



# **Wisconsin natural resources. Vol. 15, No. 3**

## **June 1991**

Madison, Wisconsin: Wisconsin Department of Natural Resources,  
June 1991

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# WISCONSIN

## NATURAL RESOURCES

June 1991 \$3.00 Volume 15, Number 3



Plenke's pond  
Dockside delicacies  
A close look at dragonflies



A detailed photograph of a loggerhead shrike perched on a dark, textured branch. The bird is shown in profile, facing right. It has a greyish-blue head and back, a white underbelly, and a distinctive black mask-like stripe through its eye. Its beak is dark and hooked. The background is a soft-focus, dark brown, suggesting a wooded or brushy environment.

# SHRIKE ZONE

Bruce R. Bacon

Skip the sunflower seed. Forget the suet. Cracked corn and bread crumbs just won't do. When it's time to eat, this feathered predator bypasses backyard feeders in pursuit of live quarry.

Although it's classified as a songbird, the loggerhead shrike (*Lanius ludovicianus*) acts more like a bird of prey with a weak, shrill set of pipes. In summer and fall, grasshoppers, beetles and other large insects make up the loggerhead's diet. Come winter and spring, mice and small birds round out the menu.

With no talons, a small beak and perching feet better suited to a robin, the loggerhead shrike seems an unlikely killer. By using methods of pursuit more common to a peregrine falcon, loggerheads make the most of their limited hunting gear.

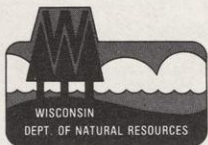
A loggerhead will drop onto a mouse from a high perch or pursue a sparrow until it's exhausted, then hit and stun it. Because shrikes can't grasp prey with their feet, the birds carry prey in their bills. A loggerhead either steps on its prey or quickly impales it on a thorn, barbed wire or a small broken branch before proceeding to eat by tearing away small pieces of flesh with its sharp, hooked, hawklike beak — a behavior that's earned the species the nickname, "Butcher Bird." Like owls and hawks, loggerhead shrikes regurgitate pellets of undigested feathers, fur and insect parts.

Despite its skill as a predator, the loggerhead shrike is an endangered species in Wisconsin. During the 1980s,

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PUBL-IE-012  
ISSN -0736-2277



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David L. Sperling  
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Circulation & Production—  
Joan C. Kesterson  
Art Direction—  
Christine Linder,  
Moonlit Ink  
Typesetting—  
WISCOMP, Department of  
Administration  
Printing—  
Straus Printing Company

*Wisconsin Natural Resources* magazine (USPS #34625000) is published bimonthly in February, April, June, August, October and December by the Wisconsin Department of Natural Resources, 101 S. Webster St., Madison, WI 53702. The magazine is sustained through paid subscriptions. No tax monies or license monies are used. **Subscription rates are:** \$6.97 for one year, \$11.97 for two years, \$15.97 for three years. Second class postage paid at Madison, WI. POSTMASTER and readers: **subscription questions** and **address changes** should be sent to *Wisconsin Natural Resources* magazine, P.O. Box 7191, Madison, WI 53707. Toll-free subscription inquiries will be answered at 1-800-678-9472.

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# WISCONSIN NATURAL RESOURCES

June 1991

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BETHESDA SPRINGS, WISCONSIN BY C. KROFF CO.  
COURTESY OF THE STATE HISTORICAL SOCIETY OF WI

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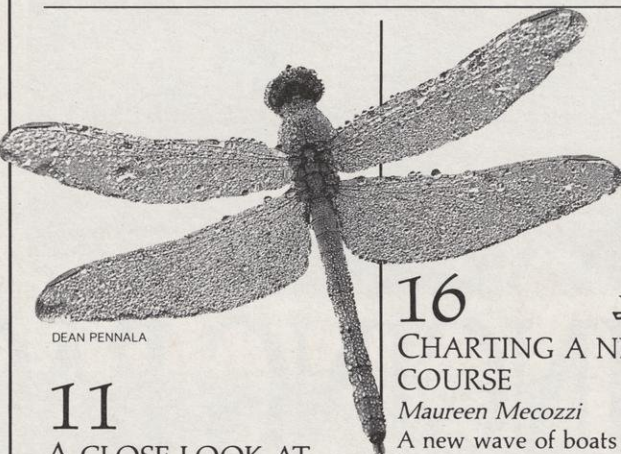
Barbara Gear and Howard Kanetzke

The popularity of bottled water has state firms retapping a famous Wisconsin business opportunity.

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DEAN PENNALA

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MaLenna S. Smith

They're fast. They're colorful.  
And for most of their lives,  
they're wet!

#### FRONT COVER:

Spring Beauty (*Claytonia virginica*) © DON BLEGEN, Spring Valley, Wis.

#### BACK COVER:

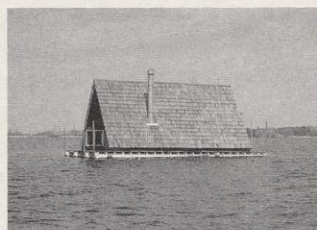
Green Darner (*Anax junius*, the Emperor of June)

© DEAN PENNALA, Plainwall, Mich.

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Exploring our common rights to live and recreate near lakes and streams.



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WATER REGULATION AND ZONING

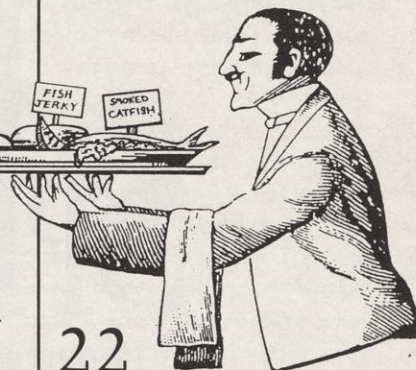
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Steven Claas

Research in remote lakes is explaining how tiny amounts of mercury can build up in fish.



*Thus nature has provided, free and delicious,  
a remedy so unlimited that every person in  
the civilized world afflicted with the peculiar  
diseases for which it is specific can have an  
abundance of it.*

— HISTORY OF WAUKESHA COUNTY



MINERAL SPRINGS IN BELOIT circa 1873-79. ANDREW DAHL. COURTESY OF STATE HISTORICAL SOCIETY OF WISCONSIN

# SPRINGING BACK

Renewed demand for healthy drinks has uncapped  
an old Wisconsin business — bottled water.

