the air and it pays to advertise.

Like birds, frog and toad species each have a distinctive call to attract females to breeding areas. In the shallow waters fertilized eggs will hatch into tadpoles and metamorphose into young frogs. We can help you get to the right place at the right time to hear and see the annual ritual. Perhaps you will collect a few amphibian eggs that you can hatch out at home.

It's fun to explore for other amphibians, too. On that first rainy night in late March before the ground thaws, about the time the chorus frogs begin calling, salamanders will also start making their moves. They make a nocturnal migration from upland wooded areas to ponds, marshes and lakes. Male salamanders do not have breeding calls. They simply show up at the breeding areas a day or two before the females to start active courtship.

A key to enjoying Wisconsin's amphibians — eleven native frogs, one toad, and seven salamanders — is knowing how to find them. It's likely that several species live near your house. Start by scouting nearby wetlands. Almost all of Wisconsin's amphibians need water for breeding. Some breed in temporary ponds that form in farm fields, some only inhabit lakes and perpetually wet areas, others use woodland pools.

Next, slowly walk or cruise rural roads that separate upland areas from ponds and marshes. By driving slowly just after dark with your headlights on or

walking the road with a flashlight, the lights might reflect the glistening bodies of migrating salamanders.

Adult amphibians can be safely handled, provided your hands are clean and free of bug spray. Always wet your hands before touching amphibians, so you don't rub off the mucous membrane that keeps them from drying out and protects them from germs.



Timing visits to hit the peak

Shortly after the chorus frogs begin to sing, northern leopard frogs, northern spring peepers, and wood frogs join in. Later in the spring American toads, and Cope's and eastern gray treefrogs can be heard. Green frogs, mink frogs, and bullfrogs start croaking in the very late spring and early summer.

Salamander species also migrate throughout the spring. You are more likely to see tiger salamanders first because they are large and populations are widely distributed in Wisconsin. Blue-spotted and spotted salamanders follow shortly after. By May, you may encounter several species at the same time.

The result of all this calling and migrating is massive, frenzied breeding in Wisconsin ponds and marshes. Millions of amphibian eggs are laid and fertilized.

Wisconsin amphibians lay moderately-sized eggs surrounded by a thin membrane and one to three concentric gelatinous capsules, depending on the species. As eggs are laid, the capsules swell and the outermost form a protective jelly.

As you search the pond, note the variety of egg masses.

Pickerel frogs and spotted salamanders enclose many eggs in a single

Amphibian eggs are distinguished by their size, shape, location and whether they are laid singly or in a mass.
(above) Spotted Salamander eggs form a firmer mass that can be lifted, others are much more fragile.
(below) American toads lay eggs in long, paired strands.
(right) The Red-backed salamander lays and defends its eggs on land under logs and stones.

jelly mass. Central newts and spring peepers deposit eggs singly. The American toad's eggs and jelly are shaped in long, paired strings. Some salamanders deposit their eggs in several small packets. Clumps of eggs are commonly attached to sticks or vegetation to hold their position in the pond or stream. Bullfrogs and green frogs lay eggs in a film on the surface of still, shallow waters. Eggs laid in a surface film are more vulnerable, but are better able to meet their oxygen needs from being exposed to the open air.

Two species of Wisconsin salamanders lay their eggs in terrestrial environments. Red-backed salamanders lay their eggs under logs and stones in hardwood forests, and four-toed salamanders lay their eggs in *Sphagnum* moss or other moist substrates in bogs and along streams.

Individual females can lay enormous numbers of eggs. In general, larger species have more eggs than

Wisconsin amphibians

TOAD

eastern American toad
Bufo americanus americanus

FROGS

Blanchard's cricket frog
Acris crepitans blanchardi
chorus frog
Pseudacris triseriata

northern spring peeper
Pseudacris crucifer crucifer

Cope's gray treefrog
Hyla chrysoscelis

eastern gray treefrog
Hyla versicolor

bullfrog
Rana catesbeiana

green frog
Rana clamitans melanota

pickerel frog
Rana palustris

northern leopard frog
Rana pipiens pipiens

mink frog
Rana septentrionalis

wood frog
Rana sylvatica

SALAMANDERS

blue-spotted salamander
Ambystoma laterale

spotted salamander
Ambystoma maculatum

tiger salamander
Ambystoma tigrinum

central newt
Notophtalmus viridescens louisianensis

four-toed salamander
Hemidactylium scutatum

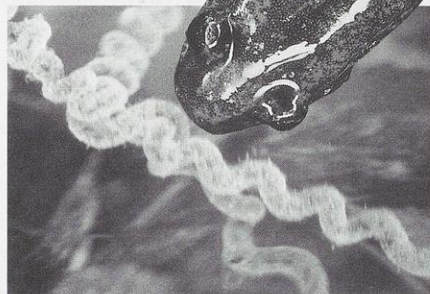
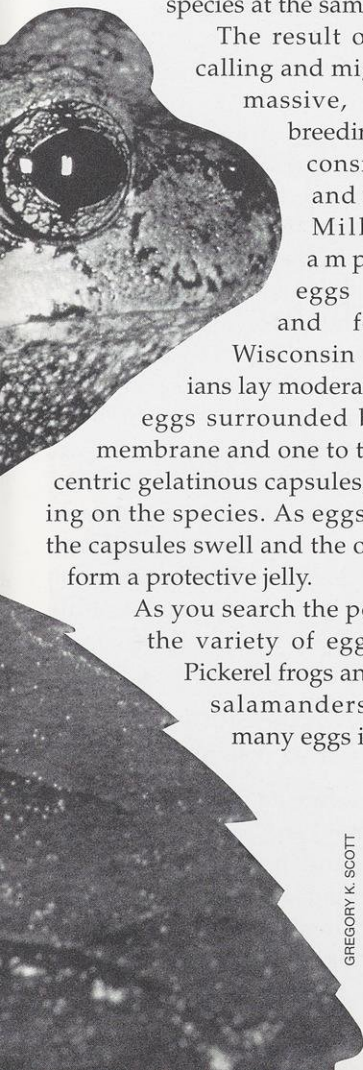
red-backed salamander
Plethodon cinereus cinereus

mudpuppy
Necturus maculosus maculosus

GARY S. CASPER (FAR RIGHT) DON BLEGEN

GARY S. CASPER

GREGORY K. SCOTT





(TOP AND RIGHT) DON BLEGEN

What's a salamander?

Nearly everyone is familiar with frogs and toads, but fewer people recognize salamanders.

Like frogs and toads, salamanders are amphibians. They are sometimes confused with lizards which are reptiles that have scales on their bodies and claws on their toes. Salamanders have smooth or warty skins and are clawless. They are small animals with backbones and moist skins. Most cannot travel very far from water and most lay many jelly-like eggs in water. Their eggs hatch into gilled larvae that look similar to small fish.

The greatest variety of salamanders inhabit North and South America. In Wisconsin, we have seven species that are fairly easy to identify. Some older references list an eighth species, Tremblay's salamander, but scientists found this species to be a genetic variation of the blue-spotted salamander.

Juvenile salamanders, unlike tadpoles, have bushy gills and projections near their necks called balancers, which help them maintain upright positions in the water. As the larvae mature, salamanders absorb their gills and develop lungs and feet.

Every family has its exceptions, and Wisconsin's salamanders have two: the mudpuppy retains its large, bushy red gills and keeps its larval features throughout its lifetime. Red-backed salamanders breed terrestrially. They never develop gills and look like miniature adults when they hatch.

Tiger salamander larval and adult forms.

smaller ones, and salamanders lay fewer eggs than frogs do. Giant bullfrogs can lay up to 20,000 eggs, while the tiny gray treefrogs will lay as few as 10. Blue-spotted salamanders will lay from seven to 40 eggs, but spotted salamanders will lay as many as 250.

Most amphibians emigrate from the breeding ponds after mating, leaving the eggs unprotected. A few salamanders, however, provide parental care. Red-backed salamanders guard their eggs from potential predators. The female often encircles the eggs with her body and aggressively defends the nest. Secretions from her skin rub onto the eggs to retard bacterial and fungal development. Four-toed salamanders often lay their eggs in communal nests which are tended by the females. Mudpuppies guard their eggs, which are attached singly to the underside of rocks or other objects in shallow water.

Now that you know where to look, here's what you are looking for. Amphibian eggs are usually easy to

find. The egg yolk is creamy yellow or pale grayish yellow. Egg masses that are exposed to direct sunlight develop dark pigment on the exposed side. The pigments may protect the developing embryo from ultraviolet radiation. Perhaps the adaptation allows eggs to absorb heat faster and keeps them warmer for a longer time than single, light-colored egg masses. Eggs laid in warm, shallow, temporary ponds usually develop quicker than those laid in colder, deeper waters. The gelatinous masses surrounding the eggs often appear greenish as algae grows in the membranes.

Eggs may hatch in a few days or take several weeks depending on the water temperature. The tadpoles and larval salamanders that emerge feed voraciously. Most tadpoles and salamander larvae metamorphose into adults after several weeks; others take their time. Salamanders become adults by late summer so they can leave the breeding ponds for upland habitats. Bullfrog, green frog, and some mink

frog tadpoles take a year or more to develop into frogs. Mudpuppies never lose their larval characteristics.

The central newt has a life history distinct from other Wisconsin salamanders. In August, newt larvae metamorphose and adapt for aquatic or terrestrial life depending on the surrounding habitat and climate. If a pond dries up, aquatic newts lose their high tail fins, change color from green to brown, and maintain a terrestrial life as "efts." If the pond later fills up, the eft transforms *back* to the aquatic stage, though they don't develop gills. The newts can oscillate between these modes of life as climate dictates.

Valued in ecosystems, economy and research

Amphibians are an important component in many ecosystems. Research in New England has shown that the weight of salamanders exceeds that of bird and mammal life in some forests. Amphibians are the top predators in



DON BLEGEN

some aquatic habitats, consuming a wide variety of insects and other invertebrates. On the other hand, amphibians are also a favored *food* for a variety of fishes, reptiles, birds, mammals and other amphibians.

Amphibians wriggle and hop through the economy as well. Frogs and salamanders are collected, raised and sold by the biological supply, laboratory and pet industries. Newt and tiger salamander larvae are sold as fish bait. Frog legs are tasty fare at upscale restaurants and mudpuppy tails have been consumed as a delicacy.

Ecologists view amphibians as valuable indicators of environmental change. Since they spend part of their life in water and on land, amphibians are monitored and analyzed to mea-

sure the effects of water, air and land pollution.

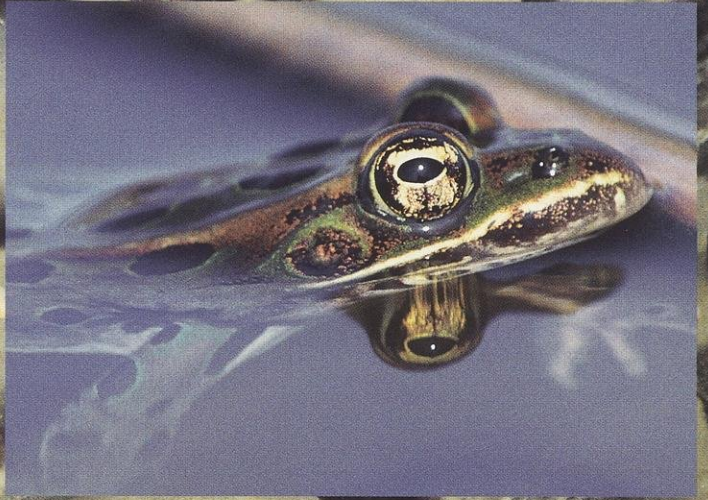
In the 1970s, scientists expressed concerns about declining leopard and cricket frog populations in Wisconsin. In 1989, concern about apparent worldwide declines in amphibian populations warranted a symposium in Canterbury, England. Scientists from 63 countries relayed their research but there was no consensus that amphibian population declines could be attributed to clearcut pollution sources or changing conditions. Scientists suspected a range of causes, including greater ultraviolet radiation due to a thinning ozone layer, acid precipitation and wind-borne pesticides.

Experts convened by the National Research Council did not find a single

(above) The central newt can adapt for aquatic or terrestrial life, depending on its environment.
(below) The eastern American toad is the only toad found in Wisconsin.



DON BLEGEN



Raising amphibians at home

Obtaining eggs and tadpoles: Ponds, small lakes and creeks are ideal places to find amphibian eggs and catch tadpoles. Use small dip nets or jars to collect eggs and tadpoles and transport them home in clean jars, plastic bags or plastic containers. Keep the container in an insulated bag or cooler to maintain the approximate temperature where the eggs and tadpoles were collected. Take an extra container of water from the waters where the specimens were collected.

Never remove eggs or tadpoles from public areas such as parks, refuges or conservation areas. Ask permission before removing tadpoles from private land. Also make sure you are not collecting eggs or tadpoles of the protected Blanchard's cricket frog. Only collect a few tadpoles and eggs and only take as many as your bowl or aquarium can hold without over-crowding.

To collect frogs, tadpoles, salamanders and their eggs, you need a valid fishing license or a small game license. Frog season opens on the Saturday nearest May 1 and runs through December 31 each year. You will find a short list of rules in the 1996 Spearing and Netting Regulations available at DNR offices and other license outlets.

Maintaining your catch: Eggs and tadpoles can be kept in a large, flat pan, fish bowl, aquarium, or a large glass jar. Set up the new home ahead of time. I recommend using water from the pond where you collect the eggs or tadpoles to give them a head start. Chlorinated tap water destroys bacteria and algae and it may kill amphibian eggs and larvae. Treat a jug of tap water with a dechlorinator you can buy at a pet store or let a jug of water stand a few days with the lid off so the chlorine can dissipate. Provide at least one gallon of water for every two tadpoles to prevent over-crowding, and use an air stone and air pump to provide a constant stream of fine bubbles. It is not necessary to provide sand or gravel.

Eggs found in submerged habitats should be kept submerged, and those found floating should be allowed to float.

Feeding tadpoles: Tadpoles usually eat algae and other minute plant matter, but this may be hard to get in sufficient quantities at home. Finely ground commercial goldfish food, a commercial trout chow, or algae from another aquarium should be fed twice daily. As a

substitute you can boil and cool two tablespoons of fresh spinach or lettuce (not cabbage). If available, crush rabbit food pellets and feed them to tadpoles as a dietary supplement. Small flakes of hard-boiled egg yolk can be added twice a week as a protein supplement.

Feed only what they can eat in an hour to avoid fouling the water. Remove any uneaten food.

As tadpoles become frogs, their diet changes from eating plants to feeding exclusively on live animals such as insects and small crustaceans. It's a real challenge to find enough food to maintain most juvenile frogs for very long. Tiny mealworms or aphids from infested houseplants are your best bet.

Tadpole transformation: Tadpoles undergo three remarkable changes that are easy to observe. First, they grow legs — back legs first; front legs last. Second, they slowly lose their tails. As the front legs grow, the tadpoles will no longer eat. The tail shrinks as the tissue is reabsorbed as food by the tadpole. Finally, the tadpole switches from breathing with gills to breathing with lungs after it grows legs.

