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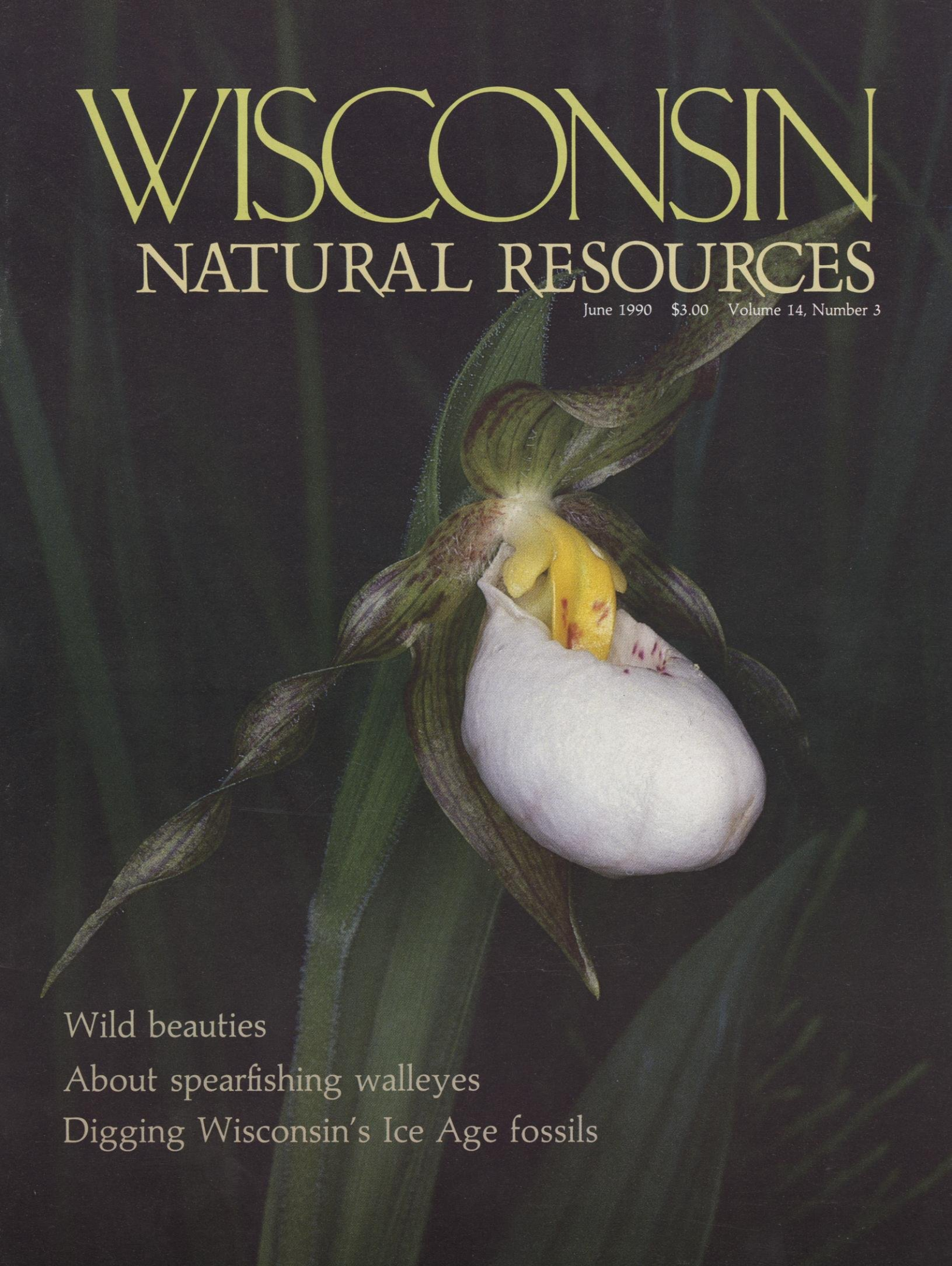
WISCONSIN NATURAL RESOURCES

June 1990 $3.00 Volume 14, Number 3

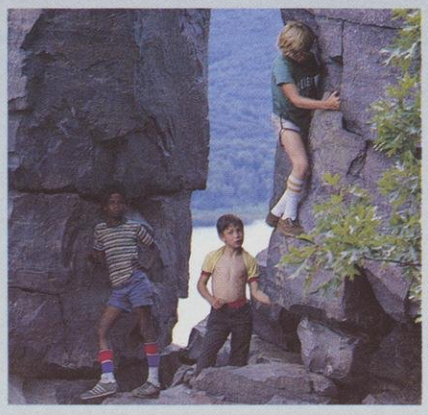


Wild beauties

About spearfishing walleyes

Digging Wisconsin's Ice Age fossils

YOUR PERSONAL TOUR OF DEVIL'S LAKE



JIM ESCALANTE

Each year, more than a million visitors hike the trails, stroll the sand beaches, soak up the sun and stand in awe of the rocky, rugged scapes at Devil's Lake State Park. A few visitors are lucky enough to hear a talk or take a nature hike guided by the park's engaging naturalist, Ken Lange. He brings 10,000 years of

continued on page 39

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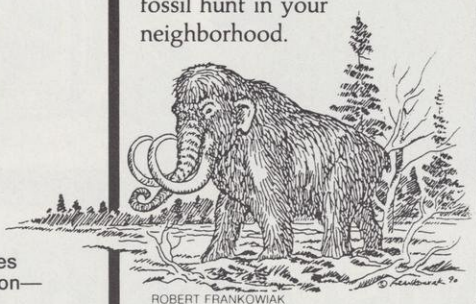

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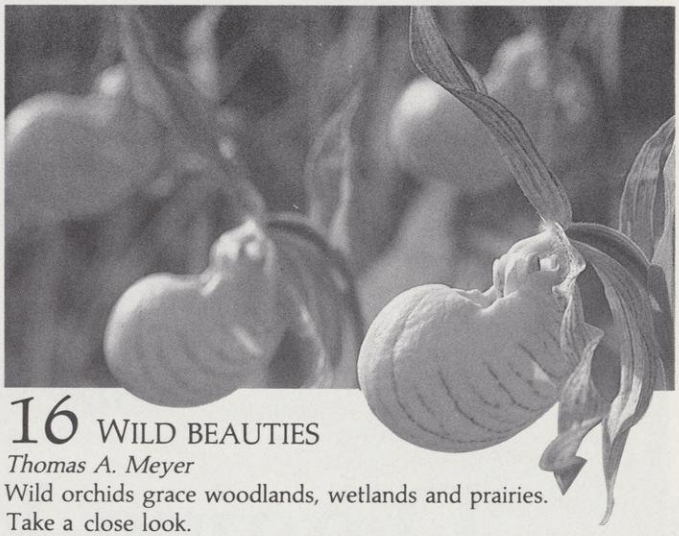
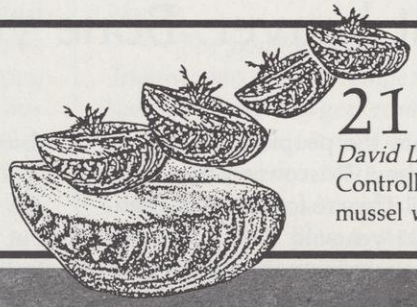


THOMAS A. MEYER

EarthNotes



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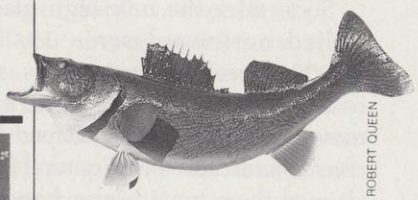


ROBERT QUEEN

FRONT COVER:
White lady's-slipper
(Cypripedium candidum). THOMAS A. MEYER

BACK COVER:
Northern flicker
(Colaptes auratus). GREGORY K. SCOTT

FEATURES

MASTODONT TOOTH PHOTO BY MILWAUKEE PUBLIC MUSEUM

Digging Wisconsin's Ice Age fossils

No dinosaurs here, but you may unearth the teeth of a giant beaver. Bone voyage!

Kurt F. Hallin

Soon after the mile-high glaciers melted northward some 12,000 - 13,000 years ago, mammoths, mastodonts, giant beaver and bison moved onto the newly-shaped Wisconsin landscape. What natural forces claimed these great beasts, how they lived and why they disappeared is a puzzle we are still piecing together.

In truth, our expanding knowledge of these extinct Ice Age mammals is largely attributable to a handful of people who often have little scientific training or background in soil science, biology or paleontology. They're perceptive people who share familiar traits — persistent curiosity, keen eyesight and love of the outdoors. Their interest, generosity and determination have enriched our understanding of Wisconsin's natural history.

Who are the people who help us find out about Wisconsin's paleontologic past? They're fossil finders, people like 11-year-old Pete Baumann. Pete was exploring a dirt pile next to a pond in Waukesha County when he spotted something resembling a huge tooth. Pete didn't just toss the mud-caked clump aside. He wanted to find out what he had found. And he didn't stop asking until he got an answer at the Milwaukee Public Museum. Pete found a tooth of an American mastodont, a distant relative of mammoths, which became extinct 9,000 years ago.

Such remains from ancient Wisconsin are often discovered by farmers, construction workers, hikers and others who recognize they have unearthed something unusual. They are willing to share the excitement of that discovery with others.

Technically, the fossils people find are the property of the landowner, but such important specimens are truly part of society's natural heritage and belong in museums or other public collections where others can appreciate them. Pete and the landowner, Willard Allen, both appreciated this, and the tooth is now on display at the Milwaukee Public Museum.

Hints for finding fossils

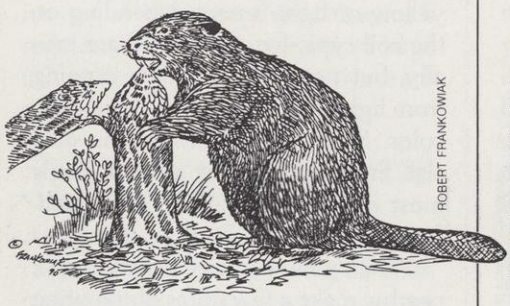
Ice Age fossils may be buried almost anywhere in Wisconsin but are most often found in the more densely-populated areas in the south where construction and digging is more common and where mammals

concentrated during the Ice Age.

The shovel and backhoe aren't the only means of uncovering fossils. Natural excavators like heavy spring rains erode soil from slopes and barren areas along streambanks and rivers.

By knowing a bit about how bones and teeth are preserved, you can determine the best places to look and increase your chances of finding fossils.

Animal and plant remains that have been preserved for thousands of years were buried in sediments that prevented destruction by air, water, sun, biological and chemical processes. When glaciers withdrew, the Wisconsin landscape was dotted with many more lakes, ponds and wetlands than we see today. These wet places provided food and cover for animals. Wetlands also provided favorable


ROBERT FRANKOWIAK

Remnants of wetland animals like the 500-pound giant beaver are a rare find.

conditions for preserving animal remains. Over time, these lakes and wetlands filled in with sediments. During the bog stage, soils became peaty, acidic and low in oxygen. These conditions significantly slowed the decomposition rate of plant and animal remains. Consequently, we find far more fossils from animals that inhabited these wet lowland areas than of animals that lived in drier upland areas where wind, rain, bugs and sunshine decomposed and reclaimed their nutrients.

A significant number of fossilized teeth, tusks and bones have also been found in gravel pits. As the glaciers melted, animal remains were carried in streams and rivers fed by glacial melt-water. Fast-moving currents also tumbled rocks into cobbles, pebbles, sands, silts and clays. Likewise, the turbulent waters washed skeletal bones and teeth downstream. The rounded and polished remains settled into gravel deposits as the waters slowed down. Bones and a mammoth tusk have been excavated from a gravel pit in Richfield, northwest of Milwaukee. Of course, we can't pinpoint where these animals lived, only that their remains washed down from the north.

That's why we're particularly excited by fossils found in layers of sediments. The surrounding soils often contain microscopic plant fossils and other remnants that help paleontologists reconstruct the environment in which an animal lived.

Digging for dinos or dollars? Not likely

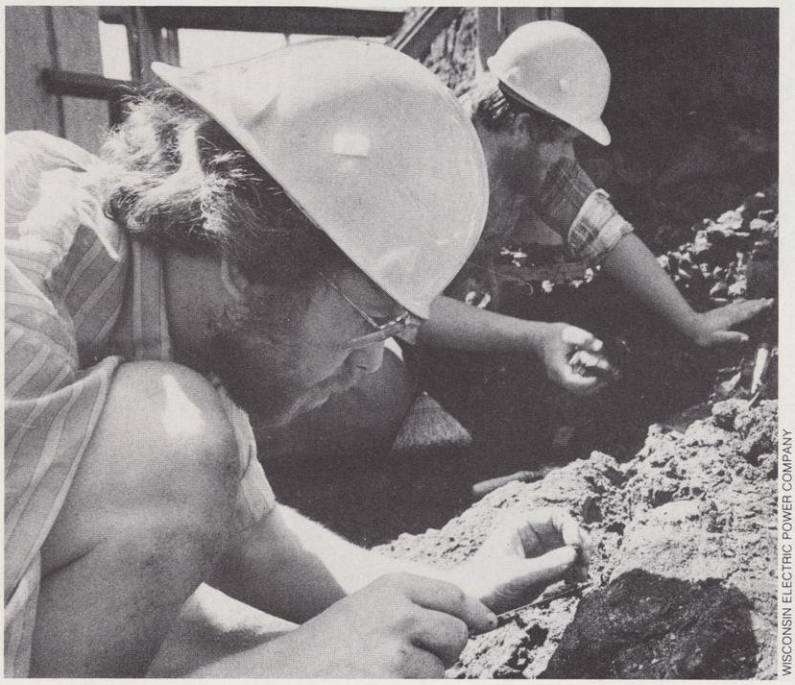
By the way, don't expect to find *Tyrannosaurus rex* in Tomah or a *Brachiosaurus* in the bottom of Beaver Lake. Ice Age deposits are much too young and Wisconsin's Paleozoic bedrock much too old to contain dinosaur fossils. It's probable that dinosaur once lived here, but we don't have bedrock from the Age of Dinosaurs (Mesozoic) and there's no chance of finding their fossils here.

I suspect by now a few of you are itching to dig up your backyard in search of some undiscovered tomb or tar pit. You've filled your head with images of Howard Carter discovering King Tut's tomb or Indiana Jones on some great adventure — Fame! Fortune! Glamour! Calm down now. Finding something that has been buried for 10,000 years is thrill enough. Fame: Would you settle for a little neighborhood celebrity? Fortune: Don't count on it. I'm not sure how this idea got started, but I don't know of anyone who became rich or retired early by discovering a dead animal, including those who found dinosaurs.

Have fun and take your time

If you are going to start your adventure searching for vertebrate fossils, the rule to remember is take it slow and steady. Enjoy what you're doing! Impatience has destroyed more scientific evidence than any other factor. Your aim at this point is inquiry and observation, not total excavation.

The author *(foreground)* uses hand tools to carefully unearth a mastodont tooth found at a Milwaukee construction site.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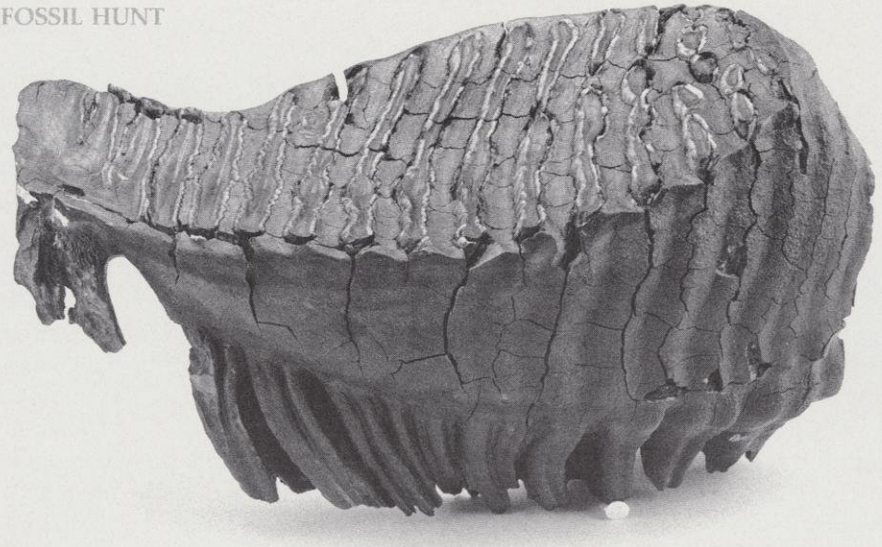

MILWAUKEE PUBLIC MUSEUM

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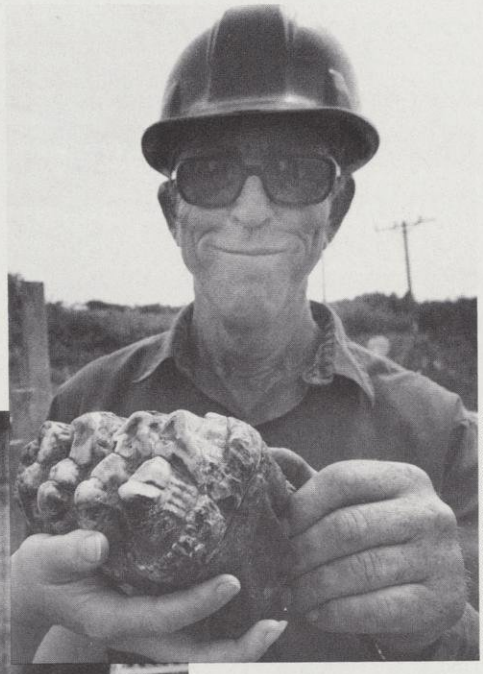

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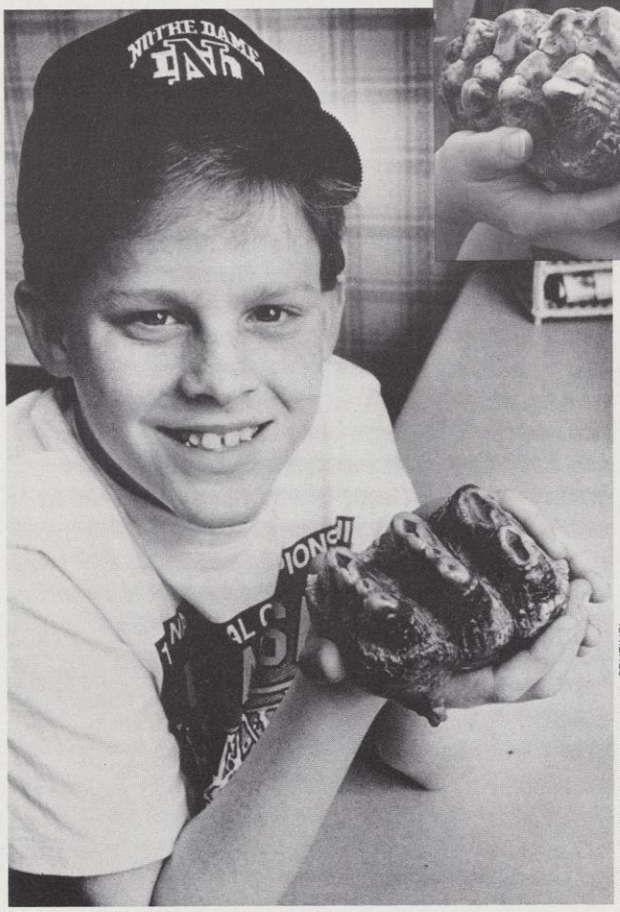


RICHARD BRODZELLER, MILWAUKEE SENTINEL

(top) Molar from a woolly mammoth.