Barbara Gear and Howard Kanetzke

People ascribed curative powers to Wisconsin's springs almost from the time they began drinking water. Pre-historic tribes first sought out the deep bubbling pools of cool, clear, mineral-rich liquid to relieve skin ailments. Post-settlement hucksters touted the tonic properties of this

miracle beverage in the late 1800s. In response, thousands flocked to Wisconsin spas and "took the cure" reputed to remedy everything from anemia to a bad case of nerves. Eagle Spring, Spring Lake, Nine Springs, Spring Valley, Solon Springs, Spring Green — place names across the state

reflect the importance of the mysterious underground founts to our predecessors.

Today's health-conscious consumers quench their thirst with Wisconsin spring water, but the aqua vita comes in bottles, cans and flavors — lemon, lime, orange, wild raspberry, even



root beer. Safety and taste, not miracle cures, sell bottled water now. The desire for an alternative to municipal tap water, private well water, caffeine and calorie-laden soda pop gave renewed life to the bottled-water industry in Wisconsin.

The history of Wisconsin's third most fabled beverage (beer and milk being the first and second, of course) goes back more than just a century. The sparkling road to fame begins in the Paleozoic era, when plants ruled the world.



## When the Earth was young

Four hundred to 600 million years ago, warm, shallow seas covered Wisconsin's crystalline bedrock. Sands and limey sediments settled from these seas and later hardened into layers of sandstone, limestone and dolomite (similar to limestone). Millions of years of erosion cut and wore the sedimentary rocks. Little of this cover remains in the north and a special type of dolomite flanks part of eastern Wisconsin.

Recently, geologically speaking, glaciers scraped and moved eroded sands from Canada and deposited sands, gravel and clay across Wisconsin, except in the southwest portion. As the glaciers melted about 10,000 - 12,000 years ago, these sand and gravel layers firmed up on top of limestone and bedrock.

Rain and snow melt seeped into the layers, moving through cracks and pores in the rocks and sediments. We call these water-bearing rock and sediment layers aquifers. Wisconsin's aquifers range in thickness from just a few feet to several hundred feet.

A spring is formed when water moving underground comes to the surface. In hilly areas, water may seep

## "The Pride of Waukesha!" FOUNTAIN SPRING HOUSE



The Finest Summer Hotel West of Saratoga Springs.  
A New Hotel! Elegantly Furnished!

Many Wisconsin communities milked gold from the clear spring waters. Reputed restorative powers from drinking and bathing in the natural mineral waters drew tourists by the thousands. Healthy spring water was the foundation of thriving resorts, hotels and spas from the 1870s through 1900.

down through fissures and flow out of a rock face horizontally. Springs can form when an aquifer emerges at the foot of a slope. An artesian spring occurs when water in an aquifer sealed between two impermeable rock layers flows upward under its own pressure through cracks and pores in the layer above it.

Springs fed by shallow groundwater sources, which are only replenished by rain and melted snow, may go dry during times of drought.

Springs occurred naturally across the state, but those that would come to be held in highest regard were located in southeastern Wisconsin.



## Taking to the waters

Early Indians traveling a trail from Lake Michigan in the Milwaukee area southwestward to the Rock River could stop at springs where fresh, clear water gurgled through several

hundred feet of sandstone. Later settlers cherished a good spring; to find one on a land claim was incredible good fortune. In 1844, Edwin Bottomley, an Englishman who settled near Rochester in Racine County, wrote to his parents of nearby springs: "There are several springs round about. James Scott (h)as one that he fetches water from which is near to the creek side. But the Best Spring that their is about here is on Creamers Land which Joins mine . . . . It comes out of a hill side. The other springs that rise on the marshy land are not as good."

The following year, Bottomley reported: "In one of your letters you wish to know wethir I have Discov-ered any Springs in my land. I must now tell you that I have found one near to the Indian Trail. I have Dug a new Draw well and stoned it and have got excellent water. The well is 14 feet Deep and (h)as 6 feet of water in now. The well is near to the house."

Wisconsin's springs took a turn toward fame in 1868, when Col. Richard Dunbar, a wealthy New Yorker suffering from diabetes, visited his sister-in-law in Waukesha. Overcome by thirst on an outing, Dunbar drank deeply from a spring located on prop-



erty owned by his in-law. Convinced that the spring water restored his health — "It was to me the most delicious, the most grateful beverage that entered my mouth in years," the colonel remarked — Dunbar organized the Bethesda Mineral Springs Company in 1869 and laid the foundation for a thriving health spa/resort business in the area.

By the 1890s, at least 10 springs in and around Waukesha attracted crowds of vacationers and health seekers: Bethesda, Glenn, Hygeia, Silurian, Arcadian, White Rock, Fountain, Clysmic, Lethean and Vesta. Owners built elaborate marble pools and baths to house their sparkling treasures and fancy hotels to house summer visitors.

The success of Waukesha's springs did not go unnoticed by other Wisconsin spring owners. Promoters trumpeted the advantages of waters in Beaver Dam, Sparta, Palmyra, Beloit, Madison, Appleton and other sites.

In 1871, Victor Lowen of Palmyra discovered seven springs within a 50-foot circle on his farm. Gustavus Bode, a Milwaukee chemist who certified the mineral content of many Wisconsin springs, announced that each of Lowen's springs contained different minerals.

Hearing of the wonders achieved by these waters, entrepreneur Ira Bidwell arrived from St. Paul to build a large resort. The local newspaper boasted, "Palmyra is known throughout the country as a successful watering place and is soon to become famous for its wonderful springs." By 1883, Bidwell's Sanitorium offered 152 rooms for visitors, pleasure seekers and invalids. Advertising stated that "complaints of all kinds and many diseases are cured by the spring waters of Palmyra."

Promoters routinely exaggerated the qualities of their springs to get an edge on the competition. George E. Swan, a Beaver Dam doctor, built the Vita Spring Pavilion over a local spring in 1880, proclaiming: "I name this water *vita*, or life." In truth, there was little difference in the mineral

content of the Wisconsin springs. Some had higher concentrations of minerals in dry weather; otherwise, they were remarkably similar.

People who took the cure in Wisconsin were eager to drink the waters from the wondrous springs after returning home. Bottling companies obliged and the business of bottling, shipping and delivering Wisconsin spring water to Milwaukee, Chicago and other major American cities thrived for many years.

Bottle collectors know that the old-time bottlers used different colored glass for different products. Through the 1860s, alcoholic stout, ale, wine and mineral water were bottled in dark green glass called olive glass or black glass. Mineral waters were sold in lighter green bottles after 1865 or so. Soda water was bottled in blue glass from the 1890s until the 1960s.