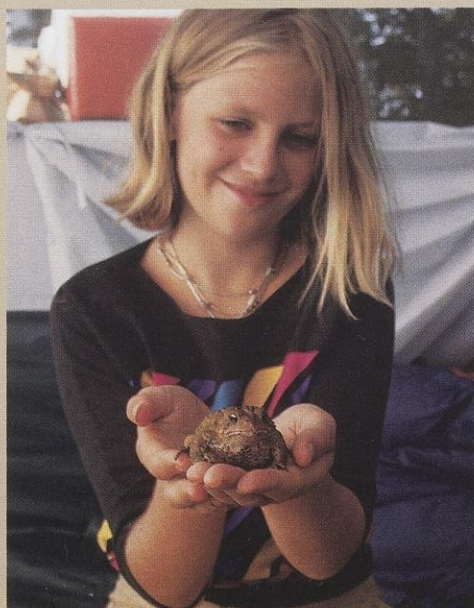
Once the amphibians' hind legs appear, you need to rework the landscape in their container. Provide a gently sloping place where they can crawl out of the water. When the froglets are ready to leave the water, they must be able to do so quickly, or they may drown. A small pile of rocks is fine. Driftwood also works, but avoid all types of treated lumber.

Returning frogs to their homes: After you complete your observations, release the young frogs back into the wild where you originally collected them as eggs or tadpoles. Do this before the end of September so they have time to find places to hibernate for the winter. Do not release animals that were not collected in Wisconsin or are not naturally found here. Introducing species that are not found here could jeopardize other native species. It's against the law for a good reason.

A tragic example of how introduced species affect native amphibians occurred in Calaveras County, California. The celebrated jumping frog of this locale is now extinct. Those not eaten by gold miners in the 19th century were eaten by the eastern bullfrogs that were brought West for food and hunting in the 20th century.

—D.J.W.

(left) It's fun to hatch out frogs, like these leopard frogs, and watch as they grow and transform from egg to tadpole to froglet to mature adult. Follow these tips.
(below) Help youngsters appreciate the value and the beauty of cold-blooded species.



ROBERT QUEEN (PAGE 8 PHOTOS) GREGORY K. SCOTT



SPRING PEEPER. DON BLEGEN

factor to explain population declines. Rather, they suspect that a series of factors — widespread destruction of amphibian habitat, changing land uses, competition from other species and natural causes such as drought — are all taking a toll.

Estimating amphibian populations is a tricky business and research can send different signals. Here in Wisconsin, for example, spring peeper populations seem stable, and wood frog populations are increasing slightly. Leopard frog populations took a big dip in the 1970s, but now appear relatively stable. Documented declines of other species are indisputable. Locally, the endangered Blanchard's cricket frog wavers on the brink of extirpation.

Since 1981, the Wisconsin DNR has coordinated a statewide frog and toad survey, the oldest such survey in the nation. Approximately 100 volunteers scattered throughout the state visit 10 wetland sites three times each year to listen for calling frogs and toads. There is no similar organized effort to monitor salamander populations in Wisconsin. In spite of their environmental importance, most cold-blooded creatures generally don't attract research dollars as readily as birds and mammals have.

The chorus of frogs in one of Aristophanes' ancient Greek plays croaked "Brekekekex koax koax," as Dionysus rowed across the river Styx in the underworld. Their words may seem like gibberish, but a sudden, deathly silence from the amphibian world in spring would send a more sobering message. □

Dreux J. Watermolen is an ecologist in DNR's Bureau of Environmental Analysis and Review. His research and writing interests include reptile and amphibian ecology and the biology of invertebrates.

Useful references about amphibians

The following books and reports, available at your local library or book store, can be consulted for additional information about Wisconsin's amphibians and can be used to identify species you encounter.

Natural History of Amphibians and Reptiles in Wisconsin by Richard C. Vogt. Milwaukee: Milwaukee Public Museum. 1981.

A Field Guide to the Amphibians and Reptiles of Eastern and Central North America by Roger Conant and Joseph T. Collins. (Peterson Field Guide Series). Boston: Houghton Mifflin. 1992.

Amphibians of North America by Hobart M. Smith. (Golden Field Guide Series). New York: Golden Press. 1978.

"A Key to the Eggs of Wisconsin's Amphibians" by Dreux J. Watermolen. Madison: Wisconsin Department of Natural Resources. Research Report No. 165. 1995.

Handbook of Frogs and Toads of the United States and Canada by Albert H. and Anna A. Wright. Ithaca: Comstock Publications. 1949.

Handbook of Salamanders by Sherman C. Bishop. Ithaca: Comstock Publications. 1943

Amphibians and Reptiles Native to Minnesota by Barney Oldfield and John J. Moriarty. Minneapolis: University of Minnesota Press. 1994.



RED-BACKED SALAMANDER.
BUREAU OF ENDANGERED RESOURCES

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PHOTO BY THOMAS MEYER © 1995

Calypso Orchid
(*Calypso bulbosa*)

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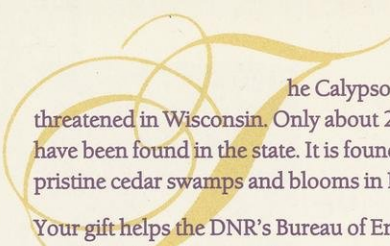
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he Calypso Orchid is threatened in Wisconsin. Only about 20 populations have been found in the state. It is found in cool, dark, pristine cedar swamps and blooms in May.

Your gift helps the DNR's Bureau of Endangered Resources (BER) protect this rare orchid and more than 200 other endangered and threatened species like timber wolves, trumpeter swans, ornate box turtles and regal fritillary butterflies.

Your money also goes to protect rare natural communities like boreal forests and prairies.

Many of these species and communities are surveyed by biologists and mapped into a large database called the Natural Heritage Inventory. The BER uses this information when we review development projects to help ensure protection of rare species.

We also protect these species and communities by purchasing or designating special tracts of land known as State Natural Areas. BER has nearly 300 State Natural Areas, totalling more than 90,000 acres in the state.

Donations from Wisconsin taxpayers are matched (up to \$500,000) by general purpose revenue — so your gift goes twice as far to help endangered species. Please give today!

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ON THE TRAIL OF TOXICS

Two inventories can help you track how chemicals are moved and released in your community.

Jennifer Feyerherm

Chemicals are a part of every home and every community. Environmental regulations and public safety standards offer protection, but they can't guarantee that everyone will be safe from chemical exposures that might harm them.

We are not equally exposed to chemical hazards. Workers in some occupations, people who live in company towns surrounded by large manufacturing plants, and those whose homes abut industrial areas bear different risks. Community tragedies like the deadly cloud of methyl isocyanate that killed thousands

in India in 1984 underscore the dangers of adjoining industrial and residential areas and the importance of community emergency plans. Becoming knowledgeable about the chemicals that are used or transported in our communities is equally sensible in Beloit, Bloomer and Bayfield as in Bhopal.

Every day, thousands of pounds of toxic chemicals are produced, used or released to Wisconsin's environment.

Many of the chemicals used in manufacturing, in commerce and in providing public services are tracked to stay aware of potentially harmful exposures. During 1993 just one such reporting program documented that 37 million pounds of various toxic chemicals were released to Wisconsin's environment and 108 million pounds were transported from manufacturing plants to other locations for treatment, burning, recycling or disposal.

Community Right to Know laws were enacted so citizens and local government could collectively define acceptable risks as chemicals are used, moved and stored.





GREG MATTHEWS

A 1985 fire at a pesticide storage and mixing firm dramatized the value of emergency planning. The fire warranted evacuating the surrounding residential neighborhood in the middle of the night within several blocks of the plant as firefighters battled a chemical fire in frigid weather.

It's difficult to estimate how substantial these industrial emissions are compared with smaller amounts of chemicals emitted by many more people from daily activities like driving cars, fertilizing lawns, controlling pests, finishing furniture or cleaning the oven. Nevertheless, the industrial emissions are more closely tracked because they are more concentrated in one location, the chemicals are used regularly, and people living near the sources are often not aware of nor would choose to be exposed to them.

The Department of Natural Resources tracks chemical flow from industries and municipal services through permits, reports and inspections. Information from these tracking systems is now available to you, free of charge, to learn more about chemical use in your neighborhood and community. You can work with the DNR's Office of Technical Services to extract information from the Toxic Release Inventory (TRI) and the Integrated Toxics Reporting System (ITRS). Both systems detail which chemicals are released, where, by whom, and in what

quantities. You can learn about chemicals emitted to the air, waterways and sewage treatment plants. You can assess which chemicals are transported from a manufacturing plant to a treatment or recycling facility. Such information is important for businesses that want to cut costly emissions, community fire departments planning emergency response, medical professionals who want to diagnose and treat conditions to which workers are exposed, home owners and parents concerned about emissions from neighboring businesses, and students who are studying chemical exposure in their community.

The Toxic Release Inventory (TRI) is a part of the federal Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986, which gives communities an inventory of toxic or hazardous chemicals that are used, transported and released.

The TRI includes information about 336 chemicals deemed "toxic." Industries, federal facilities, state agencies and educational institutions that employ 10 or more people and use

more than 10,000 pounds of one of these chemicals during the year or manufacture more than 25,000 pounds of a listed chemical annually must report information listed in the TRI.

To date, the inventory only tracks emissions from these large chemical users and doesn't include information about small community businesses that also use chemicals to provide services and clean their establishments. Still, in 1993, more than 900 Wisconsin facilities released 144 of the 336 listed chemicals. The TRI "report card" will grow because last year the Environmental Protection Agency added 286 more chemicals to the list of substances that must be tracked through TRI reporting.

Bolstered by TRI data, concerned citizens and groups across the country and here in Wisconsin are working with industry to reduce toxic emissions.

Two databases are available

The TRI isn't the only tool to track how chemicals are used. The Department of



WOOD COUNTY HEALTH DEPARTMENT

Wood County residents are briefed on the results of a community health study. County and state health officials working with schools and parents determined that children living in areas where sulfur dioxide levels are higher are more likely to develop asthma-like symptoms.

Natural Resources keeps a host of records about businesses and municipal services that need permits to release pollutants to air and water or dispose of wastes on land. Computers make it easier for the Department of Natural Resources to collect and share this information with you through the Integrated Toxics Reporting System (ITRS). This database has made it easier and quicker to learn about the combined pollutants emitted by businesses and municipalities.

Getting the big picture is only a first step in judging risks posed by chemical usage in a community. Both the TRI and ITRS list chemical releases and transfers in pounds, but quantity alone is not enough to determine risk. Some chemicals have greater health consequences than others. For example, a pound of ammonia vapors is not as toxic as a pound of lead. Furthermore, we know little about the cumulative health and safety risks of the dilute mix of chemicals we are typically exposed to in communities.

Two practical applications

Two community projects show how chemical inventories can be put to good use: a respiratory health study in Wood County and an environmental health project in a southside Milwaukee neighborhood.

WOOD COUNTY ASTHMA STUDY

Over the years, Wood County citizens have expressed concern over air quality in their area. School nurses and citizen groups noticed what seemed to be a high incidence of asthma and upper respiratory problems. They wondered if the health conditions might be caused or exacerbated by industrial emissions. The Toxic Release Inventory shows that paper manufacturers in Wood County emit nine percent of the toxic emissions in Wisconsin. In 1993, pound for pound, more chemicals tracked through the TRI were emitted in Wood County than in Milwaukee County.

By the summer of 1993, improvements in tracking and modeling how air pollutants disperse, and new techniques for studying asthma convinced the Wisconsin Division of Health to use the TRI and ITRS data to study three chemicals. The compounds may be associated with childhood asthma cases — sulfur dioxide, hydrogen sulfide and methanol. Exposure to sulfur dioxide causes asthma-like symptoms. Hydrogen sulfide is prevalent in the area and its pungent, rotten egg odor alarms people. Methanol (wood alcohol) was included because it is the chemical which TRI tracking indicates is released in the greatest quantity in the county, more than 2.2 million

pounds in 1993.

Community members with guidance from the Wood County Health Department surveyed most seventh and eighth graders, and most parents of first and second graders in the county. In all, 4,441 surveys were completed and results were analyzed by the summer of 1994. By using computer mapping techniques, the Department of Natural Resources overlaid survey results with maps showing where these pollutants had dispersed.

Health officials concluded that children living in areas where sulfur dioxide levels are predicted to be higher were more likely to report asthma symptoms. No such comparisons held for the other two chemicals. Further studies could examine if cyclic emission patterns are linked to incidences of adult asthma or to other upper respiratory infections.

Computer inventories like the Toxics Release Inventory and the Integrated Toxics Reporting System are important tools for studying if respiratory diseases and illnesses can be linked to airborne contaminants, says Jay Goldring, toxicologist with the State Division of Health.

SIXTEENTH STREET ENVIRONMENTAL HEALTH PROJECT

Are people living in older, industrial areas experiencing unique health risks from exposure to environmental hazards? In Milwaukee, one southside neighborhood wants to know.

John Bartkowski of the Sixteenth Street Community Health Center explained how local health care providers are using data from the varied chemical inventories to help their clients. The community health center, located on the near south side of Milwaukee, has been serving a predominantly Hispanic, Southeast Asian and African American clientele for 25 years. Residences adjoin the older industrial corridors along the Menomonee and Kinnickinnic rivers. Twenty-three businesses in the neighborhood file TRI reports due to their chemical emissions. Other chemical

hazards that are not tracked by the TRI also raise concerns in the area.

"Environmental causes for illness or disease are usually not in the forefront as physicians assess community health," Bartkowski said. People living and playing in this neighborhood are exposed to various chemicals and pollutants from local businesses, transportation and normal residential maintenance projects. They eat fish caught in the local creeks. They live in older buildings that may still be painted with lead-based paints and some buildings have heating pipes insulated and made fire-resistant with asbestos wrappings.

Bartkowski emphasized the center aims to help neighborhood families identify where the greatest hazards and risks are, and help them minimize the risks of exposure, especially for children.

The center's Office of Environmental Health pulled together two advisory

The study used data from the Department of Natural Resources and the U.S. Environmental Protection Agency to identify sources of toxic chemicals in and around the health center's service area. Local emitters, leaking underground storage tanks, spills and other sources were located. Center staff are creating a database to map the area and pinpoint identified health threats in the neighborhood.

This database will have many uses. For instance, a mother may bring a child to the center who is suffering a painful rash, says Peter McAvoy, co-director of the health project. After identifying where the family lives and where the child plays, doctors may identify possible environmental causes for the rash and offer ways to minimize exposure to the irritant.

McAvoy said the center is trying to determine whether respiratory illnesses or high incidences of asthma in the neighborhood are caused or worsened by air pollution. Eventually health project staff expect to identify discrete groups within the community that may share similar risks. Community outreach programs can inform residents in their own languages and on their own terms what steps might be taken to minimize these exposures to environmental contaminants. Finally, maintaining long-term health data will be valuable for tracking the health consequences of further changes in the neighborhood, McAvoy says.

Both the Wood County Asthma Study and the Sixteenth Street Environmental Health Project illustrate

important uses for the wealth of information stored in the Toxics Release Inventory and the Integrated Toxics Reporting System. "We are encouraging businesses to use cleaner technologies that produce fewer emissions and less hazardous by-products," says Susan Sylvester, administrator of DNR's environmental quality pro-

grams. "Where emissions exist, we want the public to be well informed and to use the data to resolve local concerns."

Cooperation among civic leaders, local businesses, health care services and state agencies can help communities monitor both human and environmental health. The data could be valuable as communities debate where to locate schools, parks, hospitals and nursing homes. It might help a community decide what kinds of businesses it wants to attract to industrial parks.

Others are using the TRI and ITRS data to plan business opportunities. For instance a solvent recycler might choose to locate a reprocessing plant near businesses that produce chemical by-products. Power utilities want to know who is burning which chemicals to recover energy. Environmental agencies want to track trends as chemicals are released to air and water or are transported through regions.