(middle left) Mastodont.

(middle right) Ray Malone with a mastodont tooth excavated from a natural gas pipeline site.

(bottom) Pete Baumann holds a mastodont molar he found near home in Wales, Waukesha County.

The tools of the excavation trade are cheap and readily available: hand trowels and small screwdrivers for light digging and scraping; small, cheap paintbrushes and old toothbrushes for really delicate work.

If you think you've found a fossil, carefully and slowly begin removing dirt around it. If the bone is especially delicate or rotten (we call these "punky"), it's best to stop excavating and get out a pencil and paper. Make some notes. Try drawing a sketch — not a work of art, but something you can show someone. Pay attention to the overall shape and general features, including size and color. Take a color photograph too.

Don't be surprised if the bones you find are buried animals who were more commonly called "Bossie," "Flora" or "Seabiscuit." Recent cow and horse bones may still be white, yellow or light brown depending on the soil type. Ice Age bones are usually, but not always darker, ranging from light shades to a deep, chocolate color. If you're real lucky, you may also find teeth. Teeth are the single most reliable skeletal part for identifying mammals.

While you've got pencil and paper nearby, make a few notes pinpointing your digging site. Note the distances to nearby trees, rocks or other recognizable features. This will help you relocate the site later, long after it's been reburied.

By the way, that's your next step. Fossils survive thousands of years buried underground, but exposure to the eroding forces of even a single rain shower can seriously damage a well-preserved fossil. If you have a piece of cloth, plastic or even newspaper, lay it over the fossil and then cover it with dirt.

Now put away your garden tools and pick up a deerstalker hat and magnifying glass. You've got a little detective work to do. You'll want to dig up an expert who can help you identify what you've found. Colleges, university extension offices, natural history museums and the Wisconsin DNR are good starting points. A local veterinarian or physician might be

ROBERT FRANKOWIAK

helpful in starting you on the right track.

Speaking as one who has tried numerous times to identify fossils from verbal descriptions on the phone, it is usually a waste of time to merely describe a find. Send the expert a copy of your sketches, photos and field notes.

Researchers at the Milwaukee Public Museum and the University of Wisconsin-Madison keep records of fossil finds in the state. Although they can't excavate every site, they are certainly interested in information about each find.

Unlike several of our surrounding states, Wisconsin has no sites where fossil hunters can predictably find Ice Age fossils. Nevertheless, the sites are out there. You don't even have to find a major site to have fun looking for fossils. Keep your eyes open and stay alert. You never know who could find an important fossil that adds the next piece to our rich natural history — just ask Pete Baumann. ■

Kurt F. Hallin is Public Program Coordinator at the Milwaukee Public Museum.

CHARLES FONAAS

Invertebrate fossils like these — rugose coral, tabulate coral (halysites) and stromatoporid — are easier to find. Turn the page to start your hunt for sea shell fossils in Wisconsin.

Sea shells are a common fossil find

The bulk of Wisconsin's fossils may be smaller and less dramatic than dinosaurs, but what they lose in size, they make up for in age. Wisconsin's fossils date from about 430 million years ago when the area was a shallow, equatorial sea teeming with life. Dead sea creatures settled into sediments, and the sediments solidified.

Sometimes you'll find molds or perfect casts of shells, corals and other invertebrates. Sometimes mineral-rich water seeped into a cavity, built up and molded the original creature.

Fossils of these sea creatures are easier to find than mammoth and mastodont remains. You might start by looking near riverbanks and the Great Lakes shoreline. I also look around construction sites, railroad tracks and new parking lots. I've even found beautiful specimens on rooftops. Gravel containing fossilized remains is often used in landscaping and surfacing roofs. It's strange to think that creatures that lived 400 million years ago could now be found 20 floors above the ground.

I mention these sites because they are readily accessible, but use your head when exploring. Rooftops, railroad tracks, riverbeds and construction sites can be dangerous places. Stay alert and occasionally pick up your head so you don't run into trouble.

The beginning fossil hunter is most likely to find bivalves (clams and the like), brachiopods (worm-like creatures with clam-like shells), crinoids (starfish relatives) and trilobites (our state fossil).

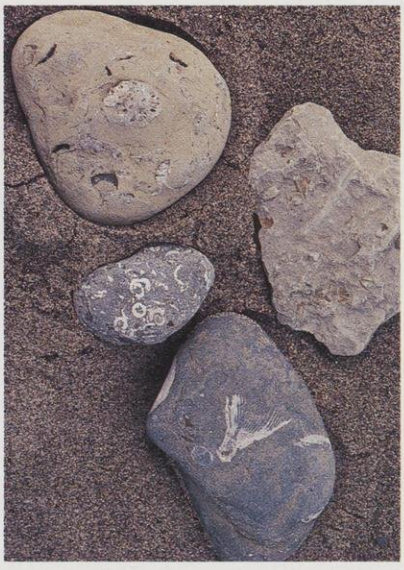
The brachiopods are most common. One favorite group, spiriferids, are sometimes called butterfly brachiopods, but they remind me more of pilot's wings.

CHARLES FONAAS

(top right) Fossilized stem of a crinoid or sea lily.

(left) A family fossil hunt in Milwaukee at Doctor's Park along Lake Michigan.

(below) Buried treasure — A trained eye found these brachiopods, crinoids and corals in five minutes on a shoreline stroll along Lake Michigan.



CHARLES FONAAS

CHARLES FONAAS

Anyone who has found a miniature coin-like fossil has found part of a crinoid. The crinoids, or sea lilies are stalked, anchored relatives of starfish. The coin-like discs we find as fossils are actually stalk segments.

We find coral remains here too. Remember, icy Wisconsin was once an equatorial sea. Rugose, or horn corals, look like small cones or horns of plenty. The tabulate coral, favosite, lived in colonies and their fossils resemble honeycomb. Another fossilized tabulate coral, halysites, looks like links in a chain when viewed from above.

Trilobites are ancient arthropods whose fossils look a bit like horseshoe crabs. Often, you'll find just a head, tail or body segment in a trilobite fossil.

Ammonites were squid-like creatures with straight or coiled shells.

All of these interesting and beautiful fossils can be found by the sharp-eyed traveler on a stroll along the Lake Michigan shore, in the city, country or in the many shoreline parks.

— *Charles Fonaas, Milwaukee*

EarthNotes

REFLECTIONS AND SPECULATIONS ON ENVIRONMENTALISM FOR THE 1990s

ROBERT QUEEN

"They're makin' people every day, but they ain't makin' any more dirt."

— Will Rogers

World War II was over. With a deep sigh of relief, America's 40 million "victory gardeners" stopped growing vegetables, turned their plots to flowers, and handed the problem of producing three squares a day back to farmers.

The task was greater than merely satisfying the cravings of one ration-weary nation. Agriculture around the world had been devastated by war. Countries turned to the U.S. in dire need of food, and American farmers responded with zeal. With bigger, more powerful machinery, they brought more land into cultivation. With irrigation, commercial fertilizers, pesticides, and improved seed and livestock, each acre yielded more corn, more wheat, more meat than anyone thought possible.

By 1970, U.S. crop production per acre was 48 percent higher than it had been in 1950. Surpluses glutted the grain elevators; the United States Department of Agriculture's (USDA's) major task was to find ways to keep food production down in order to keep farm prices up.

Nobody seemed to notice that soil, the very foundation of nature, was eroding at ever-increasing rates. In the rush to produce, the scourge of an earlier decade had slipped from memory.

"This particular dust storm [May 12, 1934] blotted out the sun over the nation's Capitol, drove grit between the teeth of New Yorkers, and scattered dust on the decks of ships 200 miles out to sea. I suspect that when people along the seaboard of the eastern United States began to taste fresh soil from the plains 2,000 miles away, many of them realized for the first time that something somewhere had gone wrong with the land."

— Hugh Hammond Bennett,
first chief of the U.S. Soil Conservation Service

DEAN TVEDT

Enchanted Valley near Cross Plains, May, 1951. Kids from rural schools learn to plant pines the state provided for wildlife cover, windbreaks and shelterbelts. Hundreds of thousands of evergreens were planted to cut erosive winds, reduce runoff and restore eroded slopes.

(*above right*) SCS Chief Hugh Hammond Bennett (left) and local conservators inspect Manske Ridge in Vernon County, October 25, 1946. Our nation's first techniques to slow erosion and soil loss were tested on farms in steeply-sloped Coon Valley.

M.F. SCHWEERS
Courtesy of Soil Conservation Service

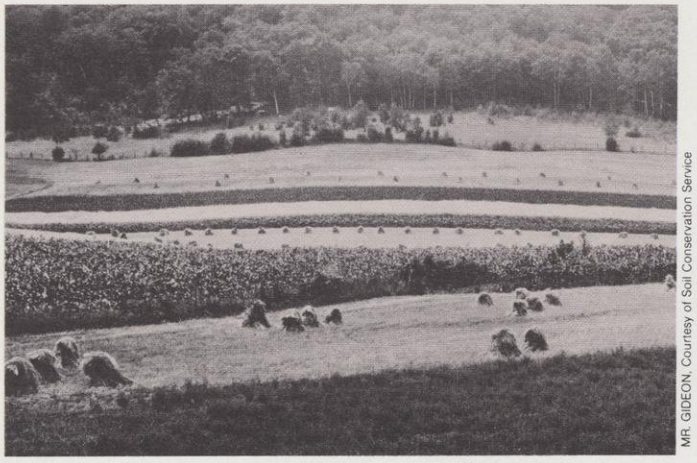
The horrors of the Dust Bowl spawned a number of voluntary state and federal programs dedicated to preserving the land.

In 1935, President Franklin Delano Roosevelt (himself an owner of a 200-acre farm with spent, barren soil) signed into law the Soil and Water Conservation Act and created the Soil Conservation Service (SCS) "to provide permanently for the control and prevention of soil erosion." To achieve the national goal, soil conservation districts were organized at the local level — a petition signed by 25 residents and a referendum established district boundaries — and run by locally elected leaders. In 1937 the Wisconsin Legislature established the State Soil Conservation Committee and authorized counties to create local soil conservation districts. Local programs succeeded because they shared costs for preventing erosion and funds were available to farmers through a system of local agents. Within a decade, over two-thirds of Wisconsin's 72 counties had conservation districts. Hundreds of thousands of farmers joined the districts and adopted conservation farming practices: terraces, strip-cropping, windbreaks, cover crops, rotations.

The same year the national SCS was formed, the Wisconsin Conservation Department started the Shelterbelt Project, providing free evergreen trees for windbreaks and erosion control. By 1948 the program was so popular the department had to charge the whopping sum of $10 per 1,000 trees and had a tough time keeping up with demand. Today, property owners can still purchase windbreak seedlings and wildlife shrubs from the Department of Natural Resources at reasonable prices.

By the late '40s the SCS program was well-established and soil erosion had slowed appreciably. Conservation tillage — the practice of cultivating the soil as little as possible — and other soil-building techniques

were widely promoted by journalist and farmer Louis Bromfield, author Edward Faulkner and J.I. Rodale, later recognized as the father of the organic movement. Wisconsin could boast of hundreds of miles of shelterbelts bounding sandy fields, the nations's most detailed study of contour strip cropping on a Coon Valley farm, and the start of a state soil inventory. Sportsmen, aware of the role soil conservation played in providing wildlife cover and preventing muddy trout streams, were delighted when Congress passed the Dingell-Johnson Act in 1950. Designed to improve fish habitat nationwide, D-J provided funds for watershed management in Wisconsin.



MR. GIDEON, Courtesy of Soil Conservation Service

Proven soil savers like strip-cropping boosted yields long before chemical fertilizers, pesticides, hybrid cultivars and fencerow-to-fencerow cropping became the rage. This bucolic Coon Valley farm, the Andrew Starck farm, (formerly the Walter Proksch farm), was strip-cropped for 25 years when this photo was taken on July 17, 1937.

"As a people we have decided on soil and water conservation; as individuals we want none of it. Are we going to quit halfway?"

— H. T. J. Cramer, assistant director, Wisconsin Conservation Department, 1948

Erosion, feared in the 1930s, was forgotten during the post-war agricultural expansion of the 1950s and into the 1970s. Why?

The country's focus shifted from rural to urban as the 1950s and '60s witnessed a spurt of growth in cities and suburbs. Housing developments sprang up in farm fields and thousands of miles of new superhighways crisscrossed the land. The impassioned movement to save the soil evaporated; that job, it seemed, had been taken care of nicely by the SCS and other federal and state agencies. Public funding for soil and agricultural research dwindled, since record harvests and burgeoning surpluses were credited to nitrogen fertilizers, 2,4-D, other pesticides and hybrid seed that farmers purchased from the new "agribusiness" corporations.

Attempting to reduce commodity surpluses without putting farmers out of work, President Eisenhower and the USDA created the Soil Bank "set-aside" program in 1956. The idea of the government paying farmers to take land out of production wasn't new — it had been done in the 1930s to stabilize food prices and halt erosion. But the Soil Bank included a provision called the Conservation Reserve, which encouraged farmers to set aside land for wildlife habitat for three, five or 10 years or dig ponds for fish and waterfowl on chronically wet fields. The link between agriculture and the environment had been recognized; only the economy was missing from the equation.

"Americans are people of surplus. We consider it our heritage and our right. We see no limits, recognize no boundaries. Yet in taking bounty for granted in our own lifetime, we may deny our children."

— John R. Block, U.S. Secretary of Agriculture, 1981

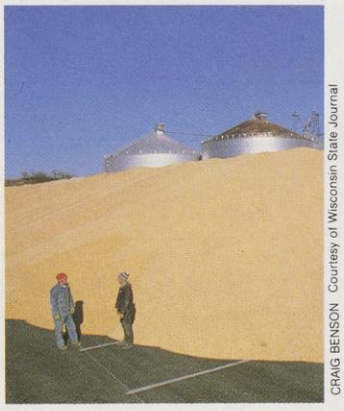
National farm policy traditionally has relied on acreage limits and price supports to control surpluses. Programs like the Soil Bank and the 1965 Food and Agriculture Act inadvertently encouraged higher crop production: Farmers who limited the number of acres they planted received price supports on the crops they grew. They boosted yields on remaining acres by farming more intensively, using more fertilizer, more pesticides, more diesel fuel and gas to run big tractors and combines.

Poor worldwide grain harvests in 1972 and 1974 set food prices on an upward trend. When the Soviet Union purchased 18 million tons of U.S. grain in 1973 — essentially wiping out the American surplus — agricultural lenders and leaders exhorted farmers to "plant fencerow to fencerow" and "get big or get out" to make up for the shortfall.

Farmers went one better: they took down the fences, chopped down the shelterbelts and hedgerows, drained wetlands, forgot about contours, skipped cover-crop rotations, and irrigated and fertilized heavily to bring marginal land into production. Many farmers went deeply into debt, purchasing more land and equipment to produce bumper crops.

The ag boom went bust in the late '70s and early 1980s. High, guaranteed prices and over-optimism in the 1977 Farm Bill resulted in production increases 23 times faster than commercial demand. By 1983, government commodity purchases had increased 882 percent in four years, escalating government costs from $4 billion in 1981 to $26 billion in 1986. Several years of bad weather, a reduction in crop prices, global competition, higher interest rates, and higher equipment and fuel costs trapped overextended farmers.