By the turn of the century, the art of medicine grew more sophisticated and interest in water cures waned. The elegant resort hotels no longer tempted vacationers, who sought new, different playgrounds. And as growing cities installed water systems, ensuring residents of a good, clean supply, the demand for bottled spring water declined. Springs that were not cleaned regularly of silt and

These Pure Refreshing Delicious Drinks Comprise

BETHANIA  
MINERAL  
WATER



BETHANIA  
TRUE GINGER  
ALE

BETHANIA  
Pure Fruit Juice  
Beverages

All Bottled at the Springs, Osceola, Wis.;  
entirely free from organic matter and

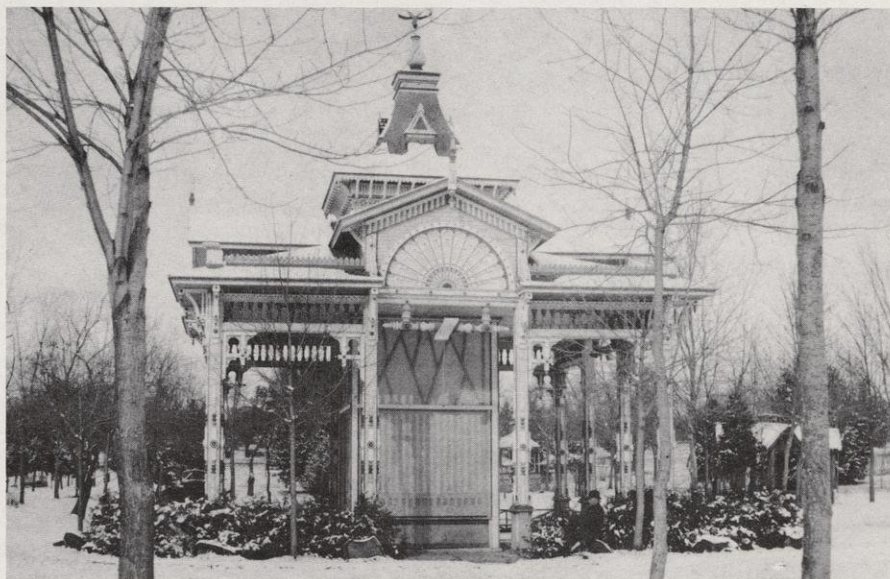
"From Rock to Glass,  
Confined from Air."

stones ceased to flow, and Wisconsin's fame as a spring water haven slowly dried up.

## A bubbling business

What a difference a century makes! In the past, people came to the water. Now the water is brought to the people, who pay a handsome price for the privilege of drinking it. Nationwide, the amount of bottled water sold annually leapt from 487.7 million gallons in 1979 to 1,816.2 million gallons in 1989. The International Bottled Water Association estimates that one out of every six households in

Elegant gazebos provided a peaceful resting spot for spa visitors. Entrepreneurs bottled and barreled the waters so patrons could bring the flavor of the experience home. The spring pavilion is now a prominent feature of Vita Park in Beaver Dam.



COURTESY OF THE STATE HISTORICAL SOCIETY OF WISCONSIN. WHI (X3) 36949. Eugene Reynolds. circa 1890.





JEAN B. MEYER

Bottled water is more than a refreshing drink. It's marketed to people who want to lead a healthier lifestyle that includes a commitment to a healthier environment. Here, bottled waters are sold along side reusable shopping bags and recycled paper. Twelve firms bottle water in Wisconsin.

the U.S. uses nonsparkling bottled water as their source of drinking water.

Consumers in search of safety sparked the renewed interest in bottled water. Ironically, municipal tap water is much more closely monitored for contaminants than bottled water. Uncertainty or unhappiness with the taste and safety of municipal tap water lead many people to purchase bottled water for drinking and cooking. Private rural wells seriously contaminated by septic systems, pesticides and fertilizers left some homeowners with no options but bottled water.

Their concern isn't unfounded. Groundwater — the source of drinking water for 75 percent of Wisconsinites — and surface water, where the remainder comes from, have been polluted in some areas by failing septic systems, industrial wastes, fuels, landfills, pesticides, fertilizers and more. Clean-up is slow, costly and sometimes, in the case of seriously polluted aquifers, impractical.

Then there's the matter of taste. Some people know their water is per-

## DRINK UP!

How much water  
do you get for a dime?

**RESTAURANT  
SERVING**  
(spring water)

1.11 OZ.



**SPARKLING**  
(individual cans  
or bottles)

2.18 OZ.



**BOTTLED**  
(gallon  
containers)

16.20 OZ.



**CITY**  
(tap)

25,641 OZ.



fectly safe to drink, but high levels of iron, sulfur or other minerals make it thoroughly unpalatable. Tap water is used for washing and bottled water for drinking, cooking and canning.

Taste aside, there are those ever mindful of the damage sugar and starch can do to the hips. Consumers turned to flavored and plain bottled sparkling water as a no-calorie, nonalcoholic substitute for soda, coffee, beer and liquor.

What would the office be without the water cooler? (A very dull place indeed.) Businesses purchase bottled drinking water to replace unsanitary bubblers or to supply water where it isn't available — on a construction site, for instance. Pure distilled or deionized water is a necessary ingredient for a number of industries: pharmaceutical production, food processing, laboratory testing, even the manufacture of semiconductors and microchips.

And don't forget the few thirsty souls who quaff bottled mineral waters for the reputed therapeutic bene-

*Continued on page 29*





# Plenke's Pond



KEN PLENKE AND SANDY

A Reedsburg man who cared about kids and fishin' dug his own Field of Dreams.

## John Beth

Driving west on the main street through Reedsburg, Wis., you might notice a neatly kept house on your right with a small green sign: Ken's Bait and Tackle. In the driveway, you'll probably see a maroon El Camino with license plates spelling B - A - I - T. Pull over and park. Follow the sidewalk back between the stacked firewood and deer antlers and look for the door leading to the basement. Walk down the stairs and you'll be greeted by a friendly hello and a smiling face. You've just entered the small but busy world of Ken Plenke.

The basement shop is packed with fishing tackle and supplies. There's an old wood stove with wood piled neatly next to it. Little signs, hand-printed on cardboard,



The basement shop: a place to relive good times and gear up for fishing trips to come.