How can you find out what chemicals are produced or transported through your community? Start by calling the DNR's toxics inventory program at (608) 264-6005 or writing DNR's Office of Technical Services, P.O. Box 7921, Madison, WI 53707. Staff can help you save time in sorting through the data banks. Information from the Toxics Release Inventory is available in several ways. Computer diskettes and paper copies are both available. Data can be sorted by facility, by chemical substance, by industry type, by ZIP code and a host of other options. Local environmental groups can also be a source of information about chemical usage in the community.

While the TRI information provides a first look at the kinds of industries and chemical use in your area, the ITRS adds information about smaller businesses and municipal services that also discharge chemicals to water, air and wastewater. Again, DNR staff are available to help you narrow your search to distill useful information from the volumes stored in the database.

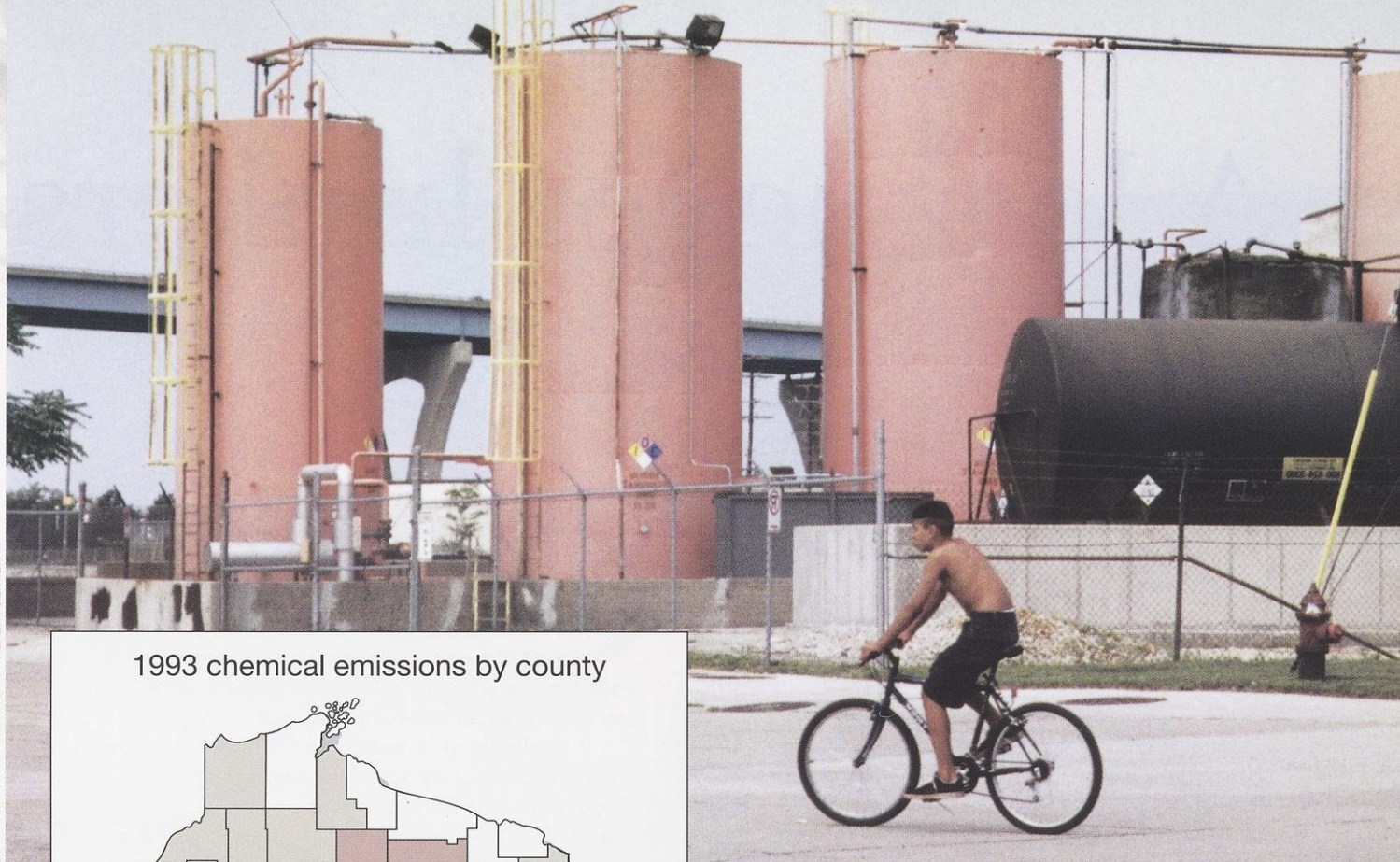
A caution — raw data needs interpretation. Chemical usage doesn't pre-



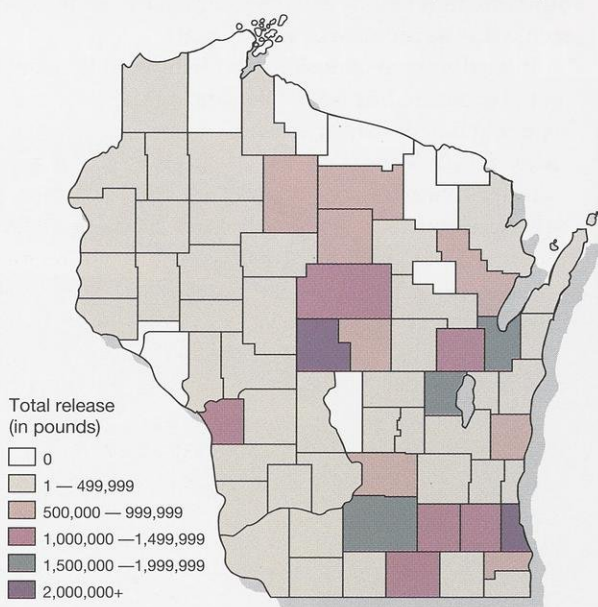
SIXTEENTH STREET COMMUNITY HEALTH CENTER

The Sixteenth Street Community Health Center on Milwaukee's south side uses information from chemical inventories to identify potential environmental hazards in their clients' neighborhood. The center advises clients how to minimize the risks of exposure to chemicals, lead paint, asbestos and other local hazards.

ry committees to accomplish this task: A Professional Advisory Committee of approximately 40 health organizations, governmental agencies, local businesses, the University of Wisconsin-Milwaukee and environmental organizations; and a Community Advisory Committee with 23 members.



1993 chemical emissions by county



DNR OFFICE OF TECHNICAL SERVICE

(above) People who live and play near industrial corridors need to consider potential health risks they pass every day.

(left) The information collected in the TRI and ITRS inventories can provide profiles of chemical use, chemical emissions and chemical transportation in a community, by county, statewide or by factors that interest you. This map shows where the combination of industrial, commercial and municipal chemical emissions are highest in Wisconsin.

(below) The data can give statewide snapshots describing how chemicals are recycled, reused, treated and emitted.

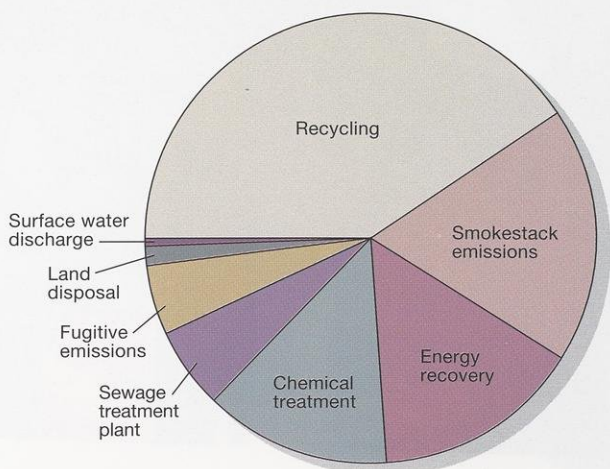
dict chemical exposure or health threats. You need to interpret the data with health care professionals and others who can help you compare these risks to other chemical exposures we routinely accept. The databases are starting points for further work in determining environmental concerns in your area.

Community right-to-know laws that created these tracking programs were passed to help you, as an individual and as a member of a community, to learn about toxic chemicals that are being used and transported in your area. The Department of Natural Resources created the Toxics Release Inventory and the Integrated Toxics Reporting System to empower you to question and understand the flow of chemicals through your community. With this data, you can bring businesses, citizens and governments together to make better decisions to ensure a safer, healthy environment. □

Jennifer Feyerherm works in DNR's Office of Technical Services helping a variety of customers extract information about chemical emissions in Wisconsin.

DNR OFFICE OF TECHNICAL SERVICE

Where do chemicals go?



A league for lunkers

A new awards program gives credit to anglers who tie into trophy fish.

Karl Scheidegger

Casting for salmon off the stern of a Lake Michigan charter boat. Tempting trout in a clear, coulee stream. Pursuing an elusive musky on a remote northern lake. Working walleye around the Mississippi's wingdams. Where else but Wisconsin could an angler enjoy such a range of outdoor experiences, each with the promise of a fine catch?

It hardly seems possible that fishing in Wisconsin could get any better, but it has. Beginning the opening day of fishing season, May 4th, Wisconsin anglers can be recognized

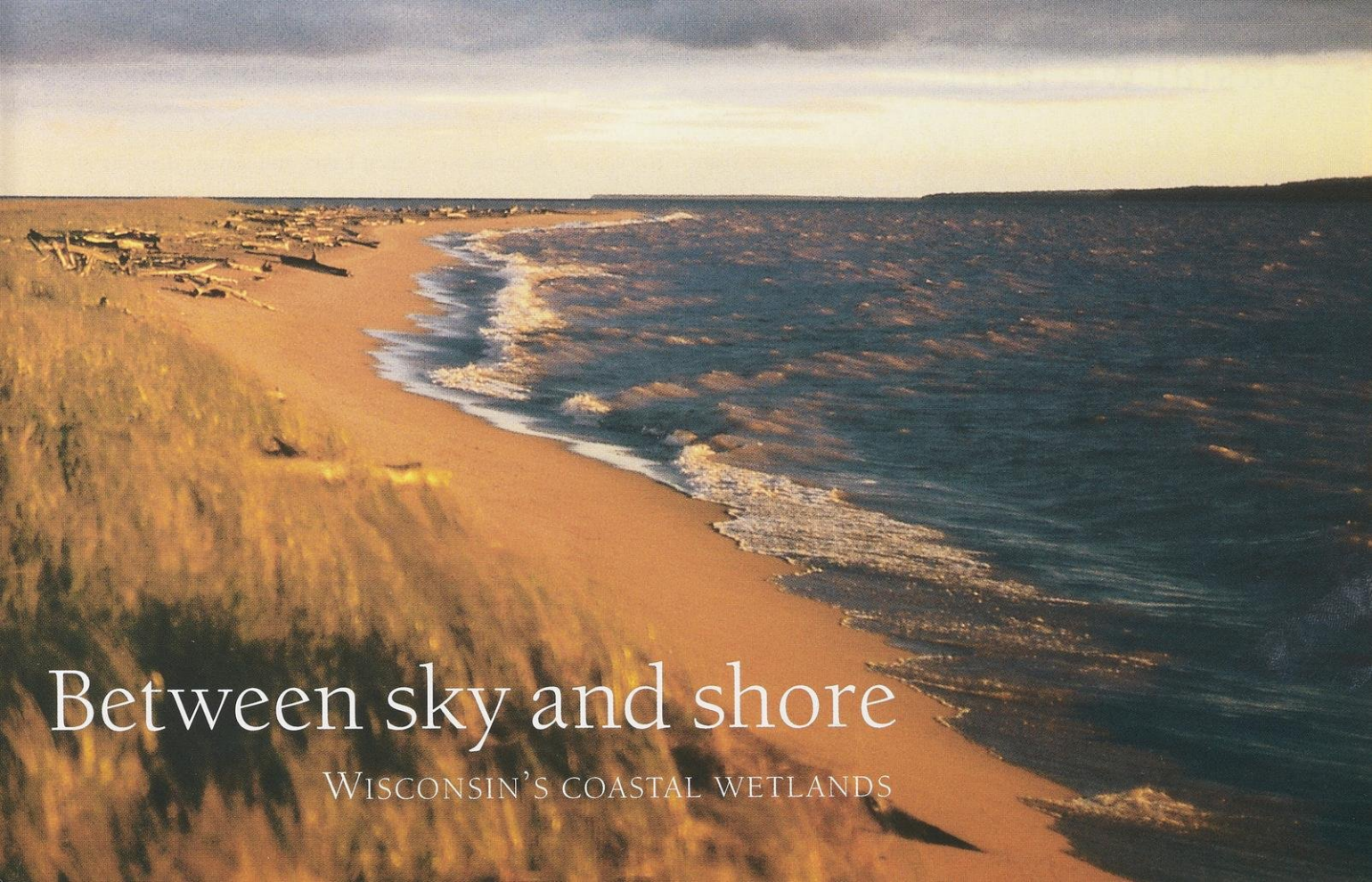
KEPT FISH



STEPHEN J. LANG



STEPHEN J. LANG



Between sky and shore

WISCONSIN'S COASTAL WETLANDS

Coastal wetlands

DEFINED BY GREAT WATERS

Wherever dry land meets water there is a contest for territory: one seeks to conquer the other, and though at times one may succeed, neither has the upper hand for long. So Wisconsin rests uneasily within the watery boundaries of its two Great Lakes, knowing that in an earlier time, they were considerably greater than they are today.

Lakes Superior and Michigan hold particular sway over the land along their edges. This is Wisconsin's coast: roughly a three- to six-mile-wide strip of soil, sand and rock caught between sky and shore, subject always to the whims of weather and wave.

Wisconsin's 820-mile Great Lakes coast contains wetlands couched in landforms found few other places on

the planet. The coastal wetlands are home to some of our rarest plant species. They are the places where migrating birds congregate in stunning numbers. And they are the gentle buffers that mediate the eons-old competition between wet and dry.

Most of Wisconsin's coastal wetlands are privately owned. Fortunately, there are many public parks, forests and natural areas along the coast with remnants of these special wetlands that you can visit. A list of suggested stops begins on page 14.

THE GLACIERS' TOUCH

They were cold and heavy and left their mark wherever they went. For a million years, glaciers ruled the landscape. Ice sheets up to 6,500 feet thick compressed the land, scouring out the deep basins of the future

Great Lakes and leaving deposits of boulders, sand and clay. With each advance and retreat of the glaciers, the land was altered.

About 10,000 years ago, the climate warmed enough to melt the glaciers. The Great Lakes basins gradually filled with meltwater, and along their shores wetlands formed behind sandspits, near drowned river mouths, along wave-cut cliffs and on clay bluffs. Above the beaches, wetland plants took hold in the swales, or low spots, between the ridges of land running parallel to shore.

When the glaciers receded, the land began to rise – a process which is still occurring in northern regions of the Great Lakes. The “tilt,” precipitation and stream flow cause lake levels to fluctuate, which in turn affects the coastal wetland ecosystems.





Diversity thrives in estuaries where river and lake waters mingle.

Coastal lands where wetlands form

"INLAND" WETLANDS — MARSHES, BOGS, FENS, SEDGE MEADOWS, SHRUB SWAMPS AND CONIFEROUS SWAMPS — ARE ALSO FOUND ALONG THE COASTS, WITH MANY FAMILIAR WETLAND PLANTS AND ANIMALS. Cattail, arrowhead, tag alder, tamarack, cedar and bur reed grow in coastal wetlands; red-winged blackbirds and great blue herons cruise the coasts; muskrats build their lodges and northern pike spawn in wetlands near shore.