In 1979, frustrated farmers wheeled tractors across the Mall in Washington D.C., calling attention to their plight, but it was too late. Farm bankruptcies and foreclosures followed. But farmers weren't the only casualties of rapid expansion.



CRAIG BENSON Courtesy of Wisconsin State Journal

Boom went bust. Surplus grain is stored on a parking lot near full grain silos. Overproduction, poor prices and soil erosion collided in 1980.

"What we do to the land, we do to ourselves."

— Wendell Berry, The Unsettling of America: Culture and Agriculture

Having dispensed with soil conservation methods in the name of progress, U.S. agriculture rediscovered an old adversary: Erosion.

Land inventories conducted by the USDA in 1977 and 1982 showed nearly one cropland acre out of every four experienced serious soil erosion. Each year, wind and water cast five billion tons of soil to the bottoms of streams and lakes, rivaling the worst years of the Dust Bowl.

Modern soil erosion carried away more than the earth's natural nutrients. This time, pesticides, fertilizers and some distinctly cosmopolitan pollutants came along for the ride.

Eroded soil laden with agricultural chemicals and animal wastes was the major source of water pollution in many parts of the country. Reports by the U.S. Environmental Protection Agency and the U.S. Fish and

SUSAN BERGQUIST

Wildlife Service in the 1970s identified agricultural runoff as a leading cause of fish kills in U.S. waters. Wind-blown soil carrying attached chemicals often ended up in lakes and rivers, too. Toxaphene, a major cotton insecticide used in the southern U.S., was transported on dust particles or as vapor into the upper atmosphere and deposited into the Great Lakes; in 1981, elevated concentrations of the chemical — a suspected carcinogen — were found in Lake Michigan fish.

Agriculture wasn't the only culprit. Certain forest management practices left large tracts of land open to erosion. And, as stormwater rushed across construction sites, industrial complexes, streets, parking lots and backyards in cities, it picked up soil, road salt, oil, grease, solvents, metals from car emissions and lawn chemicals. Without adequate urban green space and wetlands to absorb the runoff, the water poured into lakes and rivers and the soil and pollutants settled on the bottom. Clogged drainage ditches, silted-in navigation channels, weedy lakes and turbid rivers were the result. The nation was spending over $500 million dollars annually in the 1970s to clear sediment from harbors and waterways, some of it dangerously contaminated.

The realization that pollution didn't always come out of an industrial pipe was a shock for some. Knowing that our everyday lifestyles and one of our most basic of needs — inexpensive food — came with a heavy price prompted the state legislature to address nonpoint problems. The Nonpoint Source Wisconsin Fund, established in 1978, shared costs with landowners and communities to keep soil, fertlizer and street debris from washing into streams and lakes. The 1982 Soil Erosion Control Law required counties to develop erosion control plans.

Construction techniques, urbanization, agricultural practices and aging sewage treatment systems polluted more than surface waters. Nitrates and pesticides leached into groundwater aquifers, the source of drinking water for two-thirds of Wisconsin's population. At first, contamination was attributed to failing septic systems, poor pesticide application and excessive irrigation; later we realized leaching could occur with normal, careful use. Aldicarb, a commonly-used potato pesticide, first turned up in Central Wisconsin farm wells in 1980, followed by the corn herbicide Atrazine, the second most common pesticide detected in state farm wells. Aldicarb has been taken off the market for agricultural use in Wisconsin; restrictions on Atrazine now are under debate. By 1989, about 10 percent of Wisconsin drinking water wells exceeded the state standard for nitrates, the breakdown products from fertilizer, manure, and septic systems. Pesticide monitoring shows greater than eight percent of state wells also exceed standards for lead, ethylene dibromide and copper. The comprehensive Groundwater Standards Law enacted in 1984 authorized a number of state agencies to regulate use and storage of manure, road salt, petroleum, fertilizers and a host of other groundwater pollution sources.

"We shall hardly relinquish the shovel, which after all has many good points, but we are in need of gentler and more objective criteria for its successful use."

— Aldo Leopold

Our chances of curbing erosion, ensuring a healthy environment and stabilizing the agricultural economy got a boost with the 1985 Food Security Act, better known as the Farm Bill. Farm programs had been enacted in the name of resource conservation in the past, but the underlying motivation was usually economic. The 1985 Farm Bill finally made concerns about resources and the environment a cornerstone of U.S. ag policy.

The provisions of the Farm Bill are beginning to pay off. Under the Conservation Reserve Program (CRP), farmers have set aside 34 million acres of highly erodible cropland, planted in grass and trees for at least 10 years. Wisconsin can claim 615,000 of those acres to date; our CRP goal is 800,000 acres. Two-thirds of Wisconsin's farmers support the CRP and over half that number would like to see it expanded, according to a 1989 survey by the Wisconsin Agricultural Statistics Service.

Besides providing much-needed wildlife habitat, the USDA estimates that the CRP lands will reduce soil erosion by 750 million tons, pesticide use by 60 million tons and surface-water sedimentation by 211 million tons nationwide each year.

The Conservation Compliance Policy requires farmers to prepare soil conservation plans for any highly erodible cropland they farm by January 1990 and implement plans by 1995; failure to comply renders farmers ineligible for all program benefits including crop insurance and loans. Sodbuster prevents farmers from bringing fragile, unplowed lands like prairies and forests into production, while Swampbuster serves the same purpose for the nation's 99 million acres of wetlands.

The Farm Bill scaled down government price supports, allowing farmers to be more sensitive to market demands rather than federal commodity programs. A market-oriented ag economy can help the environment: There's incentive to take marginal lands out of production, since the smaller crops they yield would no longer "pay" in terms of commodity price supports.

2F MONEY Wisconsin State Journal, Sunday, November 20, 1988

Farm program aims to guard environment

Back to the Future: A Movement to Farm Using Few or No Chemicals Is Making Surprising Gains

'Good Farmers' Understand Aiming for Higher Yields Not Always Best Choice

Grow more, but do it safely

Farm 'without degrading environment,' USDA deputy says

Ag Chemical Firms Told to Get With It

Protecting soil and the rural character of farmlands are increasingly important.

While the 1985 Farm Bill pointed us in the right direction for the '90s, a groundswell of new attitudes about the way we grow our food insists that it did not go far enough.

Consumers, questioning the effects of pesticides on human health and the environment, have been demanding more and more "organically-grown" (meaning chemical-free) meat, vegetables, milk and grain. Environmental groups want federal farm assistance programs to be tied to a farmer's limited, judicious use of pesticides as well as to soil conservation. Consumer and environmental coalitions are working hard to see that the 1990 Farm Bill reflects their concerns.

The practice of "sustainable agriculture" — a way of farming that ensures profitability, environmental quality, food quality and the vitality of rural communities — gained ground in the United States in the 1980s. Like everyone else, farmers want to drink clean water and eat uncontaminated food. Ninety-one percent of farmers nationwide favor federal research on sustainable farming.

To acquaint farmers with some general sustainable techniques, the Wisconsin Departments of Agriculture, Trade and Consumer Protection

(DATCP) initiated the Sustainable Agriculture Project in 1988. DATCP, the Department of Natural Resources, and UW-Extension later published a 174-page technical bulletin on best farming management practices, including integrated pest management, conservation tillage, crop rotation, soil testing and careful, precise use of manure, fertilizer and pesticides. Farmers practicing sustainable agriculture cultivate land in the truest sense of the word; they nurture the soil and in turn, enrich us all.

The University of Wisconsin-Madison established the Center for Integrated Agricultural Systems in 1989 to research and promote sustainable farming techniques. The center examines how farming is related to human and natural resources, government policies, international trade and local markets.

A federal ag program shares costs with farmers who want to demonstrate they can maintain farm income while reducing fertilizer and pesticide use. This year up to 100 farms will participate in the Agricultural Stabilization and Conservation Service program.

ROBERT QUEEN

Erosion isn't the only way soil is lost. More than five million acres of Wisconsin farm lands have disappeared since 1942, when the state was at an all-time high of 24 million farm acres.

Farmland doesn't just disappear, of course. It's put to other uses: shopping malls and suburban housing developments, new roads and highways. When urban development encroaches on a rural area, the environment suffers. Some farmers, assuming they'll eventually end up selling the land for development, may not maintain conservation practices. Home and subdivision construction scrapes off plant cover leaving raw soil exposed to rain and erosive winds for months at a time. Fencerow, woodlot and wetland wildlife habitat are removed and slowly replaced by ranch houses, clipped lawns, sidewalks and streets as relocated urban residents demand the amenities of city life in the country. Grassed runways and retaining basins to channel and retard runoff take time to establish.

Wisconsin has taken steps to protect its remaining 19 million acres of farmland. The Farmland Preservation Program, instituted in 1977 by DATCP, encourages rural zoning to safeguard farmland from urban sprawl and other non-agricultural uses. To date, seven million acres are covered under the program.

The need for wildlife habitat is critical. Provisions of the Stewardship Fund, a 10-year, $250 million program enacted by the 1989 Wisconsin Legislature, will assist farmers and communities interested in enhancing their lands for wildlife.

DEAN TVEDT

Tried-and-true methods can conserve soil and nutrients without cutting into profits. Growing interest in sustainable farming techniques promises even greater soil economy.

(*above*) The Conservation Reserve Program subsidizes farmers who idle erodible lands for 10 years. Here, a wetland will be restored by diverting old drainage tiles back to the surface.

"The products of the land are used by all who eat. It is therefore indisputable logic that the public should bear a part of the investment in protecting the soil resource."

— Charles McLaughlin, farmer,
in testimony before a U.S. Senate Ag Committee meeting in 1980.

Once, half of America's people lived on farms. Today, less than three percent work the land. The impact farmers have on the environment is far greater than their numbers imply, yet farmers cannot and should not shoulder the responsibility and the cost of land stewardship alone. The new Farm Stewardship Act of 1990, forged by Wisconsin natural resources and agricultural interests would share costs among the general public.

The past four decades have shown that there are indeed limits to the land. Our challenge is to respect those limits in the shadow of an ever-expanding world population, and to encourage other countries to do the same. We know what unchecked development and a short-sighted agricultural practices can do to the land; we also know how to combat those problems. The choice is ours.

While zoning, agricultural technology, controlled population growth, and a more humane, less wasteful global food distribution system will help, the attitude that the land is not ours to deplete will ultimately be the most beneficial to soil conservation and wise land use. Only when we see our role as caretakers will conservation truly come to fruition.

Earth Notes is produced by the Division for Environmental Quality, Wisconsin Department of Natural Resources, P.O. Box 7921, Madison, WI 53707.

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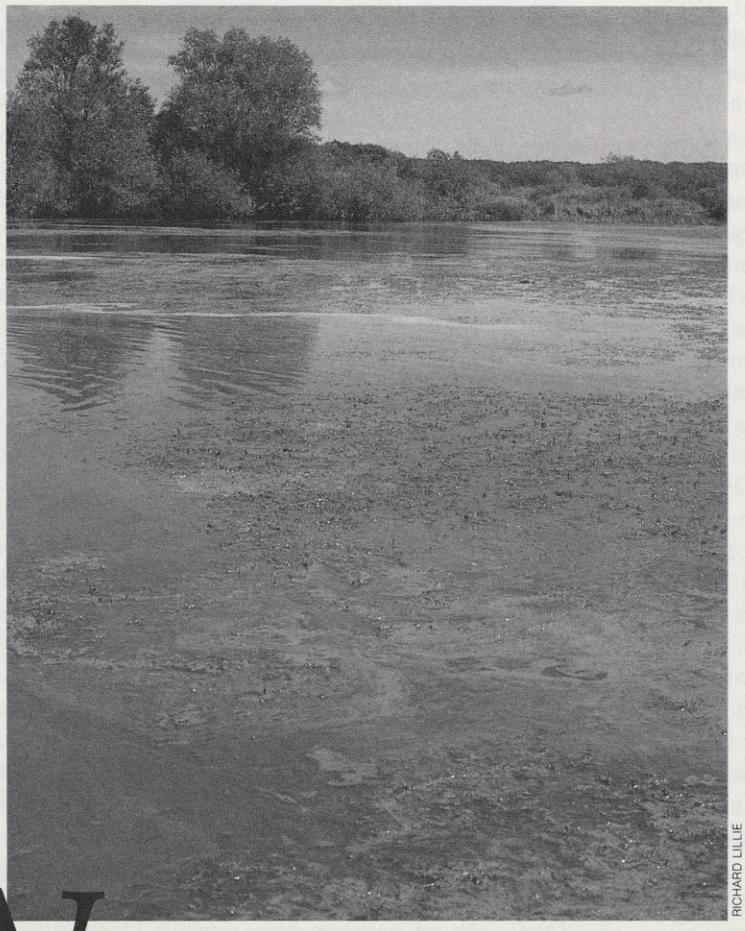


RICHARD LILLIE

WHY LAKES ARE NATURALLY DIFFERENT

All lakes are not created equal. Research shows that lakes in some regions of Wisconsin have naturally poor water quality, and people are not necessarily to blame!

Richard Lillie

We each have a different concept of what's clean. Even "clean" lake water means different things to different people. Suburban people may think of a clean lake as one with clear water, little algae and few weeds. Those used to seeing small ponds in city parks might think any lake that smells o.k. and isn't choked with weeds is just fine. People raised on the shores of a crystal-clear lake in the Northwoods might look down their noses at all lakes in southern Wisconsin.

How water is used affects our perceptions about it, too. The angler, water-skier, canoer, swimmer and scuba diver all judge water quality from a different viewpoint: What is good to one may be bad to another.

In the search for more objective ways of measuring water quality, researchers are also looking at lake problems from new angles to gain new perspectives. For instance, for more than 20 years we've been convinced that reducing nutrient flow into lakes is the key to improving water quality. Researchers tend to use fancy terms to describe this relationship. We say that lake fertility reflects inputs from the watershed. Simply put, there's a lake at the end of the funnel — lots of nutrients flow into lakes from surrounding farms, urban lawns and new construction, and the

lakes get weedy or turbid. We've made great strides in reducing nutrients from wastewater effluent, and we're beginning to make headway in reducing runoff from urban and agricultural lands. Yet, we haven't really faced up to the fact that some natural factors degrade water quality as well.

Soils contain differing amounts of nutrients and the soil's texture and porosity partly determine which nutrients will wash away when it rains. Natural land cover or vegetation also influences the quantity and quality of runoff. Minor differences in climate between regions can affect lake water quality. We also know that water quality differs by daily, seasonal and annual patterns.

The shape, depth, volume, and size of a lake also influences what happens to nutrients that enter the water. Generally, water quality of big, deep lakes is better than small, shallow lakes because the nutrients are diluted in the larger lakes. Smash a pea in a bathtub full of water, and you'll hardly notice the effect. Smash the same pea in a thimble-full of water and you have pea soup!

A lake's biological community also can alter water quality. Fish, weeds, and microscopic plants and animals channel nutrients through the food chain. To test this idea, the University of Wisconsin-Madison and the Department of Natural Resources are conducting a bold, cooperative experiment in Dane County's Lake Mendota. DNR fisheries managers are stocking large numbers of walleye with the expectation that these predatory fish will eat lots of little panfish. The panfish, in turn, eat microscopic animals that eat algae. If there are fewer little fish, there will be more microscopic animals to eat more algae. If the theory works, both fishing and water quality will improve.

Natural differences in waters may explain why some lakes have better water quality than others and why some lakes don't fit the mold. We know of several lakes that by all rights should have good quality water but, in fact, have really poor quality water. One area of Polk, St. Croix, and Barron counties has many lakes with poorer water quality than expected. Moreover, many of these poor quality lakes are located next to lakes with very good water quality. Good and poor quality lakes are surrounded by similar watersheds with similar land use and similar physical features, yet they have dramatically different water quality.

We now believe that a complicated interaction among the natural vegetation, land use, soils, geology, and climate may explain some of these differences.

Water resource experts have had intuitions about such regions, just as good farmers have hunches of where to plant their crops and where to leave ground in pasture. Until now, researchers hadn't taken on the task of defining and mapping these regions. Scientists with the Environmental Protection Agency's Environmental Research Laboratory in Corvallis, Ore. prepared maps of the whole nation delineating such "ecoregions," where organisms and their environment show similar patterns. These natural patterns help explain why natural resources like lakes, streams and wetlands are of varying quality in different parts of the country.

While the ecoregion concept helps explain lake water differences among regions, it doesn't explain the considerable variability we've noted *within* selected ecoregions.

To make the ecoregion maps more useful, the EPA team mapped the concentrations of phosphorus in Midwestern lakes. These maps generally explained the pattern of "good" and "poor" quality lake water noted by researchers. Subsequent studies by the Wisconsin Geological and Natural History Survey suggest that rock deposits laid down by glaciers before the region built up soil cover are one cause of the poor water quality in some regional lakes. Groundwater moving through these rock layers may dissolve phosphorus and carry it to lakes. This naturally-found nutrient stimulates algal blooms.

These findings have significance for lake managers, planners and the public. First, the ecoregion concept helps explain where lakes will vary due to natural causes. Second, everyone should recognize that some lakes are naturally fertile — lakes do not receive the same loads of natural nutrient. Furthermore, human activities do not cause all our water quality problems. Third, lakes in such regions are likely to continue to have water quality problems despite efforts to restore lakes and implement best watershed management programs. Water quality in such areas may not perceptively improve. Finally, water resource managers should consider these natural factors and incorporate them when developing lake management plans and setting lake standards. Lake plans should be based on regional water quality patterns rather than set by political boundaries, such as city limits and county borders.