ALL ARTICLE PHOTOS BY THE AUTHOR

point out recent sale prices on your favorite tackle. Old black and white pictures hang proudly on the cupboards around the room. Some of the yellowing photos dating from the '30s show fish and game taken in Ken's earlier years. More recent color photos show friends and customers displaying their trophies. Ken's 20-pound cat, Sandy, rests in the cardboard box in the sunlight contemplating the contents of the minnow tank.

Twenty-five years ago, Ken sold bait and a few used rods and reels; a sort of semi-retirement hobby. Well, his likeable nature, long hours, low prices and good fishing information drew more business than he could believe. He got into more and more volume, equipment and customers.



"But the real wealth came in all the new friends and acquaintances I've made in these many years of dealing in the shop," Ken maintains.

Of all the people he's met, his favorite, by far, have been the kids. I've often seen Ken up to his elbows in a pan of dirt sorting out worms. "I've got to finish sorting these," he'll fret. "It'll break (the kids) hearts if they can't get bait on their way fishing."

Several years ago, however, Ken moved dirt by the ton, not the handful. In 1982, he fulfilled a long-time dream on a seven and one-half acre parcel on the city's southwest side. Ken purchased the land, worked out a plan with the City of Reedsburg and the Department of Natural Resources and bulldozed a U-shaped pond, 125 feet by 650 feet, ranging in depth from 10 to 13 feet.

The reason?

"The kids here just needed a place to fish," Ken says. "There just weren't many places for them to go anymore." The pond is public, intended mainly for children, the elderly and people with disabilities. Three wells fill the pond with fresh spring water — 60,000 gallons flow through the pond every 24 hours before spilling into the nearby Baraboo River. Clay soils easily contain the water and the U-shape provides the maximum amount of shoreline for fishing.

"Crappie, bluegill, largemouth bass, northern and catfish up to 15 pounds or more are being caught now," Ken relates. The pond was initially stocked with baitfish. Now, growing populations of panfish seem to adequately feed the larger fish. "I put very little food in any more," Ken continued. "Some real nice fish are being caught now. People come from all over to fish here. It's wonderful!"

A pier for anglers with disabilities was added last year. People who aided in the project are acknowledged on a sign by the pier. "They deserve a lot of credit for their help," Ken says.

But it is Ken who deserves the real credit. He's the mastermind and tireless giver who spent over \$50,000 ("All earned the hard way, right here in the shop," he smiles) to make it all happen. He's also the landscaper: "I've put 50 trees in now and a bunch of bluebird houses. The picnic area should get more attractive as these trees grow. I hope even more families come."

How does someone get so attached to a sport and his community? I asked Ken about some of his early fishing experiences. He vividly recalls many. "My dad used to wrap me up in a sheepskin and take me up to the Pine River by Wild Rose when I was barely old enough to walk. We'd sit by a bonfire and wait for dawn to start trout fishing. I remember it clear

as yesterday."

Ken recalls other outdoor experiences, living to trout fish as a boy and young man. "I took two fly rods and reels with me everywhere. I remember dry fly-fishing trout in crystal clear water lined with watercress, trout rising to a dry fly in the early evening. It was wonderful."

A native of Wisconsin Rapids, Ken was a sales rep with a territory that covered most of the state. He and his wife moved to Reedsburg in 1951 and opened the small bait shop. Ken hunted and fished until his shop and customers demanded more of him. He spent more than 30 years getting up early to greet his customers. ("When you're in the bait business, you've got to be open!") He especially enjoyed helping kids bait up for after-school fishing trips. Somehow, even that wasn't enough. Ken became increasingly interested in doing something for people in the Reedsburg community.

He envisioned a plan, and then made it happen. "I wanted a pond that would be a convenient place for people to go, right in the city limits," Ken explained.

"It's put-and-take type fishing and as long as they keep catching the fish out, I'll keep putting more back in. I don't mind. I love knowing I'm making people happy." No license is required to fish at the pond.

He briskly recalls how the project developed. "The City of Reedsburg, the DNR and all the local people were real cooperative in this and things have been going real well," he says. "I've been taking it one step at a time. I've always wanted to leave something in my will for a place like this. I just decided it would be even better to see it happen."

"As long as my health and my money hold out, I'll take care of the whole thing. I've made provisions to maintain the pond and the park when I'm gone. It's all in the plans,



Creating a community fishing pond from scratch took inspiration, dedication and perspiration. Cooperative work among Reedsburg officials, the Department of Natural Resources and local contractors produced a 650-foot U-shaped pond in a new park.





Local civic groups and builders got caught up in the community spirit surrounding the project. They built an attractive pier which is enjoyed by anglers of all ages and abilities. Mike Ida relaxes while his son, Paul, wets a line on an afternoon outing.

but for now I'm going to take care of it all myself."

I asked Ken, who is 79 years old, how he intends to keep his business and this project going. He smiles and says, "I'm phasing out a lot of my tackle business and sticking with just the basics — bait and a little tackle. Other matters occupy his time, too. Ken makes a nightly visit to a nearby nursing home to visit his wife. "So I'm not here quite as much as I used to be," he says almost apologetically. "I'm never far away or gone for long." He also takes an occasional ride in the country to watch deer and turkey.

In these days of judging one's character by measuring their shrewd return on investments, Ken's selfless show of generosity is honest and from the heart — an inspiring, enduring gift to his community.

When little kids catch their first bluegills from "Plenke's Pond," their excitement and happiness takes Ken back to his own childhood fishing with his dad. He has gotten tremendous satisfaction in giving others the opportunity to share his life-long love for fishing.

"I've seen a lot of kids come through this shop," he reflects. "Some of them grew up right here in front of me. An awful lot of them are really nice. They're great. They all wave at me and stop by. They've been the best part of my business here. In fact, some of their kids are here now."

Many years have passed since I first recall needing a new bobber and a dozen splitshot. I think it was 68¢ worth. Ken said, "Make it half a buck . . . and here's a few extra splitshot 'case you lose some. Hope ya catch a big



The author's daughter, Kjersti, and her first fish, hooked at Plenke's Pond.

one, son." He recently sold my kids the same items, and I think they were still 50¢! Only this time, we were heading for Plenke's Pond.

Without a doubt, Plenke's Pond will endure as a lasting tribute to this generous man's love for his community. From one of the "kids," from all of the kids, from everyone, thanks Ken. We love you, too. □

---

*Musician, writer, photographer and ardent trout angler John Beth lives in Reedsburg, Wis. He recently wrote the musical scores for a series of instructional videotapes about fly-fishing for trout.*



# A CLOSE LOOK AT DRAGONFLIES

Dragonflies are varied, agile and fascinating.