A few coastal landforms differ from their inland counterparts. Formed by the geological forces that created the lakes, dominated by lake weather and changing lake levels, these lands with wetland communities thrive in tandem with the Great Lakes. For example:

Ridge and Swale: The ancient coastline of a once-larger Lake Michigan is marked by ribbons of sandy ridges running parallel to the old shore. The swales, or low areas between the ridges, trap leaves and other organic matter, and hold moisture, creating an intricate habitat that can support a diversity of plant species, including several rare orchids. A fine example can be visited at The Ridges Sanctuary, north of Baileys Harbor in Door County.

Boreal Forest: White spruce, white cedar and balsam

fir forests, normally found farther north in cold, wet areas of Canada and Alaska, appear in small pockets on the northeastern tip of Door County and as remnants along Lake Superior where the forest floor is saturated by springs and streams or runoff and rain form ephemeral basins on poorly drained soils. In Wisconsin, the threatened dwarf lake iris survives only in these cool, damp habitats.

Wave-splashed Cliff/Rock Ledge: Sandstone on Lake Superior, dolomite on Lake Michigan, these striking, wet rock crevices support tenacious and rare plants like butterwort, cliff clubmoss and arctic primrose.

Lakeplain Systems: Marshes and fens are part of Chiwaukee Prairie, a rare lakeshore plain complex thriving on what was once the bed of ancient Lake Michigan. The red clay plains and alder thickets near Superior, Wis. also host wetland plant communities.

Lake Dune Systems: On Lake Superior, sand dunes are part of complex "sandscapes" with the lake on one side and lagoons, wetlands or dry areas on the other. The dune-studded Long Island-Chequamegon Point coastal barrier spit stretches across Chequamegon Bay, protect-

ing the Bad River-Kakagon Sloughs, a vast 10,000-acre wetland, from harsh storm waves. Smaller, but similar dunes occur on some of the Apostle Islands.

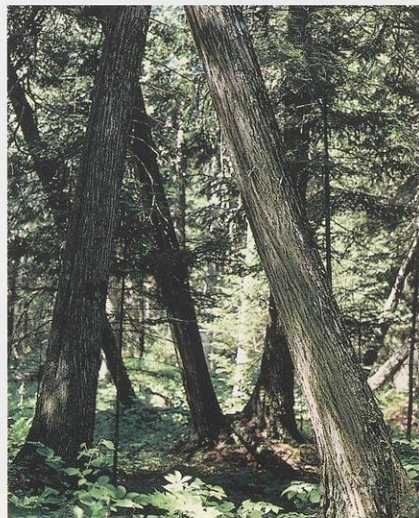
Interdunal Wetland: A wetland type that only occurs between dunes on both Great Lakes coasts. The edges of these scattered, shallow ponds and marshes are regularly pounded and sculpted by the energy trapped in wind and intense storms. Several plants only grow in the infertile ponds and depressions etched out in these alkaline sands. You can get a feel for these wetland communities by hiking the Kohler Dunes Cordwalk at Kohler-Andrae State Parks just south of Sheboygan.

Freshwater Estuary: Rivers that slope into the lakes form drowned valleys where lake and river water mix. The Mink River Estuary on Lake Michigan and the Fish Creek, St. Louis and Bad River estuaries on Lake Superior provide important spawning grounds for fish and valuable staging areas for migrating birds.

Lakeshore Ravine and Drainage Area: Along the coast and less than a mile inland, lake fog traps cool air that allows some northern Wisconsin species to thrive farther south than Milwaukee.



CHILWAUKEE PRAIRIE THOMAS A. MEYER



Weather and wetlands

LARGE BODIES OF WATER GREATLY INFLUENCE LOCAL CLIMATE. Dry air traveling across lakes Superior and Michigan picks up plenty of moisture, which falls as rain or snow on the coasts. Because such large lakes warm slowly in spring and cool down just as slowly in winter, the adjacent land areas experience more moderate year-round temperatures than the searing summers and bitter winters inland.

The coasts of lakes Superior and Michigan are cooler, more humid, and receive more precipitation than other parts of the state. The species that thrive in coastal wetlands have adapted so well to these climatic conditions that some of them — lake cress, for example — cannot survive anywhere else.

All wetlands change in response to the amount of water available in any given season or year. Coastal wetlands can bear harsh Great Lakes storms and survive fluctuating lake levels because they are dynamic, changing as the lakes change, yet achieving an equilibrium or balance over time. Plants and animals may be present one year and not another, depending on conditions.

Coastal weather even governs avian aerodynamics. In spring, the cold waters of Lake Superior trap warm air near the surface, preventing it from rising. Migrating

birds can't get any "lift" in the air and are "grounded" at coastal wetlands until the weather changes — to the delight of birdwatchers on shore!



DUNE THISTLE



Chequamegon Point — a buffer from Lake Superior's buffeting winds and waves.

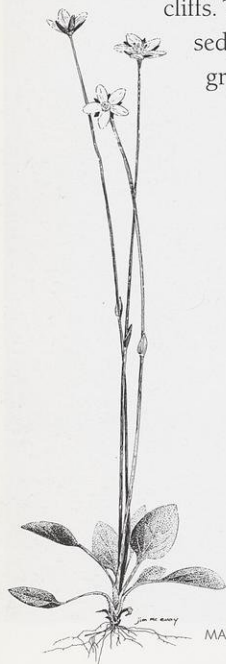
Plants of the coast

CALL THEM FUSSY IF YOU LIKE. Some of Wisconsin's rarest flowers and grasses can exist only in specific coastal wetlands. Lake cress favors the sheltered waters of Lake Superior's coastal lagoons, while butterwort prefers semi-shaded, wet sandstone crevices on Lake Superior's cliffs. The carnivorous English sundew digests its prey on floating sedge mats in Lake Superior; the auricled twayblade, an orchid, grows near the lake on sandy riverbanks under tag alder.

Coast sedge floats in mats on both lakes, but non-wetland plants like Pitcher's thistle will not stray from Lake Michigan's dunes. The dwarf lake iris keeps to Lake Michigan's boreal forest and adjoining habitat, much as marsh grass-of-Parnassus sticks to the interdunal wetlands, wet dolomite outcroppings and seeping clay bluffs of Lake Superior.

And then there are the reclusive fly honeysuckles; the rarest, not seen in Wisconsin since 1897. This denizen of Lake Superior's tamarack swamps was rediscovered in 1995!

These rare gems are supported by a cast of more common beach and wetland grasses, reeds, shrubs and trees. Together, the plants of the coast help anchor and protect our shores.



MARSH GRASS-OF-PARNASSUS



Dune thistle's taproot reaches six feet in search of water.

THOMAS A. MEYER



GERARD H. EMMERICH, JR.

Dwarf lake iris emerging.

Dwarf lake iris in flower. (top) The bog-loving pitcher plant.

Birds and other coastal creatures

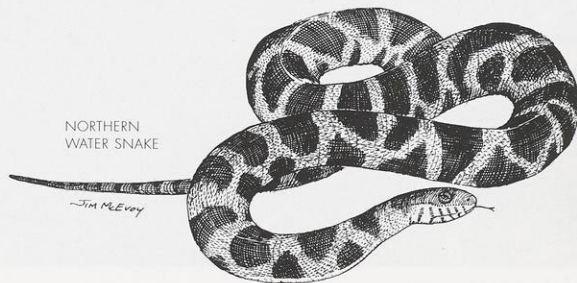
WISCONSIN'S GREAT LAKES COASTS PROVIDE SAFE HARBORS NOT ONLY FOR SHIPS, BUT ALSO FOR COUNTLESS BIRDS MIGRATING ALONG THE EAST-WEST AXIS OF LAKE SUPERIOR (IN SPRING) AND THE NORTH-SOUTH AXIS OF LAKE MICHIGAN (IN FALL). Canada geese, tundra swans, waterfowl, songbirds, merlins and other raptors follow the shore in great numbers in search of places to rest, feed and nest. Cormorants and gulls join in, too, though they'll remain after the others have flown on.

The range of habitats within coastal wetlands can accommodate even the most particular of species.

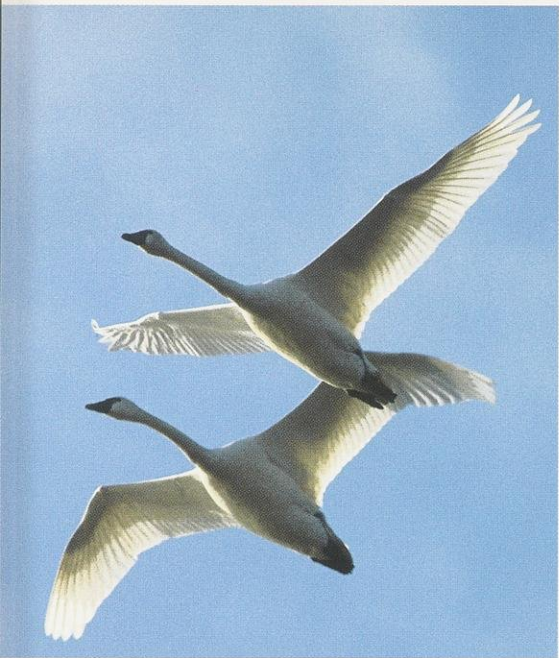
The common tern, an endangered shorebird in Wisconsin, has two stable nesting colonies on Lake Superior. The endangered Caspian tern is attempting to breed on Lake Michigan after a long hiatus. The merlin, a falcon of special concern in Wisconsin, hunts open wetlands on long coastlines, choosing to nest in tall conifers near shore.

Wetland regulars, including muskrats, shrews, salamanders, frogs, turtles and snakes, appear in coastal sites. Rarer appearances are made by the Lake Huron locust at the coastal dunes, and Hine's Emerald Dragonfly near alkaline streams on Lake Michigan. In the water, the Atlantic elliptio, a mussel, rests in coastal estuaries.

Fish benefit from coastal wetlands. Different species take refuge from the cold, deep lake waters in the warm, fertile wetland shallows, where food is abundant and aquatic plants like the bulrush provide cover from predators. Juvenile smallmouth bass and other young fish stay in sheltered coastal wetlands until they are mature enough to move into deeper waters. Northern pike use wetlands as spawning grounds. The species was once quite common in southern Lake Michigan – until the wetlands around Milwaukee were drained. Now pike populations have moved up the coast to Green Bay and Door County, where the lush Mink River Estuary offers the wetland habitat northern pike require to reproduce.



NORTHERN
WATER SNAKE



HERBERT LANGE



The Mink River Estuary. (top) Tundra swans.

Rare...and getting rarer

COASTAL WETLANDS CAN WITHSTAND THE BRUNT OF NATURE'S WATERY FURY. What they can't endure is human enthusiasm for the shore. Building and developing on lakeshores damages or destroys wetland habitat. Altering water levels by stabilizing shores and building piers and breakwaters interferes with natural lake fluctuations. Excessive nutrients from runoff and toxic substances in sediments harm water quality. Exotic species, including purple loosestrife, zebra mussel, ruffe, carp and the spiny water flea, threaten native species.

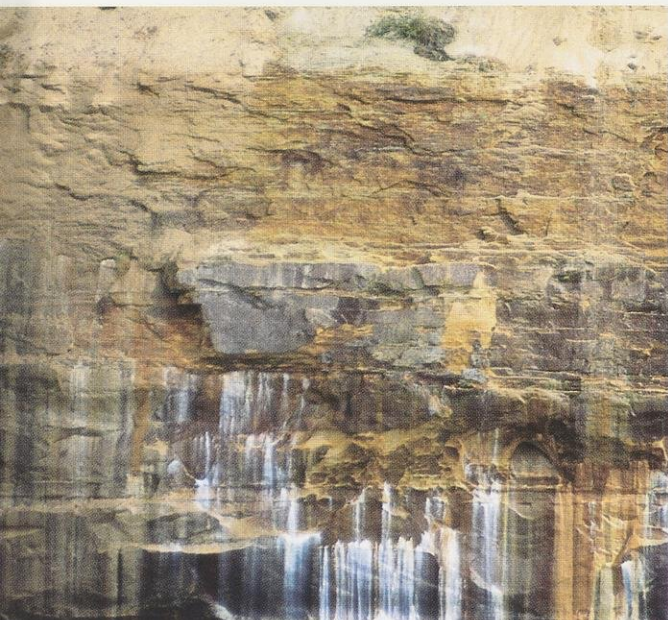
The rugged shores and long beach vistas draw visitors as no other natural attraction can. The natural features of the coasts, however, are extraordinarily fragile. If we want to keep on enjoying these special places, we must protect and preserve them.



DWARF LAKE IRIS



GERALD H. EMMERICH, JR.



Rare plants cling to crags along the Great Lakes at Cave Point (*left*) and Pictured Rocks National Lakeshore. (*top*) Wetland dunes on Stockton Island.

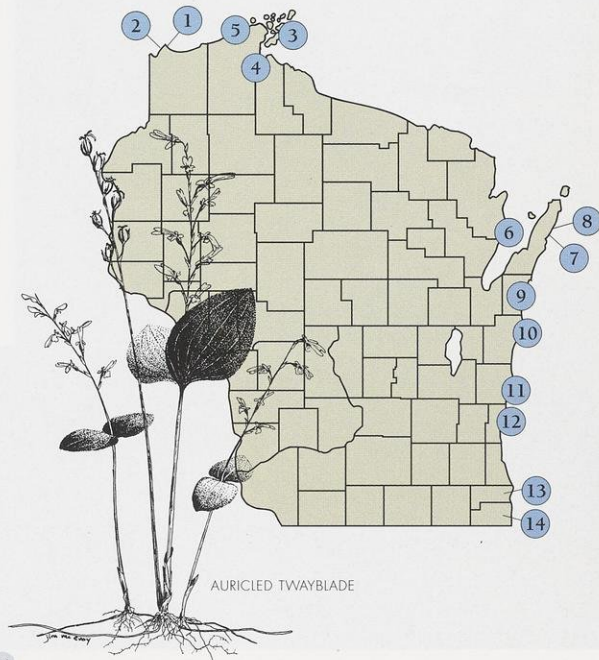
Visit the shore

YOU CAN TOUR A COASTAL WETLAND ON FOOT, OR BY CANOE OR SKIFF. Please follow paths or boardwalks and do not pick blossoms, dig plants or gather seeds. On the water, paddle or row gently and stay in travel lanes if they are marked to avoid disturbing plants, birds and animals.

The wonders of coastal wetlands can be brought nearer with binoculars and a small hand lens. Spring and fall outings will be best for birding, while plants will be in flower and changing as the spring and summer progress. Expect to get some sand in your shoes!

1. Wisconsin Point, Douglas County
2. Pokegama River Marsh, City of Superior Municipal Forest, Douglas County
3. Big Bay State Park, Madeline Island, Ashland County
4. Fish Creek Slough, Ashland
5. Bark Bay State Natural Area, Bayfield County
6. Peshtigo Harbor Wildlife Area, Marinette County
7. The Ridges Sanctuary, Door County
8. Mud Lake State Wildlife Area, Door County
9. Kewaunee Marsh, Kewaunee County
10. Point Beach State Forest, Manitowoc County
11. Kohler-Andrae State Parks, Sheboygan County
12. Harrington Beach State Park, Ozaukee County

13. Cliffside County Park, Racine County
14. Chiwaukee Prairie, Kenosha County





Explore the ridge and swale communities at The Ridges Sanctuary.