We should continue curbing the flow of nutrients that we can control, yet recognize that efforts to limit nutrient runoff will not be equally effective in every watershed or region. We need realistic expectations in the lake improvements we plan and the community support we foster. Naturally-fertile lakes should not be forgotten or ignored, but we should simply recognize that these lakes will never be crystal-clear, weed-free or algae-free. ■

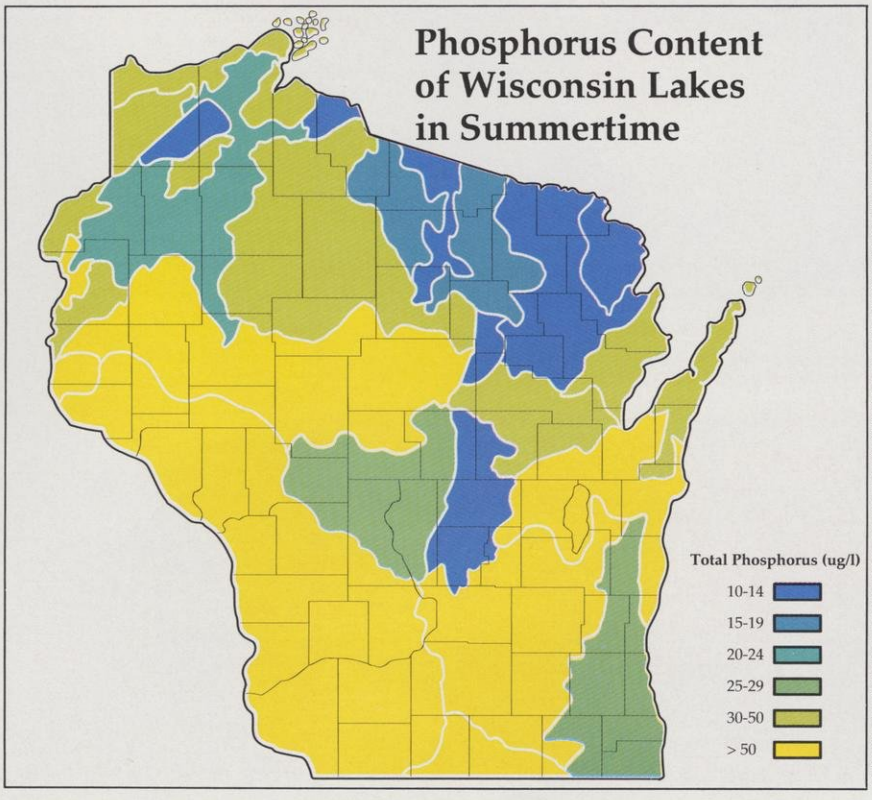
Richard Lillie is a DNR research limnologist stationed in Fitchburg. James Omernik, geographer with the Environmental Protection Agency's Environmental Research Laboratory in Corvallis, Ore., also contributed information for this story.

(opposite top) "Ecoregions" and naturally-varying phosphorus levels help explain differing water quality in lakes surrounded by similar land uses like these Burnett County lakes — Nicaboyne, Lily, Fish and Birch Island.

(opposite bottom left) Phosphorus concentrations of Wisconsin lakes. Regional lakes shown in blue contain less phosphorus, yellow regions contain relatively higher amounts of this plant nutrient.

(opposite bottom right) A Wisconsin Geological and Natural Survey team drills soil cores and tests groundwater to document natural conditions under the top soil that can alter water quality.

RICHARD LILLIE



MAP BY JEANNE GOMOLL ADAPTED FROM 1989 USEPA ENVIRONMENTAL RESEARCH LABORATORY STUDIES

KEN BRADBURY

The diminutive grass-pink *(Calopogon tuberosa)* keeps company with the dragon's mouth orchid.

Wetland royalty: the showy lady's-slipper *(Cypripedium reginae).*

Wild Beauties

Our woods, wetlands and prairies harbor more than 40 types of delicate orchids.

Text and photos by Thomas A. Meyer

They're endowed with exotic names like calypso, dragon's mouth, rose pogonia, and ram's-head lady's-slipper. They're unrivaled in their variety of curious shapes, alluring fragrances, and tropical hues of bright yellow, magenta, deep crimson, and purple. They're orchids, but you needn't venture into the steamy rain forests of Amazonia to find these fascinating and beautiful plants; they're right here in Wisconsin's forests, wetlands, and prairies.

Enter the dragon: dragon's mouth orchid *(Arethusa bulbosa).*

A late bloomer: nodding ladies-tresses *(Spiranthes cernua).*

Small round-leaved orchis *(Orchis rotundifolia).*

Lock horns with a ram's-head lady's-slipper *(Cypripedium arietinum).*

In fact, Wisconsin is home to more than 40 species of native orchids, members of the Orchidaceae, the most highly evolved family of monocotyledons. If you recall your high school biology lessons, the monocots are flowering plants that have linear-veined leaves and floral parts that grow in multiples of three. The orchids are close relatives to lilies and irises.

Even armchair botanists can identify the outstanding feature that sets the orchids apart — a flower petal that is modified into a lip, or labellum. This lip is often the most distinctive and colorful part of the flower, sometimes having a pouch-like shape, as in the lady's-slippers, or a fringed "landing pad" for pollinating insects, as in some of the rein orchids.

Pollination is often an elaborate affair in the orchid family, especially among the tropical species. Although some orchids appear to be self-fertilizing, others evolved in parallel with the insects that pollinate them. To ensure cross-pollination, the orchids developed mechanisms that appeal to the senses. For example, the familiar large yellow lady's-slipper *(Cypripedium calceolus var pubescens)* emits a faint, though wonderfully sweet, fragrance designed to attract pollinators. Although lured by the promise of nectar, many day-flying insects are reluctant to enter dark places. This lady's-slipper uses a bit of trickery to entice the hesitant insect into its pouch. Small, translucent patches adorn the walls of the slipper. These "windows" allow more light into the pouch and guide the pollen-carrying insect into the correct position for pollination. Unfortunately for the insect, there is no nectar to be had. The flower gets pollinated and the insect flies to the next blossom only to be fooled again.

Pollination is only the first step in an orchid's complicated effort to reproduce. Many orchid species are adapted to growing under very narrow ranges of environmental conditions. They produce many dust-like seeds that are dispersed widely by wind and water. This increases the chances that seeds will alight in soil having just the right combination of moisture, texture, temperature, and acidity for germination and growth.

Several species need to come into contact with specific fungi in the soil to germinate. This fungus-orchid root partnership is maintained throughout the life of the orchid, and the combined structure (called a *mycorrhiza*) aids plant nutrition. Even if all conditions are favorable and the orchid seed germinates and grows, it may take more than a dozen years to flower and produce offspring of its own.

These demanding growth requirements make most of our native orchid species notoriously difficult to transplant or artificially propagate. Gardeners who buy orchids, trilliums and other native species should know the plants' origin. Despite intensive efforts on the part of commercial horticulturists and others, orchids have not been grown in large numbers to flowering size. Be wary of nurseries selling native orchids as "nursery grown" — they may very well have been dug from the wild and then held in the nursery for a short time. Even when orchids are transplanted from the wild with a large clump of soil intact, they typically grow for only a few years, then weaken and die. Please, spare the shovel and enjoy wild orchids in their natural surroundings.

Finding prairie orchids

A few orchids aren't too discriminating about where they grow, but most species are restricted to a specific habitat type or two. Exploring these places at the right time of year with a good field guide in hand will almost assure you a glimpse of these elusive plants.

One such habitat, the moist prairie, once covered millions of acres of southern Wisconsin and was home to a host of sun-loving orchids that bloomed from spring to fall. Only a fraction of these original grasslands escaped paving or plowing. The remnants are mainly found along railroad rights-of-way and in the corners of a few "back forties." Such are the places to find two of our most handsome orchids — the white lady's-slipper *(Cypripedium candidum)* and prairie white-fringed orchid *(Platanthera leucophaea)*.

Around the turn of the century, thousands of white lady's-slippers were hauled by wagon from Wisconsin's prairies to markets in Milwaukee and Chicago where they were sold in bouquets for pennies. Now listed as a threatened species, more than 30 populations still survive in the prairies and fens in the southeastern quarter of the state. Start looking for the waxy, white, robin-egg-sized pouch in mid-May, before the surrounding grasses and sedges grow too tall and hide them.

Chiwaukee Prairie, a nature preserve in southeastern Kenosha County, is the place to look for the rare prairie white-fringed orchid, which gets its name from the fringed lower lip of its cream-colored flowers. Chiwaukee is refuge to one of the largest populations of this species in the world. Should you be lucky enough to encounter this stately plant, stretch your visit until the sun sets — it exudes a delightful fragrance in the evening to attract night-flying hawkmoths.

Should you venture back to the prairies in the fall you might discover one of our latest blooming orchids, nodding ladies'-tresses *(Spiranthes cernua)*. One of six ladies'-tresses orchids in Wisconsin, this slender, diminutive species features several small white flowers arranged in a spiral on the stem. It blooms as late as October.

Searching for woodland orchids

Despite the disturbance wrought by decades of timber harvest and cattle grazing, Wisconsin's woodlands remain a good place to hunt for orchids. Among the most dazzling woodland species is the purple-fringed orchid *(Platanthera psychodes)* with its showy spike of

dark lavender flowers. Though found in a variety of wooded and open habitats, search for it near wet depressions in rich deciduous woods during June and July. These same rich woods may also harbor the large yellow lady's-slipper, one of our most common, widespread and easily recognized orchids. The distinctive yellow-pouched flowers are abundant in some woods, growing in large multi-flowered clumps; at other sites, they grow singly.

The sandy pine woods in central and northern counties are home to another common *Cypripedium,* the moccasin flower or pink lady's-slipper *(Cypripedium acaule).* This spring bloomer differs from our other lady's-slippers by having an elongated, dark pink pouch with a cleft down the middle. Moccasin flowers are also found in wet areas, especially on mossy hummocks in tamarack bogs.

Other woodland orchids you may encounter include the showy orchis *(Orchis spectabilis),* a short, six-inch plant with wide basal leaves and two-toned white and magenta flowers, and downy rattlesnake plantain *(Goodyera pubescens)* which sends up a slender spike of white flowers from a rosette of variegated basal leaves.

Romp in the swamp for orchids

If wet feet and hordes of mosquitoes don't scare you off, the tamarack bogs and white cedar swamps of northern and eastern Wisconsin are an orchid hunter's eden. These cool, forested wetlands harbor many of our rarest and most beautiful species.

Two of the rarest, ram's-head lady's-slipper *(Cypripedium arietinum)* and small round-leaved orchis *(Orchis rotundifolia),* share the same habitat and early June blooming time. Both grow in cold organic soil in the darkest, most inaccessible parts of the swamp. The unmistakable ram's-head gets its name from the unique shape of its bearded, crimson-streaked pouch. The smallest of our lady's-slippers, it is also among our most endangered, currently known in only about six sites in the state. Equally uncommon is the small round-leaved orchis with its solitary stem leaf and white flower lip blotched with deep magenta. It avoids competition with other plants, often leading a solitary existence in beds of cedar needles and mosses.

Only those orchid stalkers dauntless enough to venture out onto the quaking mat of the tamarack bog will be rewarded with sight of one of our most striking orchids. There, nestled deep in the sphagnum moss, grows the dragon's mouth orchid *(Arethusa bulbosa).* This magenta-flowered species prefers open sun and often grows alongside the grass-pink *(Calopogon tuberosus)* and rose pogonia *(Pogonia ophioglossoides)* orchids. Look for this trio in June.

June is also the month to search for Wisconsin's largest and perhaps most popular orchid, the showy lady's-slipper *(Cypripedium reginae).* Its species name *reginae* means "queenly" in Latin — a fitting name for this regal orchid. Standing nearly three feet high and often forming large, multi-stemmed clumps, its flower features a large slipper-shaped lip of white flushed with rose-purple. The wide leaves and stem are adorned with short, poisonous hairs which can cause dermatitis, similar to poison ivy rash, in some people. This beauty is a sun-lover, so search for it in the more open areas of the bog.

Other orchids to keep an eye out for while tromping through the bogs and swamps include the delicate heart-leaved twayblade *(Listera cordata),* the rare calypso *(Calypso bulbosa),* and several of the rein orchids *(Platanthera species).*

Wherever you are in Wisconsin, you're never far from these unique and enchanting plants. With a little detective work and a bit of luck, you too may lock horns with a ram's head or look down the throat of a dragon.

Thomas A. Meyer, botanist and photographer, is part of a team compiling the Natural Heritage Inventory for DNR's Bureau of Endangered Resources.

Where to find them

Wild orchids can be found in every county in Wisconsin, if you know when, where, and how to search for them. A good wildflower field guide is an invaluable aid to identifying our 40 or so native orchids. Most libraries and good bookstores offer several wildflower books, illustrated with photographs or colored drawings, and technical manuals dedicated to wild plants. Look for those that concentrate on our state or region.

When planning your orchid hunt, remember that the widest variety of species grow in areas that have the greatest diversity of undisturbed habitat types.

The Door Peninsula, especially the Ridges Sanctuary, a privately-owned wildflower preserve along Lake Michigan, is a great place to start your search. Don't skip the state parks and wildlife areas there and elsewhere around the state that often have good populations of orchids.

Hundreds of bogs and cedar swamps dot the Chequamegon and Nicolet national forests in the north. Visit the forest headquarters for maps and tips on the best places to search. Thousands of acres of pristine forests, prairies, wetlands, and the orchids that inhabit them are preserved in the DNR's State Natural Areas system and in preserves owned by The Nature Conservancy.

Should you hunt for orchids on private property, be sure to get permission from the landowner and remember that several of our native orchids are on the endangered species list and are protected by law.

— *T.A.M.*

Musseling in on the Great Lakes

Infestations of zebra mussels underscore the need to control exotic aquatics in the Great Lakes.

David L. Sperling

Invaders! Aliens! We scan the heavens, the tabloids and the late-night cable movies for signs of little green guys in zippy saucers. In fact, the real-life invaders on Earth are planetary, not interplanetary. And they travel at something less than warp speed.

Nature's invaders take their time getting around. The most recent one took the slow boat from Istanbul. The European zebra mussel *(Dreissena polymorpha)* is native to the Caspian, Black and Azov seas of Eastern Europe. Researchers believe the mussel was first carried into the Great Lakes in the summer of 1986 in the ballasts of ocean-going barges and tankers.

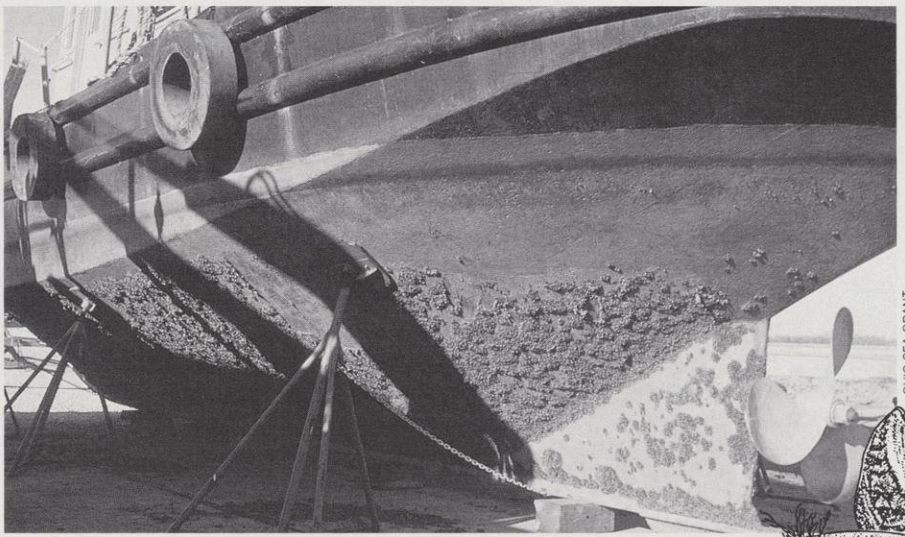
As ships load cargo overseas, they draw in ballast water to balance the load. Fish, mollusks and other aquatic organisms are drawn in at foreign harbors and are discharged at the ports of call in the Great Lakes. Similarly, organisms from the Great Lakes are carried thousands of miles to distant seas.

Many new plant and animal species are introduced to harbors, presumably via ballast water. "For the most part, these organisms are innocuous," noted Marg Dochoda of the Great Lakes Fishery Commission in a September, 1989 symposium on Great Lakes ports. However, three recent European arrivals — the ruffe (a perch-like fish, *see WNR Sept./Oct. 1988),* the European spiny water flea and the zebra mussel — are potentially very damaging to the Great Lakes ecosystem. The ruffe has little human food value, competes with native perch and eats fish eggs, especially relishing whitefish eggs. The spiny water flea preys on zooplankton like daphnia, a very important food source for larval fish. The zebra mussel grows rapidly, reproduces quickly, forms dense, barnacle-like colonies and also preys on zooplankton.

The zebra mussel takes its name from the wavy bands of brown and yellow that adorn cream- to brown-colored shells. The inch to inch-and-a-half mussel lives three to five years. Once fresh water warms to 57°F, the mussels breed and free-floating larvae are dispersed by currents, boats and waterfowl.