*MaLenna S. Smith*

Bill, my husband, has been collecting dragonflies for quite a while. He says the most memorable flight maneuver he ever saw was on a Mississippi River wing dam above Cassville. Bill and our two older boys had their eyes on this one dragonfly that was especially large and fast. It was different, very different, and they wanted it. (Bill had even offered a turtle sundae as a reward for its capture!)

The dragonfly was patrolling a stretch of shoreline, as many dragonflies do, and even though it had escaped capture before, they knew it would come back. So, on its return trip, Corbin (our oldest and biggest) stood with feet braced, arms cocked, net ready, and eyes glued on the quickly moving insect. Dragonflies may be strong and fast, but so is Corbin.

Green Darner (*Anax junius*). DEAN PENNALA





At exactly the right moment, two arms exploded with intent, and a six-foot long net with a two-foot opening slammed through the air with the kind of swing that puts baseballs out of stadiums and ball players into halls of fame.

Collectors often miss dragonflies, but Bill remembers this particular instance because it was such an impressive swing, and because the dragonfly, with a casualness that defied time, did an instant right angle, cleared the net and nonchalantly continued on its path as though nothing had happened.

The aerobic skills of dragonflies don't stop at evading nets. Bill has also seen dragonflies shoot skyward, completely out of sight, as if alien forces turned on some sort of anti-gravity device.

Dragonflies have been zip-ping over rocks and around predators quite successfully for a very long time — about 300 million years. Giant relatives of the modern dragonfly had wingspans of nearly three feet, making them the largest insects ever! They may have been the first insects, indeed the first animals to fly. By the time of the dinosaurs, 180 million years ago, dragonflies as we know them had already evolved.

If you want to find dragonflies, look for water and sunshine. When a spotlight of sunshine warms and brightens a streamside, pond or marsh, a whole cast of Odonate players takes the stage.

The Odonates (insects with tooth-shaped jaws) include the larger, stouter true dragonflies that zip and dart about so purposefully, and the smaller, daintier damselflies that flutter about at a more leisurely pace. At rest, dragonflies keep their glider-like wings flattened like aircraft, while damselflies hold their wings together over their backs.

Dragonflies generally are grouped by the habitats they use. Pond species are more

common and more tolerant of environmental extremes, while river species require moving, clean, highly-oxygenated water. Other dragonflies solely inhabit clean, cold headwater bogs and seeps.

Dragonflies spend about 90-95 percent of their lives submersed in water as aquatic larvae, called nymphs. The nymph (variously described as ferocious-looking and gargoyle-like) preys on aquatic insects, larvae, worms, small fish, tadpoles — basically, anything that moves! It has a unique adaptation: an elongated, hinged lower lip that folds under the head and can be rapidly extended like an arm to grab unwary prey.

In addition to its "lip trap," a dragonfly nymph has a second unique feature: Gills located in the rectum "breathe" water in and out of the anus. The nymph can shoot water with considerable force propelling it rapidly out of reach from would-be predators.

Dragonfly nymphs emerge or change from their larval to adult forms in two groups. The spring species emerge en masse in May and June, triggered by growing day length and warmer temperatures. The summer species develop in a less synchronized fashion throughout late June, July and August.

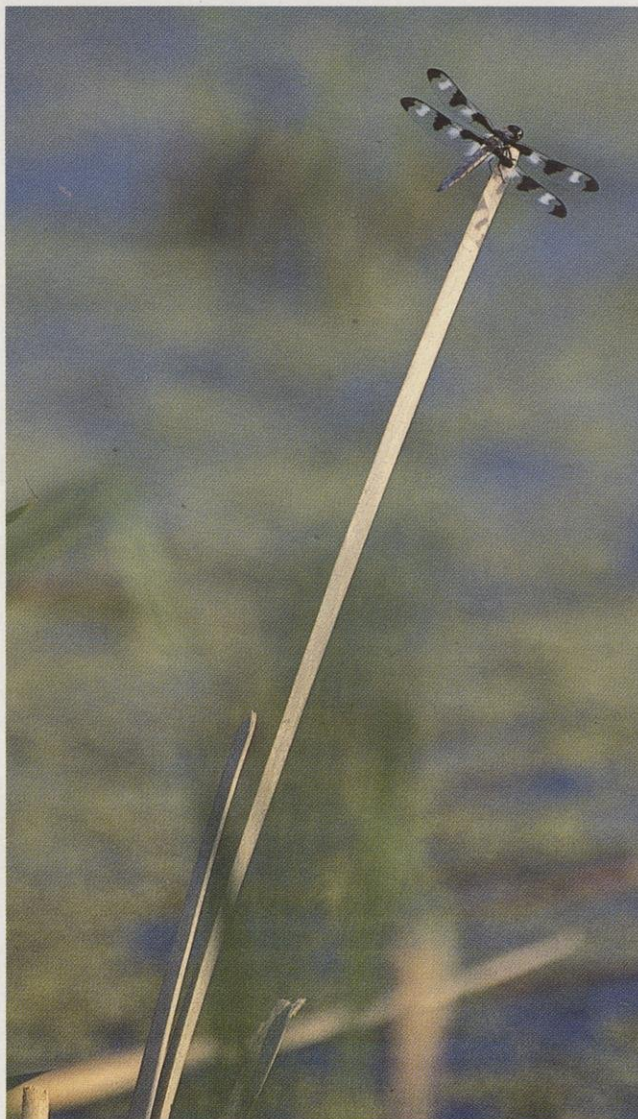
About a week before a mature nymph emerges, it stops feeding, its internal mouthparts dissolve, its eyes turn translucent and wing pads swell. Adult colors become apparent through the skin, and some species move to the surface to start breathing air. Within a few days the nymph is pretty much an adult dragonfly packaged in a larval skin.

The nymph crawls out of the water on a rock or plant stem and anchors its feet. The exoskeleton splits down the back. The new adult dragonfly swallows air to expand and pump its body up and out of the larval skin, then two crumpled knobs of cellophane-like wings unfold, flatten, and dry in the sun.

The spent skin is tan, hollow and crunchy, like giant Rice Krispies with legs. Our youngest son, Ian, is probably the only second-grader who ever took a box of dried dragonfly skins to school for show-and-tell.

If the dragonfly is lucky, it survives this helpless stage; if not, well, it's not unusual to find those brand new cellophane wings floating on the water where a few birds left the area very well fed.