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Zone Management Act and approved by the
Wisconsin Coastal Management Council.

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(front cover) View from Outer Island in Lake
Superior's Apostle Islands National Lakeshore.

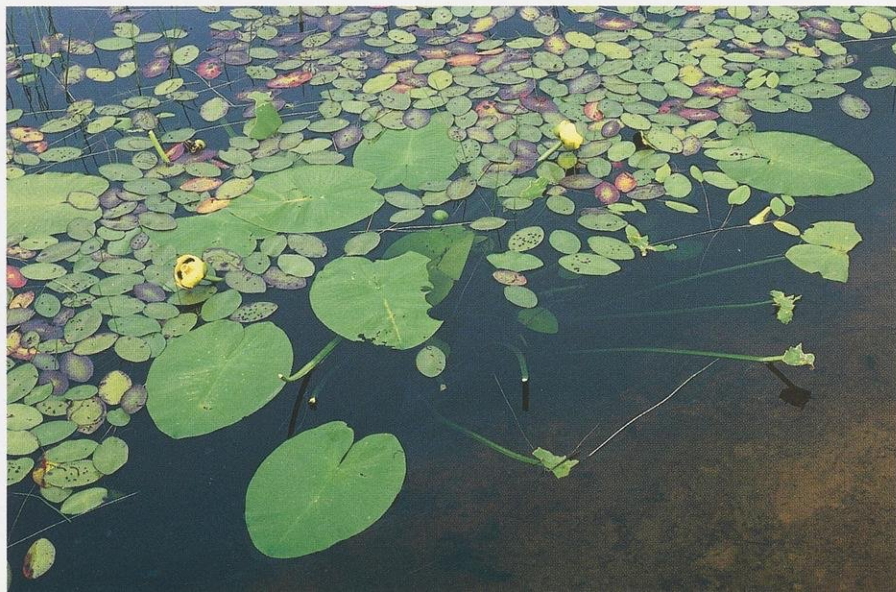
(back cover) Quiet reflections on Stockton
Island, another of the Apostle Islands.

Cover photos by Gerald H. Emmerich, Jr.

Story illustrations by Jim McEvoy

Design by Moonlit Ink

Written by Maureen Mecozzi



for their skill in the sport, their knowledge of fish species, and their conservation practices by becoming members of the "Hooked on Wisconsin" Anglers' Club.

This new award program highlights outstanding sportfishing accomplishments and it gives anglers a chance to contribute valuable field information about the condition of the state's fisheries. The club is open to anglers of all ages, resident or nonresident. And — are you sitting down? — membership is free!

Giving credit where it's due

The DNR Bureau of Fisheries Management has wanted to acknowledge Wisconsin anglers for their exceptional catches with an award program for some time.

"Big fish are an exciting part of fishing," says Lee Kernan, fisheries management director. "Every year hundreds of fine fish are caught from our waters, and our fisheries program never hears about them, let alone gives credit for them. I've wanted to recognize our anglers and provide the means for anglers to share the excitement of their experience with all of us. I think we're on the right track with a program like the Anglers' Club."

The catch alone has never been the full measure of the angling experience. The Anglers' Club aims to foster appreciation for Wisconsin's diverse fishery by increasing the angler's knowledge of fish species and encouraging catch-and-release of trophy-sized fish for others to catch again.

The club idea was cooperatively developed by the Department of Nat-

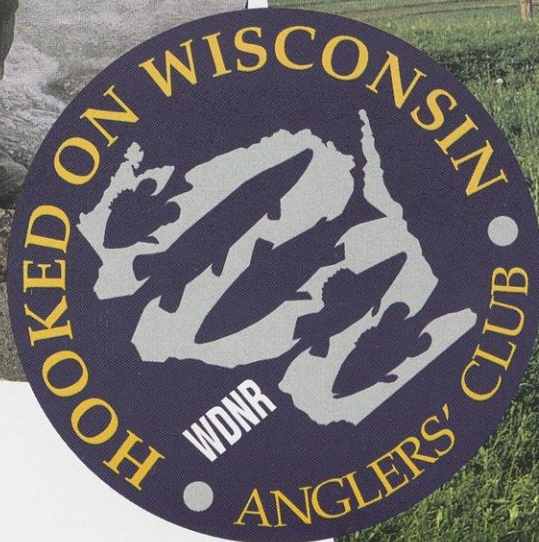
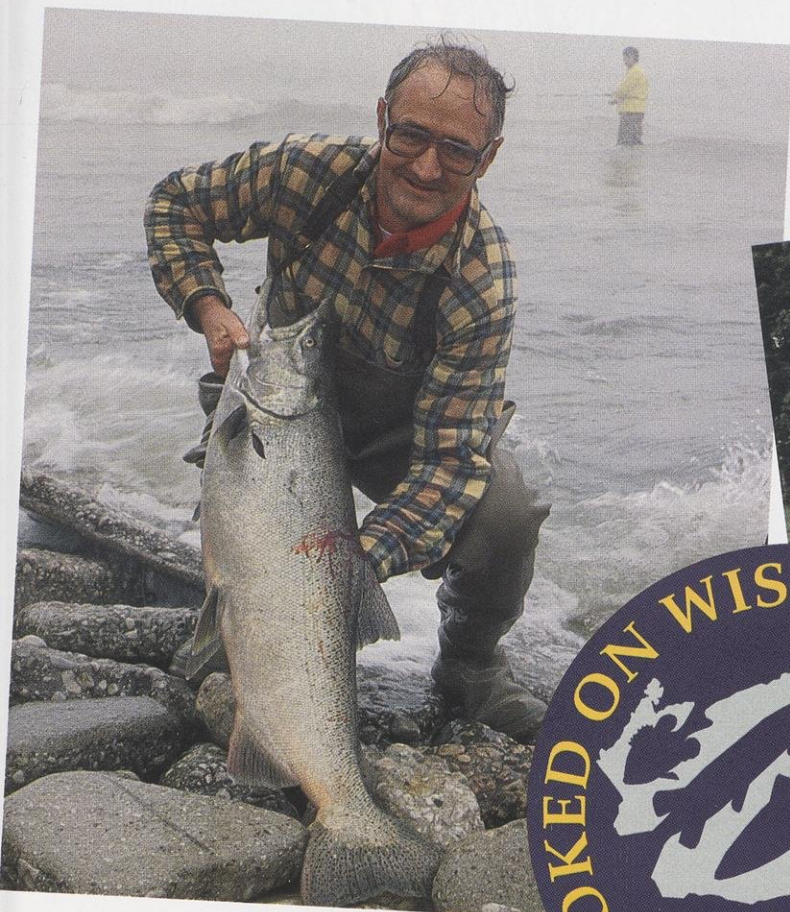
ural Resources, the Division of Tourism, local tackle manufacturers and sporting organizations. Charter contributors who will help fund the Anglers' Club include Mercury Marine, Uncle Josh Bait Company and Muskies Inc. Other sporting businesses and organizations have also expressed interest in club sponsorship.

Anglers can qualify for membership in the Anglers' Club in any or all of the following three categories:

Kept Fish: To recognize anglers who catch and keep a fish meeting a minimum weight standard.

Live Release: To honor anglers who catch and release a fish meeting a minimum length standard.

Mixed Bag: To thank anglers who catch and release a variety of Wisconsin fishes. There are no size standards in this category.



The "Hooked on Wisconsin" Anglers' Club provides a way to remember and share your exceptional catches; a way to recall those special moments when the panfish, salmon, smallies or trout provide great days of fishing.



How do I become a member?

To be initiated into the Anglers' Club, you must first meet the requirements of a particular category and, if you're over 16 years old, must also possess a valid resident or nonresident Wisconsin fishing license. All fish must be caught by hook and line according to current Wisconsin fishing regulations.

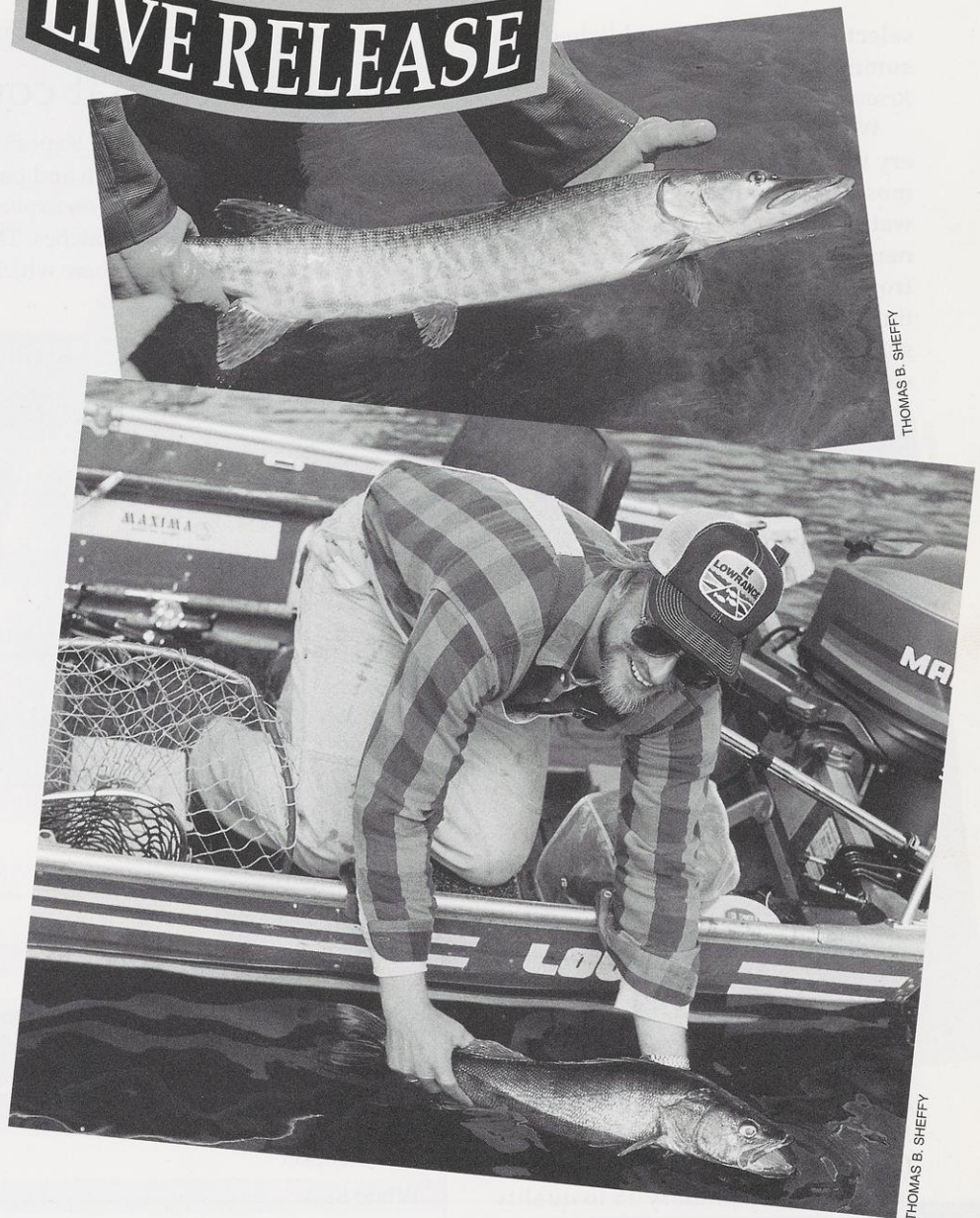
How do you document your angling exploits? Start by tucking a camera, film and a tape measure in your tackle box. To qualify in the Kept Fish category, anglers must catch and weigh whole, unfrozen fish to the nearest half ounce on a commercial scale (Don't rely on your tackle box spring scale!) in the presence of two witnesses. To qualify in the Live Release category, anglers should measure caught fish to the nearest quarter inch in the presence of one witness. Each entry in these categories must be accompanied by a clear, side-view photograph of the fish, and must be submitted with an Anglers' Club application form within 30 days of the catch.

In the Mixed Bag category, clear, close-up photographs of all caught and released species should be taken for identification and attached to the entry form.

Photographs of released fish must be taken at the catch site (no exceptions). Your snapshots will play an important role in promoting the club, so pose your fish in the best light possible, bring plenty of film and take several photos before releasing the fish! (Ed. note: You might review our June 1993 article on photographing your catch.)

All anglers submitting qualifying entries will receive a "Hooked on Wisconsin" Anglers' Club embroidered patch. In the Kept Fish and Live Release categories, participants will receive attractive certificates along with chevron patches for each species. Certificates and patches will be awarded for every 10 species caught and released in the Mixed Bag category. For example, an angler will receive recognition and an award for catching and releasing 10 species, 20 species, 30 species, and so on. Since more than 80 fish species in Wisconsin will bite a

LIVE RELEASE



We are especially proud to recognize those anglers who extend their fishing enjoyment by releasing the big fish they catch. Keep a ruler and a loaded camera handy so we can enroll your lunkers in the "Live Release" category. (clockwise from left) Brown trout, muskellunge and walleye were all handled just long enough to capture the memory on film.

hook, the angler who pursues the Mixed Bag category can look forward to a lifetime of fishing variety and challenge.

To encourage the catch-and-release fishing ethic, a drawing will be held at the conclusion of each membership year for all entries submitted in the Live Release category. The winner will receive a wall-mount replica of the fish species that was released.

Recognition has its benefits

Other than the DNR's Record Fish program and miscellaneous accounts gleaned from newspapers, there has never been a consistent way of compiling information on outstanding fishes taken from Wisconsin waters. The experiences of Anglers' Club members will certainly help fill that information gap. The information they share will identify the exceptional fish harvested and released in the state. A summary of the previous year's catches and

select photos will be published in a summer issue of *Wisconsin Natural Resources*.

We can learn much about our fishery from the people who enjoy it the most. For instance, we'll track which waters produce outstanding fish, Kernén says. As we gather information from Anglers' Club members over time, we'll see trends that affect angling such as how fish populations and size structure change in response to harvest and management practices. "Anglers' Club members will help us monitor the quality of fishing in the state and give us an indication of how well the DNR fisheries program is managing Wisconsin's fisheries," Kernén says.

You can photocopy the application form with this story, or pick up an application form for the "Hooked on Wisconsin" Anglers' Club at DNR offices, Wisconsin Information Centers, local sporting goods and bait vendors, and participating resorts throughout the state. Or write:

"Hooked on Wisconsin" Anglers' Club
DNR Bureau of Fisheries Management
101 S. Webster Street
P. O. Box 7921
Madison, WI 53707-7921

Fishing enthusiasts of all ages, residents and visitors, are eligible to join. Membership is open from January 1 to December 31 of each year. Entries must be received by January 15 to qualify for the previous year's membership.

We hope you'll get caught up in the "Hooked on Wisconsin" Anglers' Club. We guarantee it will add a new dimension of fun and challenge to your favorite pastime. Good luck — and good fishing! □

Fisheries Biologist Karl Scheidegger works for DNR's Bureau of Fisheries Management. The "Hooked on Wisconsin" Anglers' Club was launched this spring.

The species that count

Fish species that qualify in the Kept Fish and Live Release categories are generally considered game fish and panfish. Minimum length and weight standards were chosen based on expected growth rates statewide to provide challenging, yet achievable, catches. The Mixed Bag category includes additional species to those listed here which are legally caught by hook and line in Wisconsin waters.