The mussel infestation in the Great Lakes was first detected in June 1986 at Lake St. Clair. Mussel colonies rapidly spread south from this link between lakes Huron and Erie to the Detroit River and the western end of Lake Erie. Clustered mussels were found clinging to buoys in Green Bay last summer and were found this spring in the Duluth-Superior harbor.

Larval mussels attach firmly to any



OHIO SEA GRANT

In ballast water or on the hull, zebra mussels are great hitchhikers. Commercial ships and pleasure craft can spread the mussel quickly from port to port.

solid surface and form a spawning bed. As many as 1,900 mussels per square foot will tenaciously cling to pipelines, buoys, boat hulls, rocks, fish nets, piers, pilings and water intakes.

Intake pipes for drinking water, cooling water and power plants are a favorite target for zebra mussels. The mussels feed by filtering as much as a quart of water a day to glean plankton and other microorganisms. An intake pipe sucking in thousands of gallons of water each day lets huge quantities of nutrients pass through the mussel beds, making feeding easier. Massive quantities of mussels are a spawning ground for parasites and dying mussels putrefy imparting an off odor and taste to water. Moreover, clogged pipes are inefficient pipes, and pumps must work harder and longer to draw water. Zebra mussel infestations nearly shut down the Detroit Edison power plant and the water utility in Monroe, Mich. last year.

"The general feeling is that there is presently no way of stopping their spread to other lakes and streams in North America because the mussels can be transported by currents, boats and other means," according to an Environmental Protection Agency fact sheet.

Wisconsin DNR staff are also concerned that zebra mussels eat foods important to more desirable fish, smother fish spawning beds and foul beaches with putrid odors. A beach littered with sharp shells from dead mussels washed ashore could cut people's feet.

At a zebra mussel symposium in Cleveland last December, researchers hypothesized that the mussel's spread would follow a pattern. Once introduced into a new lake, zebra mussel populations are expected to build rapidly for three to five years, maintain dense populations for another three to five years and then die off by 60 to 90 percent to form a stable population.

"We've seen a lot of exotic invasions in the Great Lakes and some have prompted profound changes in the fishery," said Lee Kernen, chief of DNR's Fisheries Management Section. "We had to alter our fisheries programs to live with the sea lamprey, alewife, Asian clam, river ruffe and the spiny water flea. However, the zebra mussel will affect far more people than the sea lamprey or even the alewife; it will affect far more than just our fisheries. Cities and industries that draw water from Lake Michigan and all boaters who moor their vessels in the Great Lakes will be dealing with this exotic animal."

Reining in the spreading mussels will take a combination of tactics. Some diving ducks, crayfish, freshwater drum, carp, sturgeon, whitefish, yellow perch and white perch will eat small quantities of zebra mussels. Chemical compounds that discourage mollusks, copper products and cyanuric acid could be incorporated in paints and coatings for boats, buoys and piers. Pipelines could be flushed with oxidants like chlorine. Physical measures can blow off or kill zebra mussels. Water intakes could be flushed. A bristle-coated plug can be forced through pipes scraping the inside surface. A mild electric current on the end of pipes may prevent mussel buildup but corrode pipes. Heated water flushed over the mussels for several hours will kill mussels (131° for one hour or 90° for five hours) or divers can physically scrape or blast off the mussels with 80 psi of air. Water and power utilities that draw from lakes and rivers are considering installing several different intakes or burying intakes so service can continue as mussel-clogged pipes are periodically cleaned and maintained.

"These are the current means of countering zebra mussel damage," Kernen continued. "Unfortunately, these controls can cost millions and I suspect we will adopt a similar philosophy we've accepted with the river ruffe — take steps to limit the exotic animal's spread, install the corrective measures we can afford and learn to live with them. I see no way to prevent their spread into many of our inland lakes and streams, and we really don't know how the mussel will affect small, inland lakes."

Exchange ballast water at sea

One important step in curbing the movements of exotic aquatic organisms is controlling where ballast waters are taken on and discharged.

An empty ocean-going ship traveling the Great Lakes can carry as much as 1.25 million gallons of ballast water en route to pick up a shipment like grain, Marg Dochoda explained. We failed to appreciate the role ballast water played in transporting organisms because the ballast water was taken in and discharged below the water line, she noted. Unlike a spill, the casual observer would see nothing as ballast water was exchanged.

In the last decade, an estimated 1,100 vessels entered the Great Lakes annually; as many as 600 ships a year of these ships were "in ballast" carrying ballast water instead of cargo, Dochoda added. We believe this is how zebra mussels entered Lake St. Clair in 1986 and the ruffe entered the Duluth/Superior harbor in 1983.

Several agencies including the Canadian and U.S. coast guards, the St. Lawrence Seaway Authority and international Great Lakes organizations are working with shipping associations on solutions, she explained. Ships are asked to exchange their ballast water for ocean water before they enter the Great Lakes or as they leave the Great Lakes.

The voluntary guidelines for the St. Lawrence Seaway and the Great Lakes state that the best method of protecting Great Lakes waters from organisms collected in ballast water from foreign harbors and nearshore areas, is to exchange ballast water in open ocean water, beyond any continental shelf or fresh water current ef-

fect. Harbor and coastal waters are often rich in living organisms that could unbalance the Great Lakes fisheries systems. Water in the open ocean contains comparatively fewer organisms. Those organisms are adapted to life in salt water and are less likely to survive if accidentally introduced into the Great Lakes freshwater system.

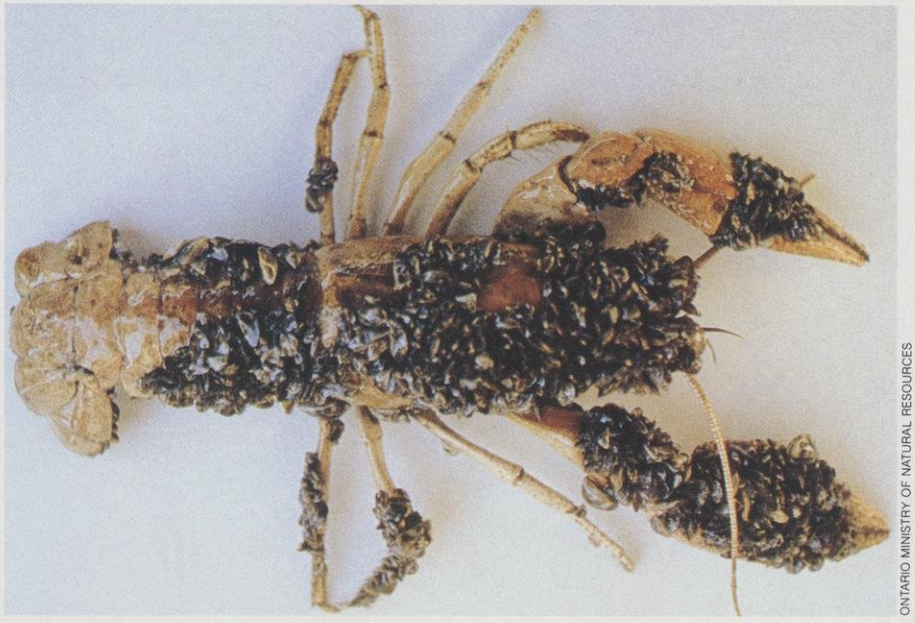
The initial guidelines were voluntary for practical reasons. First, setting standards to regulate ballast exchanges will take years. In the meantime, ships would continue exchanging ballast in the Seaway and nearer Great Lakes ports. Dochoda reports that since the voluntary guidelines were shared with shipping associations early last summer 83 percent of ocean-going vessels on the St. Lawrence Seaway met the guidelines during last year's ice-free shipping season. Second, standards need to designate areas protected from bad weather where ships can exchange ballast water during storms; scientists will want to monitor these areas. Third, vessels carrying containers or top-heavy loads would need to make special arrangements to exchange ballast water safely.

Ultimately, all shipments will have to meet the guidelines since a single ship carrying exotic organisms to port can introduce a new threat. The Non-indigenous Aquatic Nuisance Act of 1990 (Senate Bill 2244 and House of Representatives Bill 4214) currently under debate would require such at-sea ballast exchanges. The bill also sets the stage for cooperative work with Canadian authorities along the Seaway to inspect ships and protect the Great Lakes.

The zebra mussel infestation emphasizes important lessons about our environment. First, human technology often has unforeseen consequences. Who would have predicted that international transportation of grain, iron ore and commodities in ships would provide moving aquaria capable of dumping a million gallons of foreign seas in Great Lakes waters? Second, plant and animal populations are dynamic. They survive by adapting to new situations or by changing their environment. No one should be surprised that an exotic mussel introduced into an ecosystem with few predators will survive, adapt and thrive. Third, as with many other aspects of environmental protection, the costs of preventing pollution are less expensive than cleanup costs and consumers will ultimately pay them. The investments we make to inspect ships and require ballast water changes in the ocean may well prevent the spread of the next exotic alien that could threaten our fragile inland seas.


OHIO SEA GRANT


OHIO SEA GRANT


ONTARIO MINISTRY OF NATURAL RESOURCES

The zebra mussel makes up for its tiny size with prodigious reproduction. As many as 1,900 mussels per square foot can quickly encrust hulls, buoys, water intakes, fish spawning beds and even other aquatic organisms like this crayfish.

David L. Sperling edits Wisconsin Natural Resources magazine.

Formed of dredge spoils and riprapped with protective rock, Cormorant Island will shield the Lake Onalaska backwaters from wind and sediment. Once vegetation overtakes the island it will provide nesting cover and loafing areas for waterfowl. PAM THIEL

Fighting for the banks and backwaters

Battle lines are drawn in an ambitious project to restore the upper Mississippi River.

David Weitz

A quiet battle is being waged along the northern frontier of the Mississippi River. It's a fight to save wildlife and fish habitat. It's a fight against the elements. It's a fight against time. Without help, the river's rich diversity will diminish or largely disappear in the next half-century.

PAM THIEL

UPPER MISSISSIPPI RIVER COORDINATING COMMITTEE

The Wisconsin Department of Natural Resources team leading the charge is the Mississippi River Work Unit headquartered in La Crosse. It's mission: Restore the environmental front along 231 miles of the Mississippi from the St. Croix River to the Illinois border.

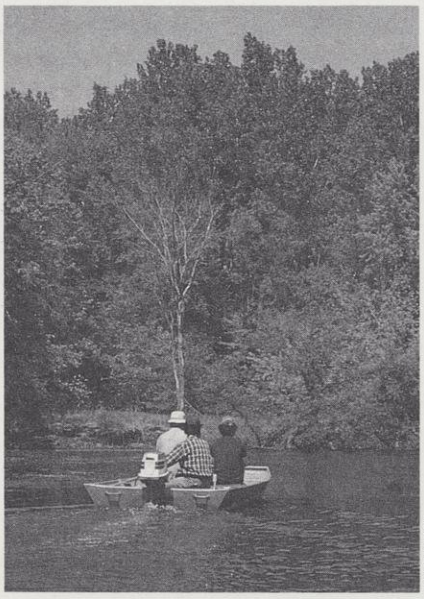
The Upper Mississippi as we know it was largely formed a half-century ago to tame the nation's largest river for navigation. A lock and dam system was designed to enable barge traffic from the Twin Cities to St. Louis. Dam construction in the 1930s created massive lake-like pools where the Mississippi once flowed freely. Pooled river waters flooded bottomlands producing deep sloughs, marshy meadows and shallow backwaters.

Wildlife and fish thrive here. Mallards and wood ducks feed among arrowhead, water lotus and bur reed. Northern pike and walleye spawn in flooded spring marshes. Canvasbacks and egrets course through these meandering waters spring and fall. A lush mixture of islands, wetlands and bays were created in the river's backwaters.

Congress designated more than 230,000 acres as federal fish and wildlife refuges. State wildlife areas, such as the Van Loon Wildlife Area near Trempealeau and the Tiffany Public Hunting Ground near Nelson enhance the Mississippi by protecting tributary backwaters.

Restoring a vast, fragile system

Despite their diversity, the Mississippi backwaters are fragile ecological systems. Studies a decade ago showed game fish on the river were steadily losing habitat. Sediment is filling backwater areas, making marshes of open lakes. Winds and waves are stirring the bottom in areas, muddying the water and blocking sunlight that forges a food chain of aquatic plants, microorganisms and fish.



DAVID WEITZ

Anglers navigate restored channels and wingdams between Wabasha, Minn. and Trempealeau, Wis.

Alarm continues to be sounded by biologists and engineers who formed a Great River Environmental Action Team (GREAT) in the early 1980s and later formed a Comprehensive Master Plan to manage the Upper Mississippi River System. Their conclusion: Backwaters are endangered. "Research during the past decade clearly indicates within the next 50 years, many of the system's ecologically rich backwaters and side channels will be eliminated or severely degraded due to sedimentation."

The 1986 Environmental Management Program for the Upper Mississippi provided new tools and federal dollars to protect the river.

The Program has five elements: habitat rehabilitation and enhancement; long-term resource monitoring; traffic monitoring; a study of economic impacts of recreation; and funding for recreation projects. The first two elements use more than 95 percent of the total funds.

"Habitat rehabilitation" restores degraded areas; "long-term monitoring" inventories environmental conditions, documents changes on the Upper Mississippi, identifies problem areas and proposes future solutions.

"We're here to help the river habitat, not simply document its demise," says Bob Moody, DNR fisheries manager who was part of DNR's Mississippi River Unit. "We're using proven techniques which have helped fish and wildlife elsewhere."

For biologists, the work is a desperate race against time. "A race to save vital areas before they are further degraded," according to Pam Thiel, former habitat coordinator and current Mississippi River fisheries manager for the Wisconsin Department of Natural Resources.

"We're trying to turn back the hands on the clock for the river in specific areas. We don't have enough money to improve all areas, so we have to work at selected sites where we can get the most bang for our buck. We're trying to improve areas that have been degraded or enhance areas that never were top-quality habitat."

Choosing where to work on a 231-mile river stretch is not easy. Sites are cooperatively selected by departments of natural resources from Wisconsin, Minnesota, Iowa, Illinois and Missouri, and the United States Fish & Wildlife Service and United States Corps of Engineers. The Corps holds the purse strings.

Most people haven't realized the enormity of the undertaking yet, Thiel says. "The Environmental Management Program is the biggest river project since the lock and dams were constructed. If we don't select and work on restoration projects, the river will continue to degrade and age. Ecologically, the river is becoming more marsh-like," she says.

"The number one river problem is sedimentation. Areas are filling in, more shallow vegetation is growing, we're losing open water habitat," Thiel adds. "Also, river islands have been eroded and rocky shores have been blanketed with sediment."

Rocks are important areas for fish spawning, providing cover for young fish and acting as food factories pro-

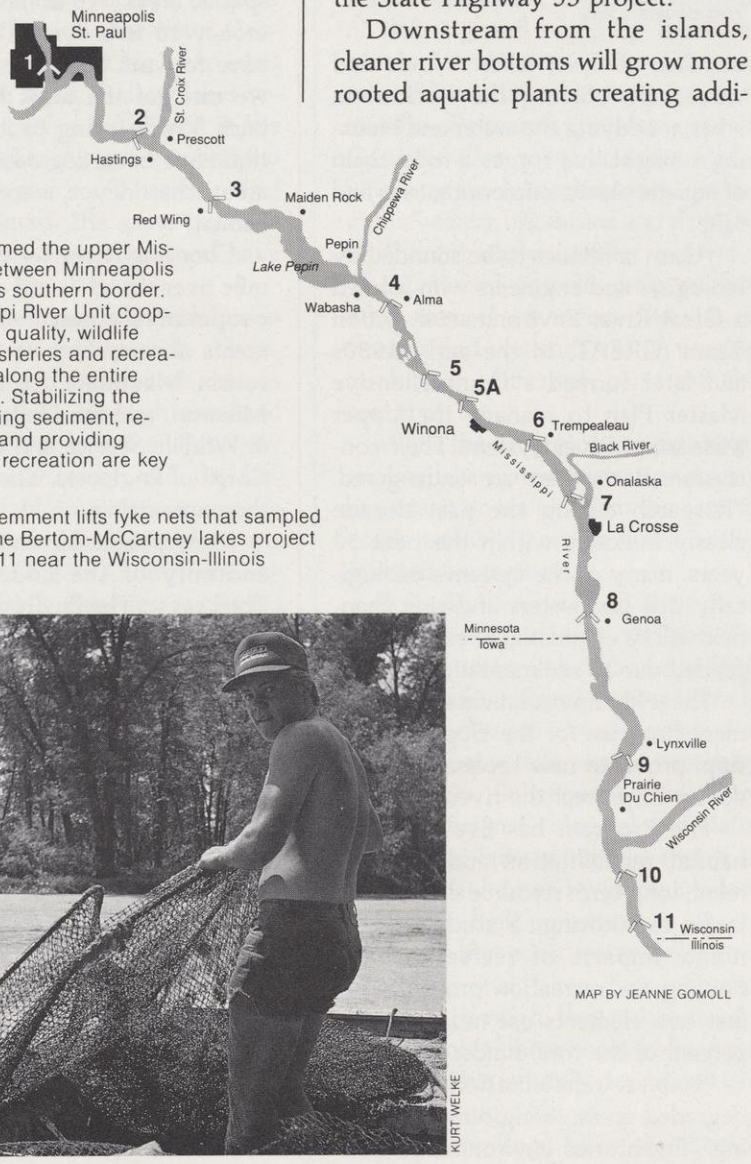
(opposite top) Looking up the lazy river near Onalaska. Note artificial islands at top and clear waters behind the south-moving dredge.