The flight season, the period when each dragonfly species can fly, lasts from four to 10



It's called Twelve Spots (*Libellula pulchella*) for its 12 dark and light wing patches. We admire dragonflies for their summertime aerial acts but they actually spend 90-95 percent of their life cycle growing in water.

STEPHEN J. LANG



weeks. Some spring emergers are visible only briefly. Others, like the Green Darner, have a very long flight season, since its nymphs emerge more or less throughout the summer.

Eventually, all dragonflies return to the water to continue their reproductive cycle. Mating, egg-laying, and patrolling a territory are all signs of reproductive behavior you can readily observe on streams or ponds. Males and females in some species have different colors or patterns, but most look alike and are distinguished by their behavior.

Male dragonflies can be very territorial and may vigorously defend a few square yards of water or patrol several hundred yards of shoreline. Some species fly nonstop back and forth over their territory. Others fly out from a perch to feed or chase individuals, and then return to the perch.

Threatening displays usually intimidate most other males. Aerial tussles can occur, but the resulting tangle of legs and wings is usually a case of mistaken identity — a male attempting to grasp a female of the wrong species or even another male. These episodes sometimes end when both individuals fall into the water.

The double dragonflies that you often see flying or sitting aren't Siamese twins, of course, but mating couples. Males grasp females behind the head with the forceps-like tip of their abdomens. The abdomens are shaped lock and key fashion to allow coupling only between like species. Color, size, shape, and wing patterns all help the male recognize a female of the same species.

Males with females "in tow" are said to be "in tandem." Mating occurs in flight or on a nearby perch. Depending on the species, the female lays eggs directly in the water, pokes them into soft mud, or inserts them in plant stems with a knife-like ovipositor.

Eggs hatch in about 10 days, or as little as five days in species that breed in puddles and temporary pools. Others lay eggs that overwinter. The tiny larvae grow and shed their exoskeleton eight to 16 times before reaching a mature size of  $\frac{3}{4}$ -2 inches.



Mating damselflies in the wheel position.

Pond species typically mature in a year; most river species take two to three years.

In the eat-or-be-eaten world of insects and animals, dragonflies are about in the middle. The larvae and the vulnerable, newly-emerged adults are relished by fish, amphibians, turtles, and birds. Fish can be such thorough predators of certain species that dragonfly fanciers keep small, backyard ponds without fish to maintain the greatest number and diversity of dragonflies.

On the other hand, dragonflies have voracious appetites for smaller insects. They're popularly dubbed "mosquito hawks" in Florida. Dragonflies catch their insect prey on the wing, by holding their legs in a basket shape and scooping them up or by flying through a swarm with their mouthparts open in a gaping maw (well, gaping to a mosquito, anyway).

Sometimes dragonflies get their mouths so full of gnats they can't close their jaws. And sometimes the prey is just too big to take a bite out of — large dragonflies have been observed attacking hummingbirds! Dragonflies are also not above eating their own

kind and a few species, like the dragonhunter, specialize in catching other dragonflies.

Identifying dragonflies is another matter. Some distinctive species can be identified at a distance with binoculars. Others need to be hand-held under a magnifying glass. Serious researchers spend a lot of time slogging, wading and waiting, net in hand. Some dragonflies can be caught in fine mist nets like birds. If all else fails, nymphs can be reared to adulthood in an aquarium.

Some *Stylurids*, a type of clubtail, patrol low over large bodies of water and almost never land where they'd be easy to catch. In fact, Bill has used a buddy system in a motorboat to chase them down — one person runs the motor and the other sits on the prow with a net in hand shouting, "This way! That way! Faster! Rats, I missed him again!"

Dragonflies owe their quickness and fantastic flying skills to two prominent, arresting features: large double wings, and a pair of eyes so big they often meet in a line on top of the head. These eyes are composed of as many as 30,000 facets or single lenses allowing the dragonfly to see in almost

CHARLES FONAS





A skimmer (*Tramea carolina*) CLARK SHIFFER



An emerald (*Somatochlora tenebrosa*) CLARK SHIFFER



A clubtail (*Ophogomphus carolinus*) CLARK SHIFFER



The Royal River Cruiser (*Macromia taeniolata*) WILLIAM A. SMITH



A spiketail (*Cordulegaster obliqua*) CLARK SHIFFER



# DRAGONFLY PRIMER

## 1. SKIMMERS

Wisconsin has six families of dragonflies. People are most apt to see the Skimmers (or *Libellulids*). These are among the most common and showy species. Many have brightly colored bodies that are shorter than their wingspans. Skimmers breed in the still waters of ponds, bays and backwaters.

This group includes the easily recognized Common Whitetails, Widows, Green Jackets, and Twelve Spots. It also includes the small, red-bodied Meadowflies that emerge in late summer; and the orange-winged Amberwings, which mimic wasps and have a unique courtship. The Elfin Skimmer, at less than one inch long, is Wisconsin's smallest dragonfly species.

The most unique skimmer and the most highly evolved dragonfly is the Globetrotter. It is a member of the Rain Pool Gliders, a group that drifts with the wind until air masses of different temperatures collide to produce rain and the temporary ponds and puddles where it breeds. The Globetrotter commonly blows in and out of Wisconsin and is the only dragonfly found worldwide.

## 2. DARNERS

(Shown on page 11 and back cover)

The biggest and best known dragonflies are the Darners (or *Aeschnids*). Adults have long slender bodies (like darning needles), large clear wings and enormous eyes that meet on top of the head. Females cut slits in submerged plant stems and lay their eggs inside. Nymphs are "climbers" and actively stalk prey.

The Green Darner is the classic dragonfly — familiar to everyone by name if not by sight. Males have a bright green thorax and a blue "tail" that is so showy it's hard to mistake them for any other dragonfly. Green Darners are among the highest and best flyers, one of the few dragonfly species that migrates south in the fall.

A darner you are less likely to see but would remember is the Swamp Darner. This dragonfly, at nearly four inches, is Wisconsin's largest species. It likes to dart in and out of shadowy overhangs and has been reported flying through the open doors of some Milwaukee buildings.

## 3. EMERALDS

The Emeralds (or *Corduleids*), also called Green-eyed Skimmers, are brown to black dragonflies often with large, brilliant emerald eyes. They like cold bogs, seeps, small streams and headwaters. Like their gem namesake, many Emeralds are rare and hard to find.

The Ohio Emerald is black with yellow markings and has incredible metallic green eyes. It is one of Wisconsin's rarest species and is found only in one small area in northern Door County.

Two brown-eyed members of the Emerald family, called the Shadowflies, cruises for gnats in the shadowy light of dawn and dusk. No dragonflies are nocturnal, but these two come as close as any.