SPECIES	KEPT FISH (POUNDS)	LIVE RELEASE (INCHES)
Lake sturgeon ¹	65.0	65.0
Lake whitefish	5.0	24.0
Lake herring (Cisco)	3.0	20.0
Coho salmon	12.0	30.0
Chinook salmon	30.0	40.0
Rainbow/Steelhead (GL) ²	15.0	36.0
Rainbow trout (inland)	5.0	24.0
Brown trout (GL)	15.0	36.0
Brown trout (inland)	6.0	24.0
Brook trout (GL)	5.0	20.0
Brook trout (inland)	2.0	16.0
Lake trout	18.0	34.0
Northern pike	18.0	40.0
Muskellunge	30.0	45.0
Tiger muskellunge	20.0	40.0
Bullhead (all species)	2.0	15.0
Channel catfish	18.0	30.0
Flathead catfish	30.0	40.0
Common carp	25.0	34.0
White sucker	5.0	20.0
White bass	2.5	17.0
Rock bass	1.5	12.0
Bluegill	1.5	11.0
Sunfish (all others)	1.0	11.0
Smallmouth bass	5.0	20.0
Largemouth bass	6.0	22.0
Crappie (White or Black)	2.5	15.0
Yellow perch	1.5	15.0
Sauger	4.0	21.0
Walleye	10.0	29.0
Freshwater drum	15.0	28.0

¹ Must be taken by hook and line, not speared during the special winter season.

² (GL)=Great Lakes: includes tributaries of the Great Lakes with substantial fish migrations.



THOMAS B. SHEFFY

Getting hooked on Wisconsin angling helps good friends savor a moment or a lifetime of shared experiences.



DNR PHOTO

MIXED BAG 10

Last Name		First Name		Initial	WI Fishing License No.		Fish ID'd by: <input type="checkbox"/> EXAMINATION <input type="checkbox"/> PHOTOGRAPH		DNR USE
Street Address				City			State		
Zip Code		Phone No. (Area code/number)		Are you a current member of the "Hooked on Wisconsin" Angler's Club? <input type="radio"/> YES <input type="radio"/> NO			Member ID No.		
INFORMATION FOR KEPT AND LIVE RELEASE CATEGORIES									
Species		Date Caught		Time Caught		<input type="radio"/> AM <input type="radio"/> PM			
Water Body				County					
Weight		Length		Was the fish.....		Fish was taken by:		Bait used:	
lbs. ozs.		inches		<input type="radio"/> KEPT <input type="radio"/> RELEASED		<input type="radio"/> TROLLING <input type="radio"/> FLY FISHING <input type="radio"/> CASTING <input type="radio"/> STILL FISHING		<input type="radio"/> LIVE <input type="radio"/> ARTIFICIAL	
Witness Last Name		First Name		Initial		Phone No. (Area code/number)		Signed initials	
Witness Last Name		First Name		Initial		Phone No. (Area code/number)		Signed initials	
FOR THE MIXED-BAG CATEGORY: I am applying for club membership in the "MIXED-BAG" category. I have enclosed photographs of _____ species of fish.									
"This entry is made in accordance with the "Hooked on Wisconsin" Anglers' Club rules." _____ Signature									

HOOKED ON WISCONSIN

A moment in the mud

What is it about the wet mucky stuff that prompts man and bird to bay?

Justin Isherwood

Spring, as any observer can tell you, is a bumper-jack season, meaning it has increments. It tends to skip cogs, sometimes slip backwards; it's not the kind of place as is safe to work under, and a farmer shouldn't until he's got it blocked up.



Two sure signs of the thaw: the return of spring mud and sandhills.

Still, there's a moment in spring when what is fine and plumb about creation is both visible and audible. As a sensation it is not so spectacular as winning the lottery or as humble as the sandwiches at a funeral buffet; yet it is a memorable moment, the exact of looking the universe in the eye.

The moment I'm talking about is precise, at least as precise as a northern spring can be. It happens just after the snow melts in the fields, leaving in its wake a vast post-glacial landscape of pure mire. One step beyond the road edge and the adventurer sinks as deep as the fetlock. A more alien, sinister expanse cannot be imagined; it is unredeemable, uncaring, and gives not the slightest indication of departing any time soon.

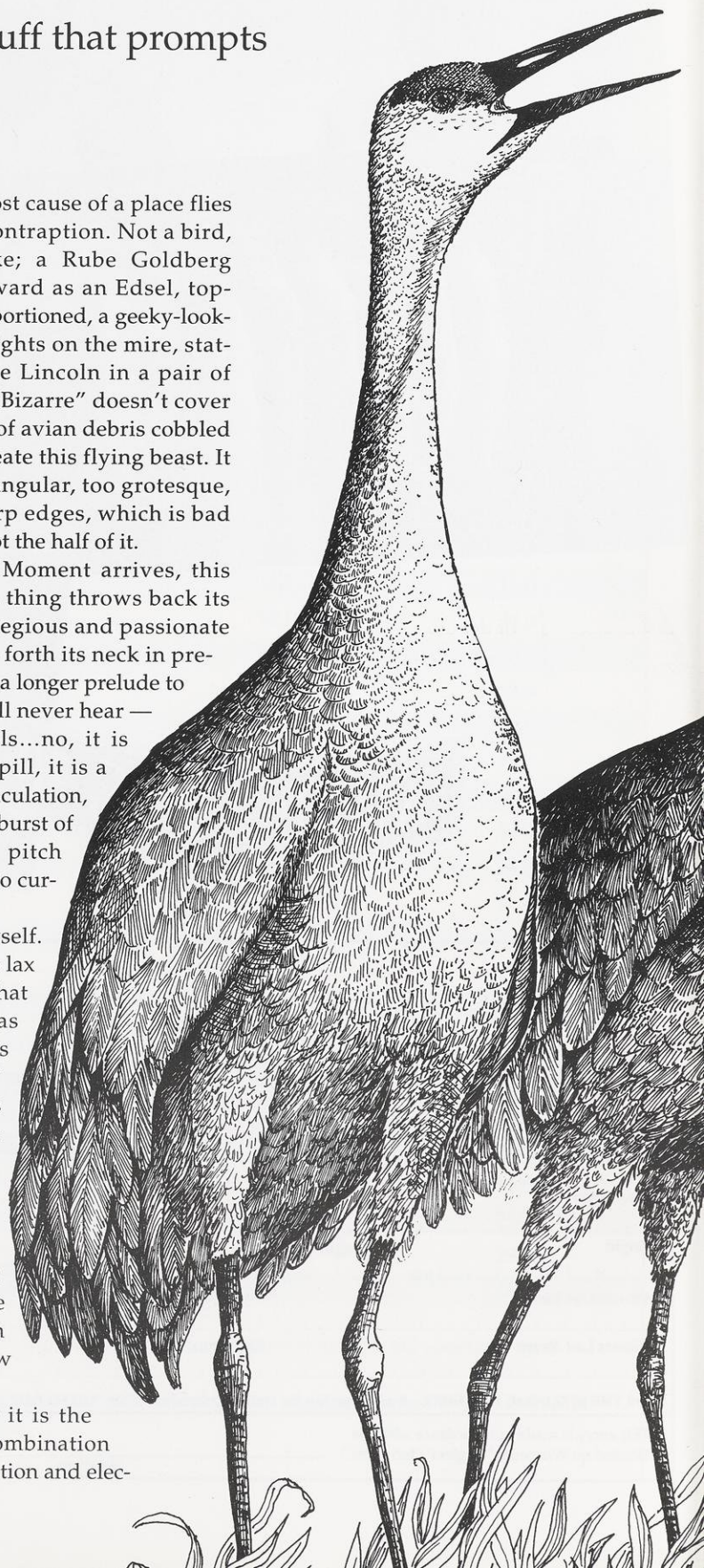
Over this lost cause of a place flies this...this...contraption. Not a bird, but a mistake; a Rube Goldberg design. Awkward as an Edsel, top-heavy, ill-proportioned, a geeky-looking thing. It lights on the mire, statuesque as Abe Lincoln in a pair of biker shorts. "Bizarre" doesn't cover the collection of avian debris cobbled together to create this flying beast. It is too...too...angular, too grotesque, too many sharp edges, which is bad enough, but not the half of it.

When The Moment arrives, this dinosaur, this thing throws back its head in an egregious and passionate toss. Stretches forth its neck in pre-vocal threat — a longer prelude to vulgarity you'll never hear — and then spills...no, it is more than a spill, it is a pouring, an ejaculation, a gush, a dam-burst of horrid brutal pitch harsh enough to curdle milk.

I correct myself. "Horrid" is too lax a term. Make that "as sarcastic as utterance gets prior to arrest."

The Hindus are right about this bird: The reincarnated soul incarcerated within the breast of a sandhill crane must have been one bad fellow indeed.

Yet I swear it is the right sound, combination war-whoop, elation and elec-



GREGORY K. SCOTT

trocutation at the arrival of spring. From this moment and this creature I take catechism. If this fool can yodel over mud with such abandon and volume, so can I. I'll duel the thing, vowel for vowel, glottal stop for glottal stop if it's a question of who owns this expanse of muck.

beforehand helps. Throw back your head like you're cocking to spit a watermelon seed, breathe in a stock-tank volume of air, then cut the bands. Sounds like "adieu adieu adieu" with a dribble of the tongue against the upper palate; this is not for polite company or when your mother-in-law is visiting.

There is a place down the road, past the creek, past the tamarack, past the butternut, an in-between sort of place in the latitude of the moor. Out in this sorry heck of nowhere I park the pickup truck and go sit on the tailgate and holler with the sandhills.

I have friends who take regular classes in duck calls. Guys who paid good money for a kitchen drawer full of hand-hewn goose noise, turkey deceivers and big buck rattlers. But I'm not about to confess the utter joy I feel howling up a duet with a sandhill just back from the Platte.

That sound is the anthem of spring. No, it's more than that — it is spring condensed, confirmed. Not a skunk cabbage in sight, not a maple in flower, and over this desolation that noise

rules. It might echo were there leaves on the hill trees. Instead, the sound plunges through the layers of place, heard even in the village above the racket of the cement plant and the motorcycles.

Cosmologists tell of the Great Echo out there, a remnant of Genesis you can hear with amplifiers and oscilloscopes. There is another sound, nearer, easier to hear, no apparatus necessary. It is not sufficiently tame to call music. The scale is another octave above this blood-thirsty opera; it is closer in spirit to punk rock, for it dares us to shrug off advanced calculus and perma-press and hard roads and perch on uncertain ground, to throw back our heads and conjoin the refrain, to frolic in the mud. No points, no gold stars, no tax refund; just a moment of noise offered as loud as you can make it before climbing back into your shiny costume. □

Justin Isherwood bellows with the birds and scratches the soil in Plover, Wis.

Hand me a walking stick and those eight-buckle galoshes and I'm ready to do Dueling Banjos with that pennasaur. I don't care if the bird has been here since the Pleistocene — I pay the rent and employ the registrar of deeds.

Doing the sandhill is three parts volume, two parts trill. A couple beers

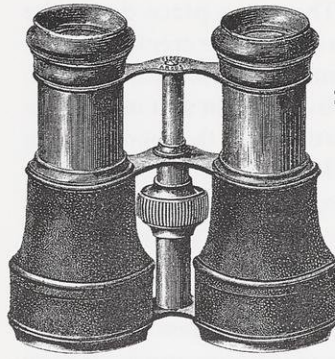
Sandhill cranes near Lulu Lake in Walworth County.



GERALD H. EMMERICH, JR.

Going afield

Join the people who work in our wetlands, prairies, parks and forests on their daily rounds.



Barb Barzen

Surely you've had the experience of reading about a person, a place or an event and then wishing you could be there, to see and hear and witness what sparked your curiosity on paper. Wish no more, adventurer! Strike out for the goat prairies, dip your paddle in Wisconsin River history, scan the Lake Superior skies for broad-winged hawks and scour the forest floor for fungi. What you've read about in the pages of *Wisconsin Natural Resources*

will come to life during the annual Field Trips offered by the Natural Resources Foundation.

On a field trip, you'll help DNR biologists, park managers, foresters and other natural resource professionals in the ongoing quest to understand and protect our natural heritage.

You'll see firsthand how trout streams are reconstructed, take water samples from the Mississippi River, "cruise timber" in a northern pine stand, or watch prairie chickens booming at Buena Vista Marsh just before dawn. How about brushing up on your wildflower identification skills, or clambering across the geologic eons at Devil's Lake in the company of someone who knows strata like the back of her hand?

From April to October, DNR staff will lead 32 field trips across the state. Sign up for one, or several, and learn about the people and the places that make Wisconsin a naturally fascinating state. But please register soon — trip rosters fill up fast and some trips have limits on the number of visitors who can be accommodated on buses and in blinds.

You'll find a registration form bound into this issue.

Reserve space for your group by trip number and date. Please tell us how many people are in your party. Those registering for trips which list a fee and those enclosing a donation should include a check payable to the Natural Resources Foundation of Wisconsin. All costs listed are per-person fees.

Return your reservations to: Field Trips, Natural Resources Foundation, P.O. Box 129, Madison, WI 53701. Enclose a stamped, self-addressed return envelope so we can confirm your trip, forward directions and suggest any special gear you may want to bring with you. Also, please include phone numbers so we can contact you with questions about your reservation.

If you have questions about these trips, contact the Natural Resources Foundation office, (608) 266-1430 between 8 a.m. and 4 p.m. Monday through Friday.

See you in the field!



(top) A summer hike on last year's field day through hilly prairies of southwestern Wisconsin. (bottom) Trip #22 will once again give birders an update on trumpeter swan recovery at Crex Meadows near Grantsburg.



(top) Modern-day badgers recount lead mining days at Schullsburg.

(above) Birders enjoy swans, shorebirds and songbirds at Crex Meadows.

1 Wetland Mitigation at Shiocton Marsh

Learn about the administrative and biological aspects of a wetland mitigation project at prime time to see migrating waterfowl, shorebirds and songbirds.

WHEN: April 20, 10:00 a.m.–noon
WHERE: Shiocton, Outagamie Co.
LEADER: Kelley O'Connor
LIMIT: none

2 Fish, Algae, Invertebrates, and Wastewater—Testing for Water Quality

See how biologists use aquatic organisms to monitor the quality of water discharged from industrial and municipal wastewater treatment facilities. Tour the state's Biomonitoring Laboratory.

WHEN: April 20, 10:00 a.m.–noon
WHERE: Madison
LEADER: Steve Geis
LIMIT: 20

3 Prairie Chicken Booming at Buena Vista Marsh

Friday evening presentation on prairie chicken behavior/ecology. Saturday pre-dawn observation of prairie chicken mating dance, followed by breakfast and discussion.

WHEN: April 26, 7:00 p.m.–April 27, 11:00 a.m.
WHERE: Central Wisconsin Environmental Station, Amherst Junction
LEADER: Todd Knepfel
LIMIT: 20
COST: \$40

4 Paddle Through Industrial Manitowoc: A Canoe Tour of Pollution and Prevention

Learn the history and basics of air and water pollution, observe current conditions, and learn about pollution reduction efforts.

WHEN: April 27, 10:00 a.m.–2:00 p.m.
WHERE: Manitowoc
LEADER: Jim Crawford
LIMIT: 30
COST: \$10/party with own canoe; \$35 per canoe rental

5 Pheasant Rearing at State Game Farm, Tour of MacKenzie Environmental Center

Slide presentations and tours at each facility, including pheasant rearing facilities for breeder flocks and wild pheasant production, demonstration of new energy cycle, and Wisconsin wildlife exhibit.