(left) A deep channel is maintained for barge traffic. Commercial traffic and recreational boaters vie for space on the upper Mississippi; both can churn up sediment in the Big Muddy.

ducing the invertebrates fish eat. They protect the shores of soft, muddy islands. The islands provide nesting sites for waterfowl and loafing areas for migrating birds. Moreover, the islands are barriers to waves. That, in turn improves water quality. Reducing pounding waves keeps the soft riverbed in place. Sediment settles instead of muddying the waters and blocking sunlight. The plant beds, in turn, are nursery areas for fish and feeding places for herons, shorebirds and waterfowl.

Early victories

One early success for the river project has been work on Lake Onalaska *(highlighted in our March/April 1988 issue).*



MAP BY JEANNE GOMOLL

Twelve locks tamed the upper Mississippi River between Minneapolis and Wisconsin's southern border. DNR's Mississippi RIver Unit cooperates on water quality, wildlife management, fisheries and recreational projects along the entire 231-mile stretch. Stabilizing the shores, controlling sediment, restoring habitat and providing clean areas for recreation are key goals.

(below) Troy Clemment lifts fyke nets that sampled fishlife before the Bertom-McCartney lakes project started in pool 11 near the Wisconsin-Illinois border.

KURT WELKE

Near Rosebud Island, sediment washing into the lake settled so thick and water became so shallow that ice nearly froze to the bottom in winter; dissolved oxygen dropped too low for fish to survive in summer.

Wind and wave action muddied lake waters and slowed growth of wild celery tubers, the most important food source for nearly three-quarters of the North America's Canvasback ducks that stop at Lake Onalaska to rest and stock up as they migrate from Canada to Chesapeake Bay.

To solve these problems, the sediment-choked channel was dredged, three artificial islands were created and shaped to intercept wind and waves and dredge spoils were used in the State Highway 53 project.

Downstream from the islands, cleaner river bottoms will grow more rooted aquatic plants creating additional nursery areas for fish as well as feed for waterfowl.

Upstream from the artificial islands, additional deep water pools were created and existing islands were riprapped to stabilize the soft muds, create good fish habitat near the deeper water and provide a predator-free nesting and resting area for waterfowl.

Deeper river channels next to Rosebud Island provide deep water and weedy-edged habitat that will hold fish in addition to meeting the main water quality objective — improved fresh water flow. A sediment trap at the mouth of Halfway Creek will keep the channel from filling in as quickly in the future.

The Lake Onalaska project has received a fair amount of publicity, but it's only one of the fine habitat rehabilitation and enhancement projects planned along Wisconsin's western boundary. In cooperation with other river management partners, the Mississippi River Unit is working on the following projects this year:

— At Blackhawk Park, near DeSoto in Vernon County, backwater areas have been cut off from the flowing Mississippi. Dissolved oxygen in the water drops so low that fish die. The team will spend about $200,000 opening blocked channels and installing culverts to restore a flow of oxygen-rich water. Fish are already thriving in the park where the Corps of Engineers has dredged openings.

— Within Pool 8, islands from Stoddard to Genoa have disintegrated due to wind erosion and pounding waves. Rehabilitation will include five phases: protecting 760 acres of deep and shallow backwaters, recreating parts of the islands, protecting soft island shores with rock riprapping, creating new fish habitat and shoring up waterfowl nesting areas. This ambitious project will improve water quality, increase wildlife and fish habitat and prolong the life of the rich backwaters. The project will cost from $5 million to $10 million.

— Bertom and McCartney lakes, south of Cassville, need work to pro-

continued on page 37

WISCONSIN TRAVELER

JUNE 1990

VOLUME 2 NO. 3

INSIDE

SAILING

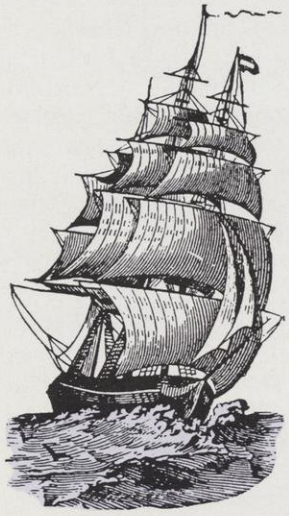
A sailor's dream

"Aye, me buckos, hoist the mainsheet and set course for Wisconsin!"

Yes, you heard the Cap'n right. More and more sailors have found Wisconsin's Great Lakes shoreline the ideal combination of water and land. From Door County's rocky headlands pounded by Lake Michigan to the Lake Superior-washed wilderness shores of the Apostle Islands, the Wisconsin Coast has much to offer salty dogs with a craving for fresh water adventure.

"What's that, matey? No boat, ye say?" Landlubbers needn't fret: Charter sailing thrives on Wisconsin's Great Lakes, and worthy craft are available by the hour, day or week to carry you across the waves.

Permission to come aboard? Granted!



There are two ways to embark on a Wisconsin sailing adventure if you don't have a boat of your own: You can rent a sailboat complete with a captain, or you can sit in the captain's chair yourself on a "bareboat" charter.

A "captained" sail is the way to go for a leisurely tour. With an experienced skipper at the helm, you need only concern yourself with the scenery, your tan and your next meal, which is often included in the price of the trip. A few examples:

On the 38-foot *Northern Swan* chartered by Classic Yacht Charters of Sturgeon Bay, captain and chef Chet Langemak — who holds the only full-service restaurant license for a sailing yacht in Wisconsin — prepares gourmet dinners with one hand while unfurling the spinnaker with the other. The *Northern Swan* is available for half, full-day, evening or extended charters; passengers can set their own itineraries, choosing to explore the rugged Lake Michigan coast or the picturesque towns of Fish Creek, Egg

Continued next page

As seen from the crow's nest: All hands on deck relax as their chartered sailboat cruises Wisconsin's Great Lakes.

Stay tuned!

Crossing the border into Wisconsin soon? If so, look forward to hearing more from your car radio than treacly Top 40 tunes or big-truck-and-broken-heart laments. Tune instead to the **Wisconsin Tourism Network** for information about vacations, nearby attractions and events! Low-power radio transmitters broadcast the travel tips at 1600 on the AM dial near Kenosha and 530 AM near Superior, Hurley, La Crosse, Hudson, Prairie du Chien, Kieler, Marinette, Beloit and Genoa City. You'll hear when the nearest Wisconsin Information Center is open and how the staff there can help you make the most of your trip. Don't touch that dial — until you've heard what Wisconsin has to offer!

Continued from previous page

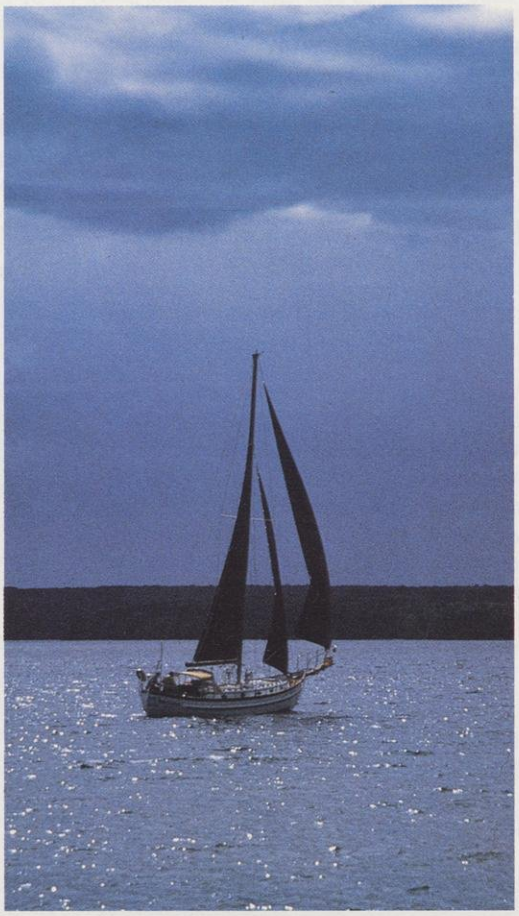
Harbor, Sister Bay and Ephraim on Green Bay.

Further south, *Noah's Ark*, a 34-foot sailboat docked in Racine harbor, can be chartered through Great Lakes Sailing Charters for two hours or up to a full day. Get a lakeside view of Milwaukee's skyline and return to Racine for a special mariner's feast at the Yardarm Grill on the dock.

You can do more on a sailboat than eat, of course. The **Sigurd Olson Institute** at Ashland's Northland College offers sailing tours of the Apostle Islands National Lakeshore led by experienced naturalists. You'll enjoy Lake Superior's diverse natural beauty and delve into the rich history of the islands on the two-day tour (August 11-12) or the three-day tours (August 13-15, 17-19, 27-29).

A captained cruise just won't do if you're the do-it-yourself, hands-on, backseat-driver-if-you're-not-behind-the-wheel type. A bareboat charter is what you'll need to satisfy your nautical aspirations.

You are the skipper on a bareboat sail. With a crew of family and friends, you guide a 25- to 47-foot yacht wherever wind, water and personal whim dictate. Wander the beaches of Lake Michigan's Rock Island, or drop anchor in Moonlight Bay just north of Bailey's Harbor for a late-night astronomy lesson. Make Sheboygan a port of call; tie up to the dock and stroll along the boardwalk, where fishing shanties still in use by commercial fishing companies stand side-by-side with restaurants and shops. Full-service marinas can be found in most coastal towns.



A softly luffing jib punctuates the quiet of a Lake Superior charter sail. Jean B. Meyer

Lake Superior bareboaters find their trips illuminated by the Apostle Islands' historic lighthouses. Miles of wilderness shore await sailors who desire the refreshing solitude the largest of the Great Lakes can offer.

Sailboats, Inc., in Superior, Bayfield, Manitowoc and Sturgeon Bay has over 100 bareboat yachts for charter on lakes Michigan and Superior. Superior Charters at Port Superior offers a diverse fleet of 80 yachts, while Door County Sailing Company has a small but solid fleet of eight vessels ready for the water.

Bareboat skippers must be certified through classes offered by charter companies or the Coast Guard. You can learn sailing skills and get a certificate after eight hours of classroom instruction and two days of on-board instruction. Once you've absorbed the basics of navigation and safety, you'll be ready to set sail!

Classic Yacht Charters, (414) 743-7200; Great Lakes Sailing Charters, (414) 633-0550; Sigurd Olson Institute, (715) 682-1223; Sailboats, Inc. 1-800-472-7133 in Wisconsin, 1-800-826-7010 outside Wisconsin; Superior Charters, (715) 779-5124; Door County Sailing Company, (414) 845-2124; Apostle Islands National Lakeshore, (715) 779-3397; Door County Chamber of Commerce, (414) 743-4456; Manitowoc County Lakeshore Development Bureau, 1-800-COAST-92; Racine County Tourist Information, 1-800-272-2463; Sheboygan Area Convention and Visitors Bureau, (414) 457-9495. For more information on charter sailing, call the Wisconsin Division of Tourism at 1-800-432-TRIP.

Send in the clowns! Cy White/Photo Action U.S.A.

Love a parade?

Then make a point to visit Milwaukee this summer. At 3 p.m. on Saturday, June 23, Beer Town opens up its streets to the **City of Festivals Parade**, the nation's largest summer musical march. Grand marshals Snoopy, Charlie Brown, Mr. McFeely from "Mister Roger's Neighborhood" and John Anderson of the Green Bay Packers will lead 8,000 parade participants — including the Hawaiian Princesses on Horseback, the Lous Pastous stiltwalkers from France, the Swiss Mardi Gras band Rollelibutzen-Verein and a children's band from Trondheim, Norway — through downtown and to the lakefront. (414) 351-8440.

Later in the season on Sunday, July 15, 750 horses, 250 clowns and 75 antique circus wagons restored to their original splendor claim Wisconsin Avenue for the 2-hour, 4½-mile **Great Circus Parade**. Calliopes and marching musicians provide the score for the circus-on-wheels; kids should be on the lookout for dancing poodles and other wild beasts. (414) 273-7877.

Creature crosswalks

Why did the wood duck cross the road?

To get to the other side. (Insert solitary guffaw here.)

Of course, when the road happens to be one of Wisconsin's most scenic highways and when what's on the other side happens to be the Mississippi River, a quacker must waddle quickly to reach its destination.

A few too many ducks, reptiles and small mammals were being thwarted in their travels across the **Great River Road** (State Highway 35) between DeSoto and Ferryville in Crawford County. Why? Concrete barriers installed to keep falling bluff rocks from flattening passing vehicles also prevented critters from reaching the water.

Take wood ducks, for example. When hens nesting in the wooded bluffs attempted to lead their ducklings across the road to the river, the barriers checked their advance. The hens flew over it, leaving the ducklings stranded behind the barrier, where they died or were eaten by predators.

The Wisconsin Department of Transportation came to the rescue by installing 10-inch pipes in the base of the barriers at 250- to 300-foot intervals. Now ducklings, turtles, snakes and squirrels use these "critter passes" to cross the road and get to the other side. They have access to important habitat, and you'll have a better chance of viewing them where they belong, in the backwaters and on the banks of the magnificent Mississippi.

Department of Transportation, (608) 785-9022. For information on the Great River Road, call the Division of Tourism Development, 1-800-432-TRIP.

Thanks to critter crossings, everything's ducky on the Great River Road. Wisconsin Department of Transportation

Make a Date

Wilbur Stites

Just a few of the events Wisconsin has in store for you:

Staber Reese

June 15-17: **Spud City Nationals Rod and Kustom Car Show**, Stevens Point, Portage County. Where pink Cadillacs, '57 Chevys and classic Corvettes rub bumpers with T-Birds and Mustangs. (715) 344-0751.

June 16: **Burnett County Dairy Breakfast on the Farm**, Siren. Wild rice pancakes with cranberry syrup, ham, farm-fresh milk, cheese, eggs and ice cream. Take a tour of the farm if you can walk after eating. (715) 349-2979.

June 29-30: **Wisconsin State Button Society Art Deco Show**, Delavan, Walworth County. Button collectors and the curious welcome; zipper hoarders or snap stashers should have their own shows. (414) 763-6405.

July 4: **Quacker 500 Duck Race,** Omro, Winnebago County. Plastic ducks vie for big prize money on the Fox River. (414) 685-6960.

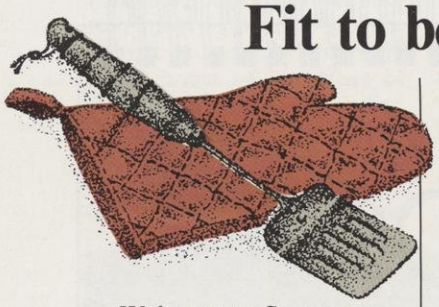
July 6-8: **Catfish Days,** Trempealeau, Trempealeau County. Catfish sandwiches all weekend long on the banks of Ol' Man River. (608) 534-6335.

COME HOME TO WISCONSIN ... where you're among friends! Write for the Calendar of Events, Wisconsin Division of Tourism Development, 123 W. Washington Ave., P.O. Box 7606, Madison WI 53707, or call 1-800-432-TRIP.

Need more information?

Travel questions: 1-800-372-2737
Travel publications: 1-800-432-TRIP
Road conditions: 1-800-ROADWIS
Outdoor recreation: (608) 266-2277
(608) 267-6897 (TDD)
Historical Society sites: (608) 262-9606

Fit to be fried



Welcome to Seymour, population 2,869. A quiet town. A friendly town. A place where citizens greet strangers with a cheerful "Have a nice burger!" and the standard comment on a sweltering summer day is "Hot enough to make your patty melt?"

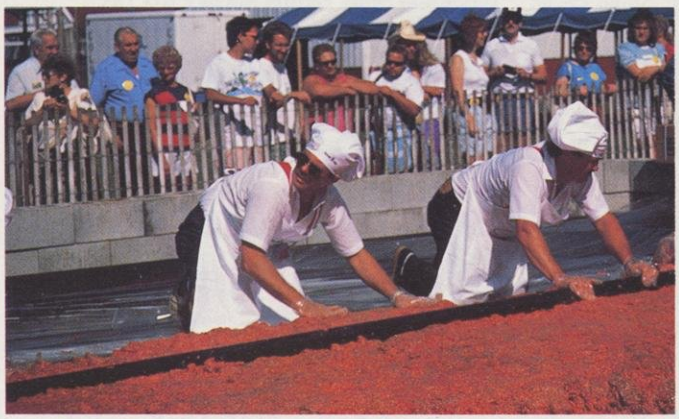
That's Seymour — where the entire populace is afflicted with hamburgers on the brain.

The Outagamie County town's love affair with the sizzling sandwich began in 1885 at the Seymour Fair. Meatball vendor Charlie Nagreen, unable to sell his wares in spherical form, flattened the meatballs between two pieces of bread so fairgoers could walk and eat instead of walk and juggle. The sandwiches, called "hamburgers," were an instant hit. As they say in cliche heaven, the rest is history.

Seymour's fame as **Home of the Hamburger** has grown in recent years. In 1989, the town gained international recognition by frying the world's largest hamburger. The beefy 5,520-pound behemoth ranks first in the *Guinness Book of World Records*.

This year the town will celebrate the birth of the burger on Saturday, August 4 at the Seymour Fairgrounds. Festivities include the Hamburger Olympics, featuring a bun toss and ketchup slide; the world's largest hamburger parade, complete with walking, talking pickles and marching onions; and the SeeMore Bun Run.