## 4. CLUBTAILS

Clubtails (*Gomphids*) get their name from the distinctive, enlarged abdominal end. Their black bodies are marked in yellowish or green patterns. The common Cobra Clubtail and the rarer Skillet Clubtail have especially large flattened abdomens and wide-set eyes.

Most Clubtails like streams and windswept shores of large lakes. They often fly over open water and dart among resting places on rocks, stones or leaves. Clubtail larvae are "burrowers" that lay in wait for prey just under the surface of the stream bottom.

The spectacular Dragonhunter (genus *Hagenius*) is black with bright yellow markings. It has a small head and eyes, long legs and wings, and a huge thorax — a real powerhouse in flight! "The Hag" eats other dragonflies and large in-

sects like swallowtail butterflies. It is the largest clubtail in North America.

## 5. CRUISERS

Most Cruisers (*Macromiids*), also called River Skimmers, are black with yellow markings, and have stiff narrow wings built for sustained speed. The males are very territorial and cruise back and forth all day along the shores of large streams and lakes.

Females lay eggs by dipping their abdomens repeatedly in the water in a skipping motion like the Clubtails. Cruiser nymphs have distinct round-shaped bodies and very long spider-like legs. They are known as "clingers" because they hang onto the underside of rocks and wait for prey.

The Swift River Cruiser is a splendid large dragonfly common in Northern Wisconsin. It is black and yellow, has emerald eyes and is very fast!

## 6. SPIKETAILS

Spiketails (or *Cordulegastrids*), also known as Biddies, emerge in spring from clean, cold, small headwaters and trout streams. Females have spike-like ovipositors to thrust eggs sewing machine-style into sand or soft muck bottoms in shallow water. Nymphs have laterally positioned legs and are known as "sprawlers." They cover themselves with silt at the stream bottom and grab any prey that happens by. Adults fly back and forth along the waterway hovering about a foot above the surface.

The Twin-spotted Spiketail has small, bright green eyes (aqua in those found in the southern U.S.), and double yellow spots that repeat in a kaleidoscope pattern on each of its black abdominal segments. They are large, fast, and very beautiful! The Arrowhead Spiketail is not common but is noted for its very striking yellow-on-black color pattern.

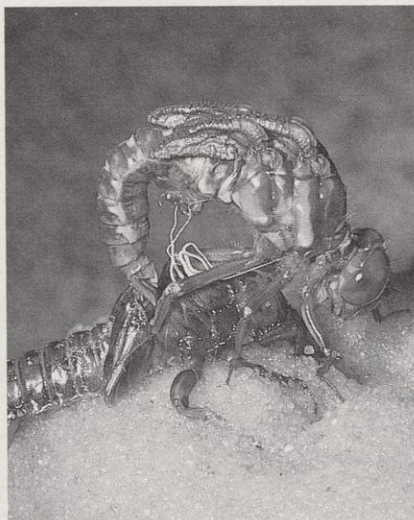


all directions, although less well directly to the rear — which is why net wielders are more successful if they swing their net right after the dragonfly has gone by.

The dragonfly's cellophane-like wings are actually nonliving cuticle supported by a network of veins that carry blood vessels, air ducts, and nerves. Tiny hairs on the veins detect the pattern of air flow over the wings and relay information to the nervous system. A characteristic vein arrangement helps classify each species.

Dragonflies are the only insects with flight muscles attached directly to their wing bases. Other insects fly by changing the shape of their thorax. Dragonflies flap their wings in unison, for maximum lift during take-off, then alternately flap their hind and forewings once airborne. They can also control wing movements independently.

Flight mechanics aside, you can't beat the sleek styling and sophisticated design of a dragonfly. Their



SIDNEY W. DUNKLE

An amazing metamorphosis. A dragonfly (*Progomphus obscurus*) emerging from its larval exoskeleton.

double-winged symmetry, uniquely-patterned wings, streamlined shape and bright colors glinting in sunshine make dragonflies some of the most beautiful creatures in the insect world.

The Natural Heritage Inventory Program, a section of DNR's Bureau of Endangered Resources, identifies, lists, and assesses populations of Wisconsin's plant and animal species. Their records currently list 152 Odonates in Wisconsin, including 108 dragonflies. Of these, about a third are common, a third are rare, and populations of the remaining third are not known.

"We know [which species] are rare but we don't know what's lost because the state has no baseline data," says Bill, who coordinates the inventory for DNR. "Not enough collecting was done 200 years ago, 100 years ago, or even 20 years ago to provide a picture of what was here before people started tinkering in a big way with the Wisconsin landscape."

Seven species have not been seen or collected in Wisconsin since the early 1900s. Two of them, the Gilded River Cruiser and the Painted Skimmer, used to roam southeastern Wisconsin.

The most threatened dragonfly species spend their larval stages in streams and rivers or in specialized habitats such as headwater bogs and seeps. These species can't tolerate changes in aquatic environments that increase

siltation and turbidity, alter temperature, or decrease oxygen content. Culprits include clearcut forestry, farming practices that expose topsoil, livestock access to water, water impoundments, dredging, construction runoff, and chemical and sewage contamination.

This sensitivity to habitat change makes some dragonfly species especially good indicators of water quality. Field collections in 1989 on different branches of the Flambeau River in northwestern Wisconsin produced strikingly different results: Sections of the South Fork, which has few dams and relatively little human alteration, produced 18 species of dragonflies; while portions of the North Fork, which is more heavily dammed and below a paper mill, produced only three species.

Bill's research in 1989 produced another surprise: an entirely new species of dragonfly! It was found on a short stretch of the St. Croix River and later named the St. Croix Snaketail. This exciting find attracted national news coverage. Intensified research in the past few years has discovered populations of 25 uncommon species that were likely always here but never documented in Wisconsin.