WHEN: May 11, 9:00 a.m.–2:00 p.m.
WHERE: Poynette, Columbia Co.
LEADERS: Don Bates, Derek Duane
LIMIT: 25

6 Spring Wildflowers at McGilvra Woods

This State Natural Area in the Baraboo Hills is the stage for a spectacular display of spring wildflowers. Take a leisurely stroll through a maple-basswood forest to see trillium, hepatica, spring beauty, and much more.

WHEN: May 11, 9:00 a.m.–noon
WHERE: Baraboo, Sauk Co.
LEADER: Thomas Meyer
LIMIT: 20



DON BLEGEN

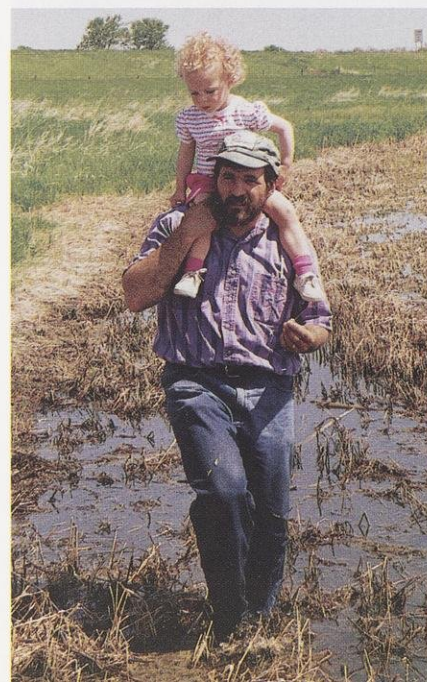
7 A Birder's Tour of the Garbage Industry—Wisconsin Point

Learn about waste management issues and technology at one of Wisconsin's best birdwatching sites. Tour old and new landfills on/near Wisconsin Point, visit a waste facility, and lunch at the tip of Wisconsin Point.

WHEN: May 11, 7:00 a.m.–1:30 p.m.
WHERE: Superior
LEADER: Steve LaValley
LIMIT: none

(above) Search for the dainty Spring Beauties on Trip #6.

(below) Swamp stompers of all ages can visit Patrick Marsh (Trip #12) to search for frogs, ducks, herons and yellow-headed blackbirds.





8 Spring Wildflowers at Newport State Park

See an array of rare and beautiful wildflowers of the northern boreal forest and spectacular Lake Michigan shoreline.

WHEN: May 18, 1:00–3:30 p.m.

WHERE: Newport State Park, Door Co.

LEADER: Coggin Heeringa

LIMIT: none

COST: Sticker or entrance fee at state park

9 Trout Management and Stream Shocking Demonstration

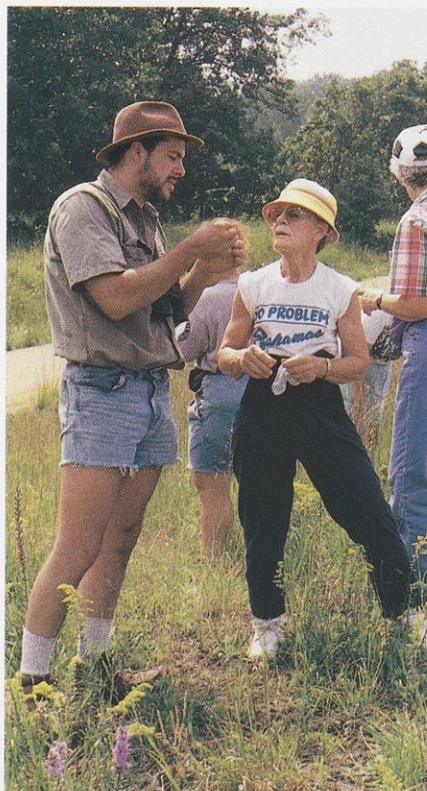
Wisconsin's rolling coulee region has beautiful trout streams and a colorful history. Visit regional trout streams, discuss programs to improve stream habitat, and see the shocking truth of how trout populations are estimated.

WHEN: May 18, 10:00 a.m.–noon.

WHERE: Coon Valley, Vernon Co.

LEADER: David Vetrano

LIMIT: 40



10 Mitigation of a Trout Stream: The Case of Allenton Creek and Highway 41

Learn about the process of moving streams and wetlands to make room for roads. DNR and UW-Milwaukee experts will conduct an on-site recounting of the mitigation of Allenton Creek, a high-quality trout stream.

WHEN: May 18, 9:00 a.m.–noon

WHERE: Allenton, Washington Co.

LEADER: Vic Pappas

LIMIT: 30



11 Tour of Rocky Run Oak Opening State Natural Area

Hike through this 300-acre natural area and learn about the ecology and management of prairies and oak openings. Picnic lunch on scenic bluff.

WHEN: May 25, 9:30 a.m.–1:00 p.m.

WHERE: Wyocena, Columbia Co.

LEADER: Mark Martin

LIMIT: 25



12 Patrick Marsh: A Glorious Wetland Restoration

Explore this 160-acre marsh, which was drained in the early 1960s, farmed for nearly 30 years and restored in 1992. Search for birds, nests, tadpoles, aquatic insects, plants and much more.

WHEN: June 1, 10:00 a.m.–noon.

WHERE: Sun Prairie, Dane Co.

LEADER: Alan Crossley

LIMIT: 30

Trips #4, #17, #20, #24 and #26 explore resources from the water.

(top) Take a sandbar-side view of the Mississippi River birds, plants, turtles, mussels and fish.

(above) Explore the history and current land uses along the lower Wisconsin State Riverway.

13 Renewable Energy: A Modern Residential Application

See a slide presentation on the DNR's involvement in renewable energy development, along with examples of solar, wind, and energy efficient technology in use at a house that is "off the grid."

WHEN: June 1, 10:00 a.m.–2:00 p.m.

WHERE: Brooklyn, Green Co.

LEADERS: Cheryl Rezabek, Bob Strous

LIMIT: 40

Trips are lead by working experts in their field whether in (above) endangered resources, (left) field botany, or (below) dune ecology.



14 Geology for Children at Devil's Lake State Park

Spend a day getting into and onto rocks at one of the state's most beautiful parks. After a brief indoor session of slides and activities, hike the bluffs above Devil's Lake and explore the rich geologic history of the area.

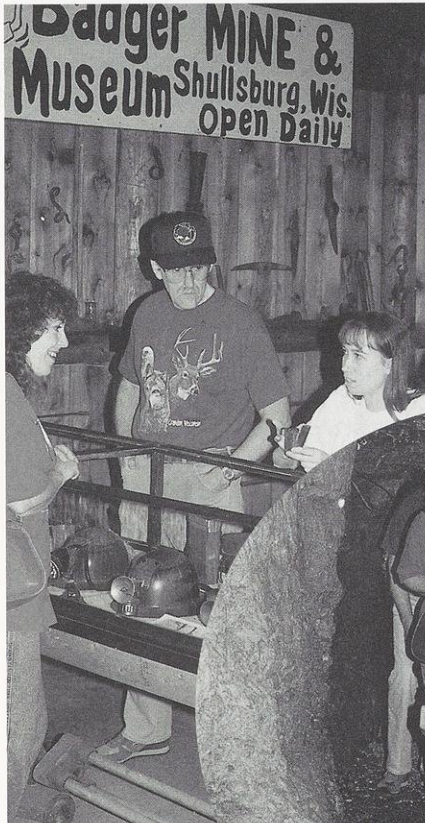
WHEN: June 8, 9:00 a.m.–4:00 p.m.
 WHERE: Baraboo, Sauk Co.
 LEADER: Heidi Conde
 LIMIT: 20 (at least one adult per two children; for children ages 9–13)
 COST: Sticker or entrance fee at state park

15 Twilight Stroll at Havenwoods State Forest

Learn about the unique history of this urban state forest and the programs offered there. Take a twilight walk to discover what animals are active at dusk.

WHEN: June 12, 6:30–8:30 p.m.
 WHERE: Milwaukee
 LEADER: Jackie Scharfenberg
 LIMIT: 30

Last year, we included a look at historic mining practices and mining reclamation still left undone in southwestern Wisconsin.



16 Tours of Roche-A-Cri and Buckhorn State Parks

Tour one or both of these picturesque central Wisconsin parks with specialists in archaeology and fisheries. See petroglyphs, pictographs, the Castle Rock Flowage, and recreational highlights.

WHEN: June 15, 9:00–11:00 a.m. at Roche-A-Cri and 1:00–3:00 p.m. at Buckhorn
 WHERE: Adams & Juneau counties.
 LEADERS: Joe Stecker-Kochanski, Bob Birmingham, Scot Ironside
 LIMIT: 30
 COST: Sticker or entrance fee at state park

17 Plants, People, and Places Along the Lower Wisconsin

Mark, to the day, the 323rd anniversary of Marquette and Joliet's passage along this stretch of the Lower Wisconsin River. Follow their route from Gotham to Muscoda. The five-mile canoe trip will focus on natural and human history, with stops at Avoca Prairie, riverbottom forests, and islands, plus a Lower Wisconsin State Riverway update.

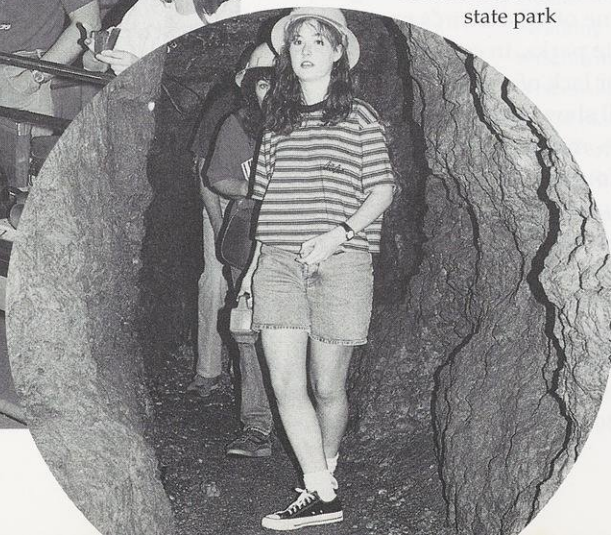
WHEN: June 16, 10:00 a.m.–3:00 p.m.
 WHERE: Gotham, Richland Co.
 LEADER: David Kopitzke
 LIMIT: 20
 COST: \$10/person, if renting canoe

18 Creek Walk at Whitefish Dunes State Park

Take a family hike to a small creek and wade right in to explore life on the creek bottom.

WHEN: June 22, 9:00–11:00 a.m.
 WHERE: Whitefish Dunes State Park, Door Co.
 LEADER: Ginny Haen
 LIMIT: 24

COST: Sticker or entrance fee at state park



You never know what a DNR naturalist will help you see on a field hike.

19 Tour of Hayward State Forest Nursery

Tour nursery facility to see how trees and shrubs are grown for forestry plantings, from seed extraction to shipping.

WHEN: July 13, 10:00 a.m.–noon
 WHERE: Hayward
 LEADER: Gordon Christians
 LIMIT: none

20 Jon-boating the Mississippi Backwaters and Sampling the River

Join biologists in exploring sloughs, wetlands, the main channel, dredge spoil sites, and habitat projects on the Mississippi River. See demonstrations of methods used to monitor the health of the river. Learn about river history, issues, wildlife, mussels, fish, and plants. Spectacular scenery!

WHEN: July 13, 7:30 a.m.–3:30 p.m. (Group A) or 9:30 a.m.–4:30 p.m. (Group B)
 WHERE: La Crosse
 LEADERS: Jeff Janvrin, Terry Dukerschein
 LIMIT: 48

21 Hike at Trenton Bluff and Morgan Coulee Prairie State Natural Areas

Visit two of the highest quality dry "goat" prairies in western Wisconsin. Let the Natural Areas Management Crew show you work they have done to help restore these prairies and the surrounding cliff, oak savanna, and forest habitats.

WHEN: July 20, 9:30 a.m.–1:00 p.m.
 WHERE: Hager City, Pierce Co.
 LEADERS: Jim Buchholz, Ron Lichtie
 LIMIT: 25

22 Trumpeter Swan Recovery Program—Crex Meadows

See wild trumpeter swans with cygnets on a beautiful marshland. Learn about trumpeter swan ecology and efforts to restore swans in Wisconsin.

WHEN: July 20, 9:00 a.m.–noon
WHERE: Crex Meadows Wildlife Area, Burnett Co.
LEADER: Mike Mossman
LIMIT: 30

23 Tour of Wisconsin Heights Battle Site

Take a walking tour through a historic battle site, oak savanna restoration, pre-historic mound site, and the hill-top where Black Hawk directed the 1832 battle.

WHEN: July 27, 1:00–4:00 p.m.
WHERE: Sauk City, Sauk Co.
LEADER: Wayne Schutte
LIMIT: 30

24 Exploring Mississippi River Natural Resources

Venture onto the Mississippi River by boat and learn about the history, fish, birds, mussels, plants, and habitats of the Father of Waters.

WHEN: July 27, 10:00 a.m.–4:00 p.m.
WHERE: Merrick State Park, Buffalo Co.
LEADER: Brian Brecka
LIMIT: 16
COST: Sticker or fee for state park entrance

Some trips are especially designed to let you explore by foot and bike. Any time of year, park naturalists and rangers can suggest scenic routes.



25 Management of Old Growth White Pine in Black River State Forest

Take a bus tour through the Black River State Forest and hike through managed and unmanaged old growth white pine stands. Learn the pros and cons of different forestry practices.

WHEN: July 27, 9:30 a.m.–3:00 p.m.
WHERE: Black River Falls, Jackson Co.
LEADER: Ed Vlach
LIMIT: 40
COST: \$2/person

26 Canoe the Lower Wisconsin State Riverway

Learn about the management and history of the Lower Wisconsin State Riverway while canoeing from Mazomanie to Arena.

WHEN: August 3, 10:00 a.m.–3:00 p.m.
WHERE: Mazomanie, Dane Co.
LEADER: Wayne Schutte
LIMIT: 30
COST: \$10/person, if renting canoe

27 Timber Harvest Workshop — Northern Highlands-American Legion State Forest

Tour timber harvest projects, observe equipment in operation, learn how and why trees are thinned, and participate in cruising and marking a timber harvest project.

WHEN: August 24, 9:00 a.m.–3:30 p.m.
WHERE: Woodruff, Vilas Co.
LEADER: Ralph Hewett
LIMIT: 28

28 Mushroom Foray at Whitefish Dunes State Park

Join a mycology expert for a fungi foray in one of Wisconsin's most scenic state parks. In case of bad weather or lack of mushrooms, Ms. Lukes will show a sampling of slides of the 470+ mushrooms she has found in Door County.

WHEN: August 31, 9:00–11:00 a.m.
WHERE: Whitefish Dunes State Park, Door Co.
LEADER: Charlotte Lukes
LIMIT: 24
COST: Sticker or entrance fee for state park

29 140 Years of Applied Forestry on the Menominee Indian Reservation

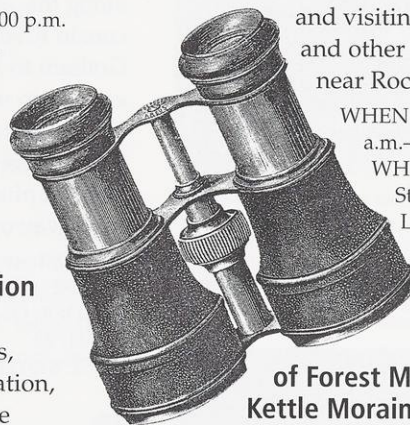
See how reservation forests have been managed for diversity in species and size since the 1850s. Tour the reservation by bus to learn how the area's history and forestry practices set it apart from other northern forests.