Mile O' Burgers promises to be the highlight of the event. Participants line up shoulder-to-shoulder for a mile. (Allowing 18 inches per person, *Traveler* estimates it will take 3,520 people.) Each person is served a burger, and at the signal from the Burgermeister, everybody bites at the same time.



Last year, Seymour flipped at the sight of the World's Largest Burger. Will this year's Mile O' Burgers have the same sizzle?

Home of the Hamburger, Inc.

Seymour needs your support to retain its reputation. "Hamburg, New York claims the title, too," says Tom Duffey, vice-president in charge of burger research and development for Home of the Hamburger, Inc. "And then there's some darn city in Texas — I can't remember the name, they're all so small — that says *it's* the home of the hamburger. Hah! The title is *ours*!"

See for yourself if Seymour can cut the mustard this summer.

Home of the Hamburger, Inc., (414) 833-6800; Outagamie County Chamber of Commerce, (414) 766-1616. For a copy of Wisconsin's Calendar of Events, write the Division of Tourism Development, 123 W. Washington Ave., P.O. Box 7606, Madison, WI 53707, or call 1-800-432-TRIP.

Pledge allegiance

If your patriotism needs a boost, visit historic **Old World Wisconsin** on July 4th for an old-fashioned 19th-century Independence Day celebration. Farmers parade cows, pigs and horses through the crossroads village while orators flex their vocal cords on critical topics of the day. You'll see a greased-flagpole climb, potato-sack races and — slothful drunkards beware — a temperance march by the ladies of Old World, who have every intention of keeping John Barleycorn at bay in the small but thriving community. Old World Wisconsin is located in Eagle on Highway 67 in Waukesha County, just 35 miles southwest of Milwaukee. (414) 594-2116.

Wisconsin Traveler is produced by Wisconsin Natural Resources magazine in cooperation with Wisconsin's Division of Tourism Development, Department of Transportation, and State Historical Society.

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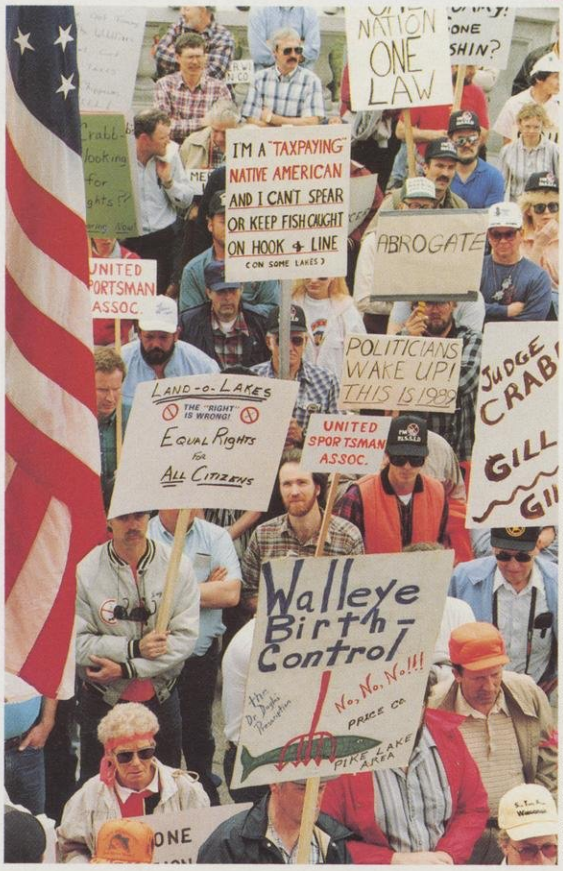
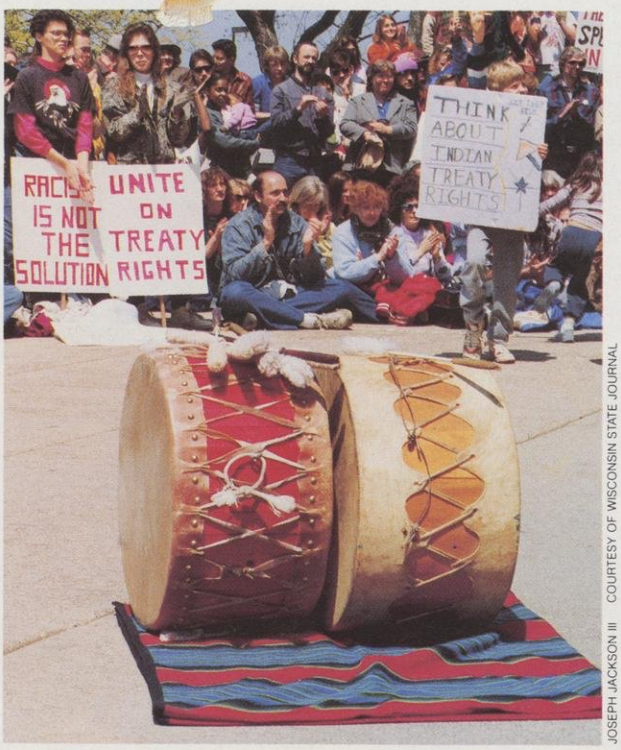
ROBERT QUEEN



JOSEPH JACKSON III COURTESY OF WISCONSIN STATE JOURNAL



JOSEPH JACKSON III COURTESY OF WISCONSIN STATE JOURNAL

ABOUT SPEARFISHING WALLEYES

The Department of Natural Resources receives many questions about Chippewa Indian spearfishing rights and issues. Visitors, vacationers and residents are often unfamiliar with the series of legal decisions that has led to events commonly called the "spearfishing issue." Below are answers to the most commonly-asked questions. This discussion focuses on walleye fishing. Although muskellunge are also taken by spearers, most anglers want to know how spearfishing changes their chances for catching walleyes.

Q. Why does the DNR allow spearfishing?

A. The state has no choice in this matter. Chippewa Indian rights are not decided by the Department of Natural Resources. In fact, most are not even determined by the State of Wisconsin. Rather they have been primarily set by the U.S. Government and reaffirmed in recent federal court decisions that the state is required to obey.

The federal courts determined that Chippewa Indians retained property rights to hunt, fish and gather wild foods and timber when the bands sold lands in northern Wisconsin to the U.S. government. This happened in treaties signed in 1836, 1837, 1842 and 1854. These rights were reaffirmed in federal court cases in 1983, 1987, 1988 and 1989. From 1984 through 1989 the federal court directed the State of Wisconsin to negotiate interim agreements that outline harvest methods, bag limits and season lengths in advance of each hunting, fishing or gathering season.

The federal courts established a system that limits of fish harvesting to ensure that healthy fish populations will be maintained now and in the future.

Q. Why do Chippewa Indians spearfish?

A. Gathering fish by spearing is a Chippewa tradition. The springtime harvest of fish has religious and ceremonial ties for the Chippewas in addition to providing fish for subsistence.

Q. When is spearfishing done?

A. Fish spearing usually takes place during mid-April through early May when walleyes are spawning. Large numbers of walleye naturally congregate in shallow waters at night to spawn. Lights shined into the waters reflect in the eyes of the walleyes. The Chippewas harvest fish with a 10-14 foot spear. A few fish are speared in the fall, but not many since the fish do not naturally congregate in as large numbers as they do in spring.

Q. Is it easier to spear fish than catch them by hook and line?

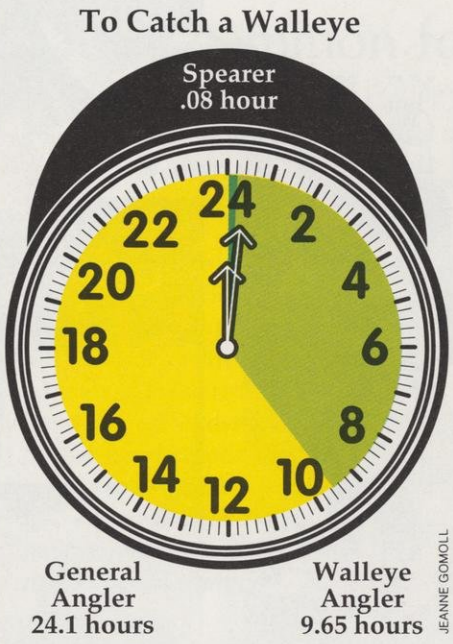
A. Yes, very much so! Tribal spearers take an average of one walleye every five minutes spent spearing, but it takes a hook-and-line walleye angler about 9.65 hours to catch a walleye. Tribal spearfishing is more than 100 times as effective as hook-and-line fishing.

The spearing estimate is based on statistics gathered by Department of Natural Resources and Great Lakes Indian and Wildlife Commission biologists during the 1986-89 seasons. It includes harvest figures for all bands on all lakes where fish were speared and figures from lakes where Chippewas attempted to spear but did not harvest any fish because spawning periods had not started or had already ended.

Q. Are the regulations for Chippewa spearfishing more restrictive than hook-and-line rules for state and tribal anglers?

A. Yes, in many respects regulations have to be more restrictive. Spearing and netting are much more efficient techniques for taking fish than hook-and-line fishing. Spearing regulations are set to protect the long-term health of the fishery.

In other respects, spearfishing is more liberal. Non-Chippewa anglers are prohibited from using spears and nets during the spawning season on most lakes. Anglers also have lower bag limits, lower possession limits and must purchase a fishing license.



Spearers can harvest walleye much more quickly than anglers although there are many more fish are taken by anglers each year. Fishers who don't specifically seek walleye catch one for every 24.1 hours on the water.

Q. Does this mean more walleyes are taken by spearers than by hook-and-line anglers?

A. No. Four hundred twenty-six spearers on 92 lakes took 26,477 walleyes in the ceded territory in 1988. Each year, anglers take about 670,000 walleyes from 861 lakes in the same area. Spearers generally take their fish in a two- to three-week season in spring; anglers take their fish during a 10-month season between May and March.

Q. What percent of the walleye harvest in northern Wisconsin is taken by spearers?

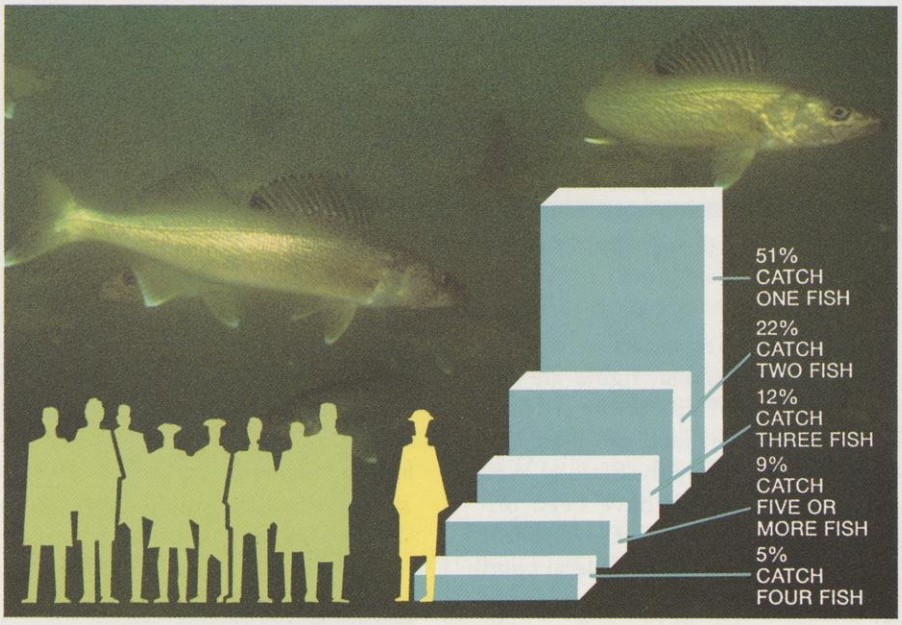
A. Tribal spearfishing accounts for about 15 to 22 percent of all walleyes taken from lakes where spearfishing occurs; spearing harvests represent about four percent of all walleyes taken in the ceded territory of northern Wisconsin.

Q. Do all Wisconsin Indians spear?

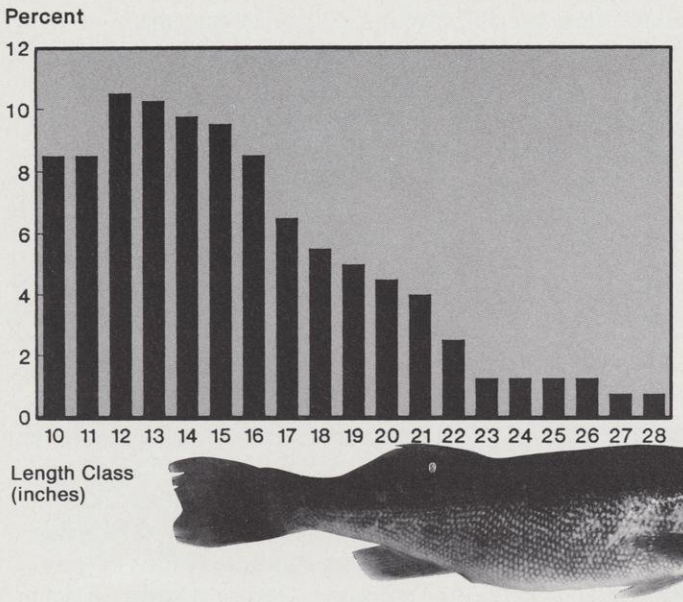
A. No. Since 1986, 200 - 400 people or less than three percent of the estimated 18,100 Chippewas enrolled on tribal registers have spearfished each year. The Menominee, Winnebago, Stockbridge-Munsee, Oneida and Potawatomi tribes do not have tribal rights to spearfish off their reservations. So fewer than one percent of Wisconsin's Indians actually spearfish.

Q. Is it true that spearers mainly take large, spawning female walleyes?

A. No. A five-year summary shows that 84 percent of the speared walleye are males, nine percent are females and the sex of seven percent of speared fish was not determined.



Catching walleye takes skill and time. Only seven percent of anglers catch walleye. Among successful walleye anglers, about half catch one fish and fewer than nine percent catch a limit.



Research shows Indian spearers take larger fish than anglers, but relatively few trophy walleyes are harvested by either group.

BARBARA HEGGEMAN

Spearers are selectively taking larger fish and they are spearing a greater proportion of large male walleye averaging 16 inches long. The spear harvest of fish larger than 20 inches is regulated to limit the number of large fish taken to two per spearer each night.

Q. Why are many more male walleyes speared than females?

A. Walleye populations usually contain far fewer adult females than males, although female walleyes comprise the majority of walleyes longer than 20 inches. Fisheries managers and researchers speculate that spearers take relatively few large females because the males arrive at the spawning grounds before the females, the males congregate in much greater numbers and the females leave the spawning grounds more quickly after they have released their eggs.

Likewise, statistics show that spearers take a similar percentage of large female walleyes during the spring spawning season as hook-and-line anglers take during the open fishing season.

Q. What is the average size and age of adult walleye taken by spear or hook-and-line?

A. The average speared walleye is 16 inches long, the average walleye caught by anglers is 14 inches long. (New 15-inch size minimums will change the angler figure). Male walleyes average 13 to 15 inches in length and are about four years old at maturity; females average 15 to 18 inches in length and are about six years old at maturity. Walleye sizes and ages vary widely from lake to lake depending on habitat, water quality, food abundance and numbers of people spearing or angling for the fish.

Q. How are tribal fishing quotas and hook-and-line angler bag limits set?

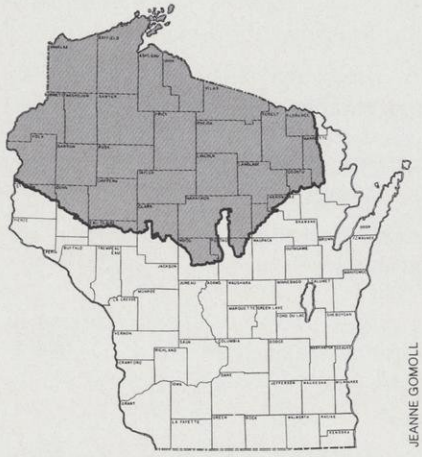
A. The maximum number of fish that can be taken from a lake without decreasing the overall population is called the Total Allowable Catch (TAC). The rule of thumb among biologists is that, at most, 35 percent of the walleyes in a lake can be harvested by spearers and anglers each year.

Since it's difficult to accurately estimate walleye populations in all lakes, fisheries biologists recommend that only a percentage of the TAC should be included in quotas for spearing, netting and other efficient ways of gathering fish. We call the adjusted percentage that can be "safely" taken each year the Safe Harvest Level.

The courts recently ruled that Chippewas are entitled to an equal share of harvestable natural resources. It's unclear how the ruling will be interpreted regarding Safe Harvest Levels for walleye. Once the Chippewas take a part of the Safe Harvest Level, then fisheries managers set bag limits or adjust fishing seasons for other anglers to ensure that the TAC is not exceeded.

Q. Does this mean anglers can only fish for a brief time each day?

A. Not at all. Remember, anglers typically spend more than nine hours fishing for every walleye they catch. Moreover, anglers can continue fishing for other game fish and panfish. Less than two percent of anglers catch more than three walleye of legal size (15 inches) in a day. Most walleye anglers will still enjoy a full day of fishing.



JEANNE GOMOLL

Courts have ruled that Chippewa Indians who sold land to the U.S. Government through treaties maintained fishing, hunting and gathering rights in areas ceded to the United States.

Q. How does DNR estimate how many fish are in a lake before setting a total allowable catch?

A. We use survey methods. We can't drain a lake like an aquarium and count the fish as they come out of the tank. Biologists rely on two methods of surveying fish populations.