WHEN: September 21, 10:00 a.m.–4:00 p.m.
WHERE: Keshena, Menominee Co.
LEADER: Marshall Pecore
LIMIT: 40
COST: \$5

30 Geology of the Baraboo Hills

Explore the rich geologic history of the Baraboo Hills by hiking the bluffs overlooking Devil's Lake, studying formations at Parfrey's Glen, and visiting Van Hide Rock and other geologic features near Rock Springs.

WHEN: September 28, 9:00 a.m.–4:00 p.m.
WHERE: Devil's Lake State Park, Sauk Co.
LEADER: Philip Fauble
LIMIT: 25



31 Bus Tour of Forest Management in Kettle Moraine State Forest

Enjoy fall colors and learn tricks of the forestry trade — thinning, planting, harvesting, etc. — via a 50-mile trek by bus through the Southern Unit of Kettle Moraine State Forest. Several forestry experts will show results of various management techniques.

WHEN: September 28, 9:00 a.m.–3:30 p.m.
WHERE: Eagle, Waukesha Co.
LEADER: Michael Sieger
LIMIT: 45
COST: \$12/person

32 Lake Michigan Salmon Fisheries

See the peak spawning run of Lake Michigan salmon and get a behind-the-scenes look at how eggs are collected for distribution to hatcheries.

WHEN: October 7, 10:00 a.m.–noon
WHERE: Kewaunee
LEADER: Paul Peeters
LIMIT: 30



GEORGINE PRICE

Continued from page 2

Pasque flowers are perennials. The flower rises from the caudex, the thickened base of the plant. The five to seven pastel-colored petaloid sepals cover the flower parts. Pasque flowers lack true petals, as do all members of the anemone family including Canada anemone, wood anemone and thimbleweed. White silky hairs, each two to three millimeters long, densely

cover all parts of pasque flowers, giving the plant its fuzzy appearance. One wonders if such hairs protect this early-blooming plant from frosty spring nights.

The female part of the flower looks like a fuzzy little button. Numerous yellow stamens surround it. After insects pollinate the blossoms, the achenes (fruits) mature and the female style elongates to form a feathery wisp. Each plant looks like a miniature Fourth of July firework with a cascade of two- to three-inch wisps bursting from the exploding button. The plumed pasque flower resembles the fruiting stage of another prairie resident, prairie smoke, but the two species are unrelated. Pasque flower is

a member of the buttercup or crowfoot family, Ranunculaceae; prairie smoke, *Geum triflorum*, is in the rose or Rosaceae family. Pasque flower's plume is silvery to greenish-white while prairie smoke's fruiting plume is brick red.

Pasque flower is so named because it blooms about the time of two important religious ceremonies. Originating in the Middle East, *pesach* referred to both passage and Passover; important spring tenets of Moslem and Jewish faiths. Later, the French altered the name to *passefleur* or pasque flower as a reference to Easter. That name persists today.

Pasque flowers are a welcome sign of spring. They remind us that despite the fitful nature of spring's arrival, the season is progressing and will soon surround us in all its glory. □

Anita Carpenter pokes the ground searching for spring ephemerals near her Oshkosh, Wis. home.

Readers Write

GET CLICKIN'

Photo reminder! Don't forget our two reader photo contests. We're looking for photos of your hunting shacks, unique shack features and descriptions. Send them by May 1st to: Cabin Photos, Wisconsin Natural Resources magazine, P.O. Box 7921, Madison, WI 53707. Photos of Wisconsin's wild symbols (badger, white-tailed deer, robin, muskellunge, honey bee, mourning dove, trilobite, sugar maple and wood violet) should be sent by August 1st to: State Symbol Photos, Wisconsin Natural Resources magazine, P.O. Box 7921, Madison, WI 53707

NAME IT

I'm a new subscriber and I like that the magazine devotes itself to Wisconsin wildlife. However, I have a suggestion to improve the educational value of the pub-

lication — label the photos with the specific name of the subject pictured.

For instance, the December issue has a picture of a pine tree on the front cover and a plant leaf on the back. What plants are they? Likewise p.11 has a beautiful photo of a male mallard, but it isn't identified.

I'm trying to teach myself to identify native plants and animals and the magazine could help me toward that end.

Kurt Keller
Forest Junction, Wis.

We usually provide common names and Latin genus and species where a species has several common names. Many of our captions describe a resource or environmental issue that species face. In those cases, we are more likely to describe the issue than expend the space to identify species. Your point is

well taken. Many readers similarly enjoy identifying species. By the way, our December cover showed a balsam fir (Abies balsamea) and our back cover was a closeup shot of Virginia creeper, also called woodbine, (Parthenocissus quinquefolia) fringed in frost.

HIKING UPDATE

Thanks for using my book, "Walking Trails of Southern Wisconsin," as a resource in Wisconsin Traveler.

I'd like to update readers about Parfrey's Glen. An unusual flash flood in the summer of 1993 pretty much flushed out portions of the glen including some trees, other vegetation and the trail. During the following year, DNR trail builders rebuilt and somewhat rerouted the trail. They constructed wooden bridges and long boardwalks

over the stream near the bottomland. Extra pairs of socks and dry shoes are no longer needed as the new trail neatly carries the hiker over the top of any mud or running water. It's a great improvement!

Bob Crawford
Sun Prairie, Wis.

WHERE AGATES FORMED

The second sentence of your attractive article "Rainbows in rock" (December 1995) states that Lake Superior agates were formed "in the lava of ancient volcanoes in northern Canada..." In fact, they were formed in lava flows of the Midcontinent Rift System, exposed in the Lake Superior basin and dispersed southward by the glaciers. That's why they are called Lake Superior agates. Rocks formed in northern Canada could not have been transported to Wisconsin

Readers Write

since the glaciers flowed the other way there.

One of the references you cited, "The Lake Superior Agate" by Scott Wolter, explains their origin.

*Professor John C. Green
Dept. of Geology
University of Minnesota
Duluth, Minn.*

TRAIL IN TRUST

The caption on p.18 of your December 1995 article "In land we trust" should have read "Nucy" Meech Trail rather than "Nancy." "Nucy" is the abbreviated nickname for "nuisance," a name her brother gave her at an early age. I have heard people call her Lucy, but never Nancy. She was a remarkable mother, extraordinary art collector, first woman Trustee of the Minneapolis Art Institute and an avid nature enthusiast. She was killed at the age of 76 when a tree felled by a beaver hit her kayak on the Brule River.

As a long-time summer resident of Madeline Island, she was a major sponsor of the Madeline Island Wilderness Preserve, and we are flattered that you chose this picture for your article.

*Charles E. Meech
for the Meech Family
Wayzata, Minn.*

TROUTING MEMORIES

I have enjoyed reading the magazine for more years than I can remember. Several issues in the last few years brought back memories of trout fishing on the Tomorrow River from the time my father took me fishing there starting in 1927.

We started fishing with double spinners and worms, then we "graduated" into fishing with make-believe flies. We spent 60 years fishing the river downstream of Nelsonville from the old gristmill and slaughterhouse.

Over the years I got to know every hole and its sticks, stones and snags like a book. Ah, how many good memories I have with my Dad and his buddies, later on with my son and daughter.

*Gordon Hackbarth
Stewartville, Minn.*

STUDENT MONITORS

I'm a Junior at Marshfield High School and I'm faced with a chemistry assignment to develop an original solution to an environmental problem. The December articles called "Vital Signs" gave me an idea. If the Department of Natural Resources is looking for partners to continue the work of monitoring the environment, is there any role for students in public schools? Could science teachers and students provide some of the field collection work in the future?

*Drew D. Baldauf
Marshfield, Wis.*

Fabulous idea, Drew. In fact, we have many partners who are helping provide the environmental monitoring you suggest. There is always room for more volunteers! Currently volunteers collect information about lake clarity, water quality and water chemistry every two weeks from spring to fall. The information becomes part of a database we are building to keep track of lake conditions over time. A second group of volunteers participates in a school program called Testing the Waters. These students visit streams and rivers near their school to sample water chemistry and aquatic insect life several times a year. The data they collect is fed into a worldwide computer base so schools on the same river, across the country or around the globe can share information about rivers and streams. A third program is training school teachers how to monitor milkweed plants for signs of ozone damage.

It makes sense to forge such partnerships with schools, communities and individuals to interest people in tracking environmental progress. We can spread our monitoring network more widely with help from volunteers. Second, the labor these folks donate stretches each monitoring dollar much further. Third, getting people involved creates a commitment to understand and protect resources. A public that on a regular basis

examines the environment generally supports efforts to sustain clean air, clean water and public spaces. So on many levels, your idea has merit.

BUSY WOODPECKER

Your article about pileated woodpeckers (August 1995) brought back some memories of a few years ago. There was a pileated who persisted in pecking at trees at a very busy intersection in Wausau. It would make a three-inch-wide, seven-inch-long, half-inch-deep opening in the side of the tree quite a way up. It was there so frequently that I would just look up when I spotted the chips at the bottom of one of the trees at that corner. The parks department later removed the trees for the safety of drivers and pedestrians. I was just amazed that the woodpecker would choose such a busy street for its activities.

*Margaret Wollslair
Wausau, Wis.*

MARKET HUNTING PHOTO

One of the photos used to illustrate "Toward an outdoor ethic" in the December issue shows market hunters posing with over a hundred waterfowl (p.10). The Oshkosh Public Museum has that same image in its collection identified as "Dunkel's boathouse on Lake Poygan." The museum has a fairly large collection of photographs related to waterfowling in the Lake Winnebago region, including images from the market hunting era. This photo is one of the more unique images, capturing the essence of the market hunting era.

*Bradley G. Larson
Director
Oshkosh Public Museum
Oshkosh, Wis.*

SILT FENCES

A photograph in your August issue sparked a deep memory. The photo on p.5 of your "Down to the Shoreline" supplement showed a black fence-like structure, which I call a runoff con-

tainment barrier, alongside a highway. The barrier was placed there for a good cause, but some of these barriers remain in place indefinitely and are subsequently abandoned.

The sight of these weathered, dilapidated barriers is rather disgusting. In the fall of 1993 I used to pass a stretch of Highway 32 near the north branch of the Pensauckee River where both sides of the road were littered with old barriers. Part of that ugly barrier is still visible poking through the snow two years later. To me, it is just as disgusting as discarded diapers, tires, bottles or other trash randomly and inconsiderately tossed along our roadways. Who is responsible?

*Al Walker
Abrams, Wis.*

We contacted the State Department of Transportation (DOT) to get an answer. On state highway projects, engineers and crews from DOT are responsible for maintaining silt fences and removing them after vegetation is well established. This usually takes a year. Sometimes maintenance work, including the subsequent removal of silt fences is contracted to county work crews.

Silt fences are also installed by utility companies after they complete roadside repairs, replace phone poles or bury cables. Construction companies also use them to control runoff from landscaping, so every silt fence you see is not necessarily installed by a highway worker. In fact, DOT has largely switched to using hay bales, erosion mats and sprayed seed mixtures to establish vegetation more quickly and control runoff more effectively, so you should see fewer silt fences on roadsides in the future.

We agree that erosion controls need to be maintained, like all tools, to perform an intended function without becoming a problem or an eyesore.



Rustic roads, like this Pierce Co. route, provide an opportunity to travel both time and space. Take your free travel guide with you and enjoy these detours to past, slower times.

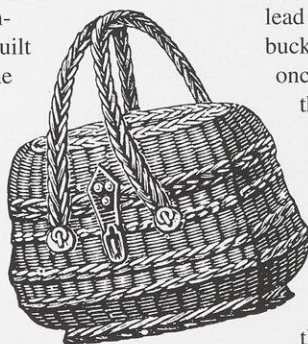
Silent highways

It's rare to think of a road as a source of quiet contemplation, a thing that takes you back, and inward, rather than a means to move you forward, faster. No, roads and silence and deep thought don't seem to mix — unless you find yourself on one of Wisconsin's 67 Rustic Roads.

These scenic, lightly traveled country roads found in many Wisconsin counties lead to no particular place. They may be short or long (the roads range from two miles to over 25 miles in length), they may be dirt or gravel or paved, one lane or two, but all beckon hikers, cyclists and motorists to slow

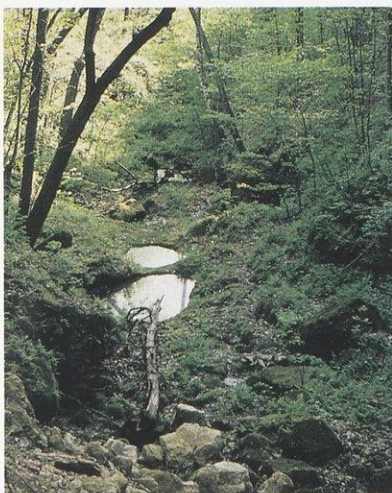
down and fill the senses: Smell the green shoots of clover, see dusk's horizon bathed in lavender whispers of goose wings, hear the voices of families in old, laid stone, taste the hours of sun in a single wild raspberry, touch the soft yellow of a tamarack's new needles.

"Each Rustic Road takes us to a miniature universe," writes author Ben Logan in *Wisconsin's Rustic Roads: The Road Less Traveled*. Though only 2.1 miles long, **Road R-48** in Waushara County near Saxeville skirts a log cabin and two farm-houses built before the



Civil War on 160-acre lots granted through the Homestead Act. Stop and walk along the shoulder...you may hear the snuffling of a hitched team straining to plow a newly cleared field, or the flap of quilts airing on a line in a fresh spring

DOT RUSTIC ROADS PROGRAM



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breeze. Perhaps your nose will catch the mellow breath of the banked oak fire in the hearth. You cannot remain in this contained world for long, however. A flush of rainbow feathers will startle you into the present, as a hidden ring-necked pheasant takes flight from a grassy hummock.

Road R-32 in Marinette County partially traces the banks of the Peshtigo River through 26.6 miles of dense woodlands and northern waters, with vistas of High Falls and Cauldron Falls flowages. In these great forests many voices mingle: The ancient chants of native peoples, the missionary's prayers, the bluff and hearty logger's songs. And yet few signs of human presence are apparent, save for the road that brought you here.

The 7.5 miles of **Road R-66** in Lafayette County tell a different story of the human imprint on the land. In this tiny corner of the Driftless Area, an abandoned lead mine ringed by rusted ore buckets mutely speaks of a once-vibrant industry built with the sweat and toil of hopeful immigrants.

Trilliums nod in the dappled shade along **Road R-55**, a 2.8 mile-Vernon County byway still surfaced in part with gravel. Wildflowers are the boon companions of many Rustic Roads, adding lively bursts of color to shoulders that seldom feel the pressure of tires, or even feet.

Make time this month or next to catch the warm promise of spring on a Rustic Road. Pick a county, pack a lunch and go — for a Sunday (or Monday or Thursday or any day) drive. All roads are marked by brown-and-

yellow signs. For a road guide, write Rustic Roads Board, Wisconsin Department of Transportation, P.O. Box 7913, Madison WI 53707-7913. A second book suitable for coffee table travelers is *Wisconsin's Rustic Roads: A Road Less Traveled*, with 85 color photographs by Bob Rashid and text by Ben Logan, George Vukelich, Jean Feraca, Norbert Blei and Bill Stokes. It is available for \$35 and published by the Lost River Press, 10477 Main St., Boulder Junction, WI 54512.