In a mark and recapture survey, fish are trapped in nets and a little piece of each fish's fin is clipped off. Clipping doesn't hurt the fish, but it provides a distinctive identification mark. Then the fish are released. At a later date, fish are trapped again. By counting the ratio of fish with clipped to unclipped fins in the second trapping, biologists can estimate the total

fish population in a lake.

The second method relies on a statistical technique which estimates fish populations by comparing the lake to other lakes of similar size and similar conditions where fish populations have been surveyed.

The spearfishing controversy has given DNR managers the opportunity to update surveys of many northern Wisconsin lakes and improve estimates of fish populations in lakes that haven't been surveyed or haven't been examined in several years. Even more information will be needed to make more accurate estimates of fish populations and allowable catches.

Q. What if those methods of estimating fish populations are wrong?

A. Experience tells us these methods are reliable and accurate. Nevertheless, we're conservative in using these numbers. We know the margin of error in these estimates and we add a safety factor to assure fisheries are protected.

Q. Once you've estimated how many fish are in a lake, how do you estimate how many fish are taken by hook-and-line anglers?

A. We used techniques that have proven to accurately estimate how many walleyes are taken. A clerk is assigned to monitor a lake throughout the fishing season. The clerk counts numbers of anglers and interviews anglers to determine their catch and time spent fishing. The information allows biologists to accurately estimate the total fish harvest from that lake. Between 1990-1994, creel survey clerks will monitor fishing at 25 lakes each year where walleyes were speared and 10 lakes where walleyes were not speared in the ceded rights area.

Q. How many walleyes live in lakes in the ceded territory of northern Wisconsin?

A. We estimate the 856 off-reservation lakes with walleye populations in the ceded territory contain about 1.6 million adult walleye and 89,000 adult muskellunge. Far more juvenile fish of each species live in these lakes.

Q. What key factors determine how big walleye will grow and how many will live in a lake?

A. The most important factor is habitat — if walleye have food, cover and quality water, they will usually reproduce naturally and thrive. Fish abundance also depends on how many predators live in the lake, how many people spear or fish the water, weather patterns and other factors.

Q. Why doesn't the DNR merely stock adult walleyes to replace the fish taken by spearers and anglers?

A. It isn't that simple or easy, and in some cases it can pose health risks to native walleyes. Restocking lakes with adult walleyes can be a poor management practice in lakes where fish naturally reproduce. The natural fish population has maintained vigor by "survival of the fittest;" stocked fish have different genetic makeup and may not have the "right stuff" to survive or improve these wild strains. Moreover, large numbers of stocked fish can carry diseases into the wild populations. Finally, it's very expensive. It costs more than $15 to purchase each 15-inch walleye and no one is commercially raising fish to this size. They would have to be caught and transferred from other lakes.

The state **does** stock small walleye in lakes where walleyes don't reproduce naturally and in lakes where we want to re-establish populations where fish have been depleted. In 1989, DNR crews stocked 54 million walleye including 49 million fry, 4.6 million small fingerlings (two-inch size) and 122,000 large fingerlings (four-inch size). People who cooperatively raise fish in hatcheries and rearing ponds added another 118,000 walleyes to Wisconsin's waters.

Q. How long will spearfishing continue?

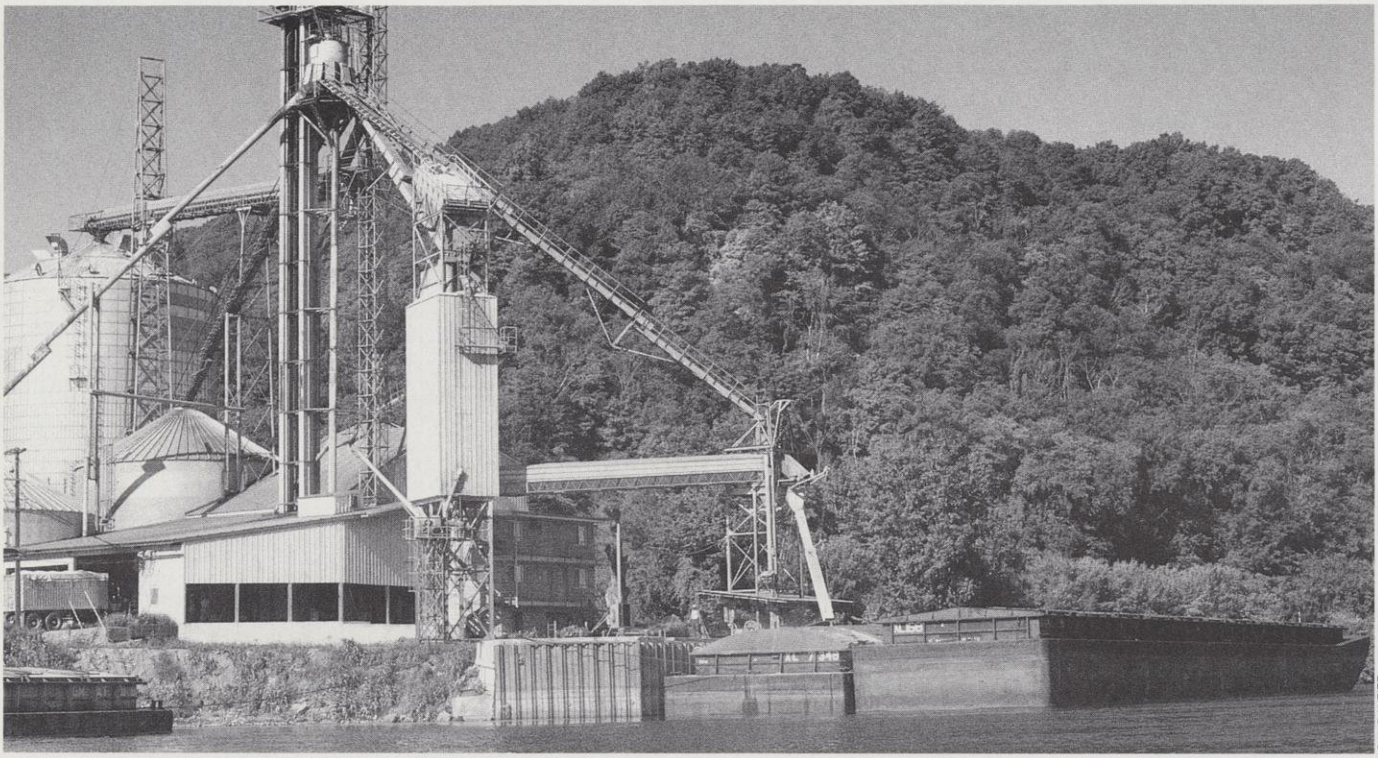
A. No one knows for certain. Spearfishing's future is largely up to the tribes and the federal courts.

PRODUCED BY THE WISCONSIN DEPARTMENT OF NATURAL RESOURCES' BUREAU OF FISHERIES MANAGEMENT AND OFFICE OF TRIBAL COOPERATIVE MANAGEMENT. FM 745-90

MIKE DEVRIES COURTESY OF THE CAPITAL TIMES

SCOTT SEID COURTESY OF WISCONSIN STATE JOURNAL

Anti- and pro-treaty rights activists rally their forces at the state capitol.



DAVID WEITZ

Loading grain onto barges. Maintaining shipping channels to move grain, iron ore and other commodities while maintaining the fragile river environment will be a continual challenge.

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tect the lakes from sedimentation, excessive weed growth and low oxygen levels in the water. A $2.7 million plan will create a 1,300-foot channel containing artificial habitat structures for fish and mussels. Rocks ranging from boulders to pea gravel will line the channel bottom to provide an irregular surface to attract many kinds of fish. Dredging in selected areas will create deep water.

Other longer-term projects for future years include:

— Indian Slough — sedimentation and erosion are severe filling in Big Lake, near Nelson. The $1.5 million effort, targeted for construction in 1991-92, will build a partial closing structure to protect the backwater habitat from river sediments as navigation channels are dredged. Rock and log structures will be placed in the slough to improve fish habitat.

— Pool 9 islands, between Ferryville and Lynxville, where islands that have shielded backwaters from winds and waves are disintegrating and have disappeared in some areas. Under the $700,000 project, islands will be created and stabilized to protect approximately 400 acres of backwater. Dredging will create deeper areas and provide fill to create the islands.

— The Long Lake area, in Pool 7 downstream from Trempealeau, has low dissolved oxygen content making it unsuitable for fish. A $200,000 effort planned for 1993 will open a channel into the lake infusing a flow of oxygen-rich river water into the now-clogged backwater.

— Cold Springs, between Ferryville and Lynxville, is a backwater area that is filling with sediment. Oxygen-poor water is diminishing the value of a once-abundant fishery. The $400,000 project is scheduled for construction in 1991-92.

— Pool 11 Islands, between Potosi, Wis. and Dubuque, Iowa holds a cluster of islands that have eroded. Sediment from the islands that have filled much of a rich backwater and created muddy waters. A $6.4 million project scheduled to start in 1994 could create and stabilize islands to protect backwater vegetation beds and provide cover for waterfowl. Dredging around the islands will improve deep-water habitat for fish.

— The river banks of pools 4 to 10 from Red Wing, Minn. to Guttenberg, Iowa, need to be stabilized. Vulnerable habitat can be protected with rock rip-rap under terms of a $2.5 million project that Wisconsin, Minnesota and Iowa sponsored.

As you now appreciate, the challenges in restoring the river are nearly as broad and wide as the majestic river itself. This region, so managed by people and machinery, will need continual attention to keep wildlife and commerce flourishing. We are up to the battle if we continue to have the will and resources to restore and maintain this vast ribbon of water. ■

David Weitz, stationed in Eau Claire, is DNR's public information officer for the Western District.

Readers Write

ICE CAVE KUDOS

The ice caves of Squaw Bay — what a treat to see Ann B. Swengel's photos on the front and back covers of your February 1990 issue . . . and then to see more photos and read her fascinating story!

Having only a few days earlier walked out to the caves during our first winter in Cornucopia, Wis., we were particularly intrigued. Ms. Swengel's advice to be cautious out on the ice is well taken; we went with a group of experienced hikers for our trip, which was exhilarating, but tiring.

Once seen, the ices caves are a sight to be remembered forever.

Norman W. Larson
Cornucopia, Wis.

P.S. The letter addressed to "Gentle readers" was a nice idea. Hope to see more.

BEAVER BROUHAHA

"Tailor-made for beaver" (February 1990) is written from a point of view which troubles me. We must learn to co-exist with wildlife, to live in our environment as an interrelated part of the ecosystem, not its master. Perhaps we should better manage people rather than beaver.

Our resource manipulation often gets us into difficulties, and the situation with the beaver is a good example. Encouragement of aspen monoculture has increased habitat for the beaver and they have taken advantage of this to their detriment. We make them pay cruelly. Beaver were not put here to be used and abused by one generation or by many. They are intelligent animals that form close-knit families. They provide habitat for an intricate web of life.

[You] would have us understand only the human values of the beavers' work — the ponds useful for drought protection or as duck habitat to increase the number of birds for waterfowlers. The "wildlife as commodity" viewpoint dominates this article.

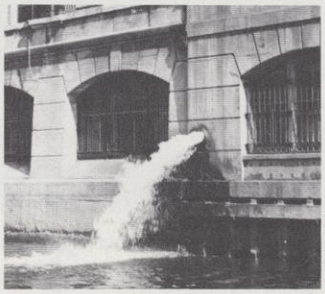
Beaver need not justify their existence. Instead, we should have to do a much better job of justifying our persecution of them.

Sharon Clark Gaskill
Black Earth, Wis.

We mentioned uses of beaver and beaver habitat because it's difficult to appreciate "beaver for beaver's sake" when their dams have flooded your fields or backed up culverts. The Department of Natural Resources is particularly proud of the Beaver Management Plan precisely because it was formed by a group representing a wide variety of interests all seeking to promote peaceful co-existence with beaver.

I thoroughly enjoyed your article on beavers in the February issue. Last summer my wife and I spent a couple of days in Prairie du Chien, and we were told beaver pelts were shipped from there to England in the 1700s to make hats. Upon arriving in England the pelts were shaved and the fur blackened with a dye containing mercury. The mercury caused the men who wore the hats to "go crazy!" Thus we got the expression "mad hatter."

Gene A. Dawato
Menomonee Falls, Wis.



DNR PHOTO

WHAT ON EARTH?

In the premier issue of "Earth Notes" (February 1990), you included a photo with the caption, "We must strive to see the unseen pollutants. In some places, storm sewers still carry untreated wastes like litter, salts, oils and residues directly into streams and rivers." The photo showed a pipe discharging water into a river.

Both the photo and the caption were misleading. The discharge is from the old First Wisconsin Building at 733 N. Water St. in Milwaukee. The discharge is not stormwater, but cooling water. The water is pulled in from the Milwaukee River, used for cooling and discharged back into the river. The water is no more contaminated at the discharge point than at the intake. (The pipe is still discharging to this day — you can see it from the Wisconsin Avenue bridge.)

The caption implies that only in "some" places is untreated stormwater discharged into surface waters. Presently there are only a handful of counties in the entire nation that require any stormwater treatment. Treatment is usually by detention basins in which particles can settle to the bottom. The basins are not very effective with salts and oils, but can help control sediments, toxic metals and pesticides. If the basins are not maintained, they quickly lose effectiveness. Only now are federal regulations being proposed to regulate stormwater diversion.

Within the City Of Milwaukee, the $2 billion Water Pollution Abatement Program will help to reduce the discharge of polluted stormwater into Milwaukee-area rivers. The stormwater will be collected and treated by the Milwaukee Metropolitan Sewage District before being discharged into Lake Michigan.

William S. Gonwa
Registered Professional Engineer
Milwaukee, Wis.

SPECIAL K

Thanks for publishing my deer hunting story in your February issue. However, I'm sorry to report that you misprinted my name: It's *Kevin* A. Kufahl, not Keith.

Just thought I would let you know. Also, I want you to know I enjoy your magazine greatly. It keeps me in touch with the Badger State and the exceptional performance of the Wisconsin Department of Natural Resources.

Kevin A. Kufahl
Charlotte, NC

MOVIN' NORTH

Enjoy your fine magazine! We'll be moving to Elkhart Lake this year, after "long distance" weekend remodeling on our home overlooking the Sheboygan Marsh. Soon we'll be able to visit the many fascinating places you've written about (we save every issue). Your "Gentle readers" letter promises more educational and interesting information, much of which will help us naturalize our five hillside acres.

Dave and Karin Radke
La Grange Park, Ill.

HMONG FRIENDS

Last year about this time, I wrote to you about getting back issues of *Wisconsin Natural Resources*. I was specifically interested in the article about Hmong sportsmen (November/December 1988) because I teach English to Hmong adults through the Friendship Program of Christ Church in LaCrosse. You were kind enough to send me a copy. I'd like to thank you — the article was very popular with our students and was the subject of much conversation and discussion.

William Markwardt
Galesville, Wis.

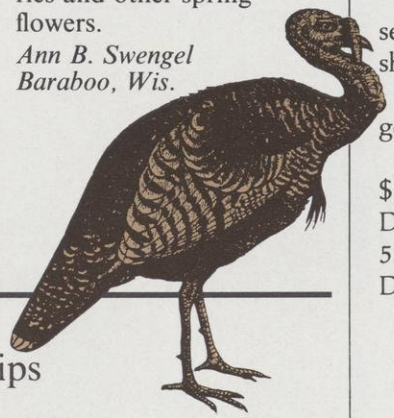
ANITA CARPENTER

ONCE UPON A PINE

The piece on pine elfins (April 1990) is very nice. I, too, am fond of elfins — they're my harbingers of spring!

Please be aware that pine elfins can be found throughout Wisconsin except for the southeastern part of the state. They are not restricted to the Central Sands region, or to sandy areas. The caterpillars feed on various hard pines (red pine and jack pine in Wisconsin) as well as on one soft pine, the eastern white pine. I've seen pine elfins in and around bogs and pine plantations because larval food plants are available. Besides bird's foot violet, pine elfins will also draw nectar from blueberries, blackberries and other spring flowers.

Ann B. Swengel
Baraboo, Wis.



NEXT ISSUE:

Fall turkey hunting tips

Sighting-in hunting arms

The good, the bad and the ugly: stopping erosion at construction sites

Challenges in managing wildlife

continued from page 2

Naturalist and author Ken Lange

natural history to life with stories of drifting continents, earth's upheavals, mountainous glaciers, ice storms and coursing waters that shook and shaped the Baraboo Range.

Now, you can capture Ken's seasoned eye and enthusiasm in your hip pocket. *"Ancient Rocks and Vanished Glaciers"* by Kenneth L. Lange, is like having your own personal guide lead you through the park's natural history. The 154-page, 6 x 9 1/2 book easily fits into a hiking jacket or backpack.

The narrative is split into bite-sized chapters guiding readers through the park's rough-and-tumble history, sharing visions of times when giant beaver, mastodont and mammoth pounded the same turf where picnickers now roast weenies and campers pitch a tent.

Handy charts list the park's permanent residents — insects, fish, amphibians, reptiles, birds and mammals that share Devil's Lake with human visitors.

Nine walking and windshield tours point out prominent geologic features around the park.

Copies of *"Ancient Rocks and Vanished Glaciers"* are $10.00 at the park or $12 by mail. Order the book from Devil's Lake State Park, S5975 Park Road, Baraboo, WI 53913. Checks for mail orders should be payable to Devil's Lake Concession Corporation.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