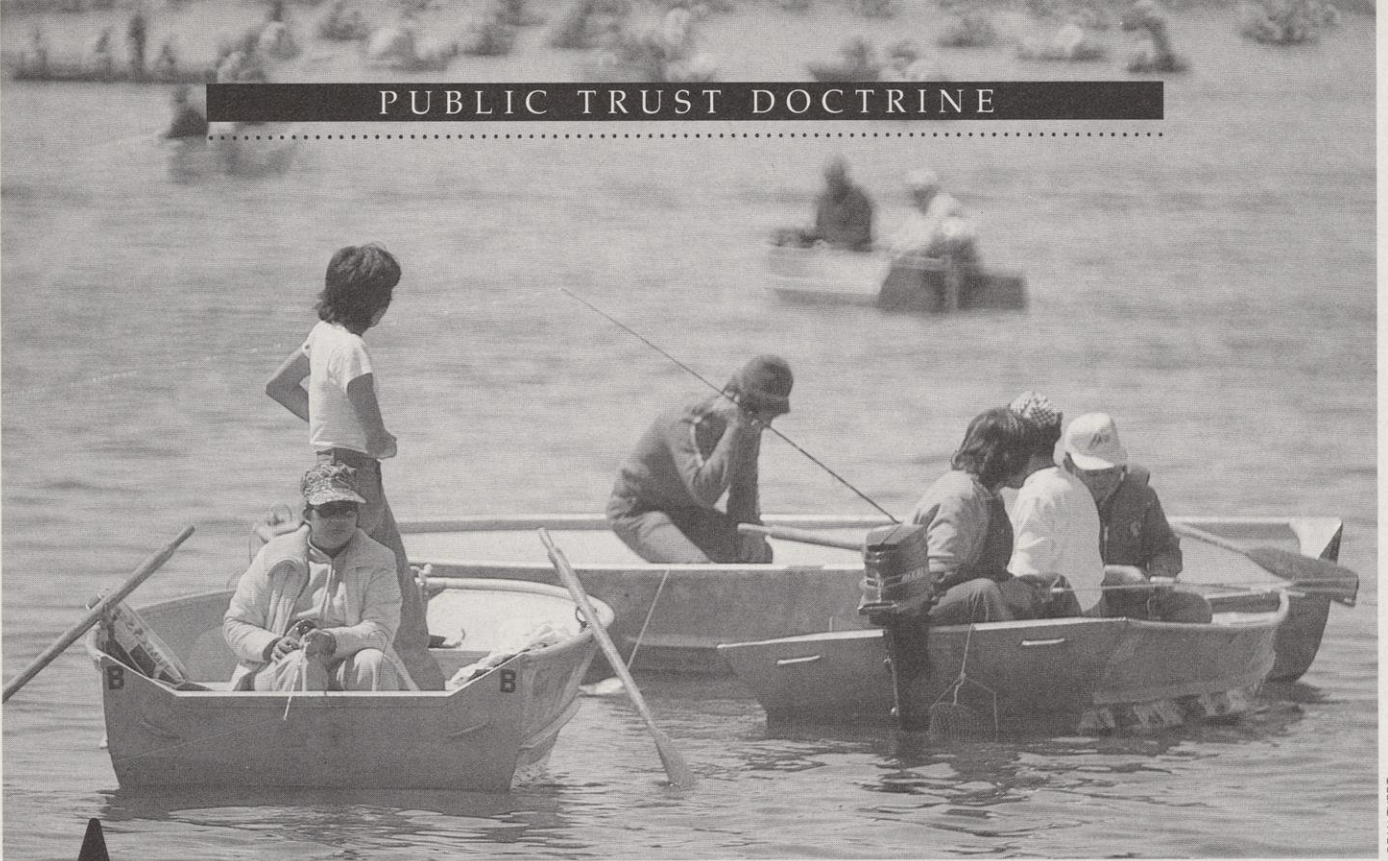
Oh yes, Corbin did finally catch that strange dragonfly cruising the Mississippi River wing dam. It turned out to be a Royal River Cruiser and the first documented record of that species in Wisconsin. Corbin's final successful swing didn't win him a place in a baseball hall of fame, but it did win him a turtle sundae. □

*MaLenna S. Smith, former biology teacher, lives near Leland. Her family shares space with boxes of pressed plants, insect collections, jugs of clam shells, three aquariums, nets, binoculars and many, many field guides.*

## DRAGONFLY BOOKS

The first field guide devoted exclusively to dragonflies was published just two years ago. It is *Dragonflies of the Florida Peninsula, Bermuda and the Bahamas* by Sidney W. Dunkle, Scientific Publishers, P.O. Box 15718, Gainesville FL 32604. It contains many, but not all Wisconsin species; has excellent color photos and interesting notes on behavior, flight, and ecology. The *Audubon Society Field Guide to North American Insects and Spiders*, and *Peterson's Field Guide to the Insects* have pictures of some common dragonfly species and good descriptions of each family. More detailed and technical information can be found in *Dragonflies of North America* by Needham and Westfall, and in *The Odonata of Canada and Alaska* by Walker. An excellent book for youngsters and adults is *Dragonflies* by Molly McLaughlin.





DEAN TVEDT

# A tug of war over water



ROBERT QUEEN

Property rights, new types of recreation and changing lifestyles are stretching our water rights in different directions.

*David L. Sperling*

The public trust doctrine, the underlying bed of common rights to public waters, continues to be shaped as we meander through time.

In the early years of European settlement, waterways were the lifeblood of commerce, and water rights were forged by and for the powerful — to float logs, to power mills, to link merchants to their markets.

As the nature of our work has changed, so have the questions that mold water rights. Ours was an economy based on long days of hard, manual labor in the factory or field. Compared to other regions, the Wisconsin economy still holds more tightly to that ethic — casting en-

gines, canning vegetables and cutting pulpwood. However, our job market is also branching into a service economy and spawning a host of smaller businesses like computer companies, sportswear, sporting goods and fast foods. Moreover, these days, even the machinist, the pea picker and the paper maker work an eight-hour day and a 40-hour week.

In theory, we should have more leisure time. In reality, day-to-day pressures of two-income households or single-parent families cut into our free time. It's a sad fact that some people feel compelled to plan their play time as tightly as they plan their work time. This no-nonsense ap-

proach to leisure shapes our lifestyles and our attitudes about water. More of us want to live by the water or get onto it quickly. And we want to bring a wide variety of water toys with us. People who can't afford to live by the water during their working years often like to retire by it.

Our collective desires for water recreation create conflict. Some people seek solitude and end up in flotillas of other boats. Some try to sail and motor through the same bays at the same time. Some want to set up private swimming rafts, ski jumps, boat shelters and piers in public waterways. Developers aim to meet recreational demand by revitalizing wa-



terfronts and sprucing up old navigation channels into marinas and restaurants. No one envisioned such diverse, disparate interests when the public trust doctrine was formed. Yet the body of laws and interpretations that resolved past conflicts is still up to the task of shaping present policy.

## Defining where lands meet public water

Private property ends at the lake-shore, and you might think that's an easy boundary to define — it's yours 'til your feet get wet. In fact, it took

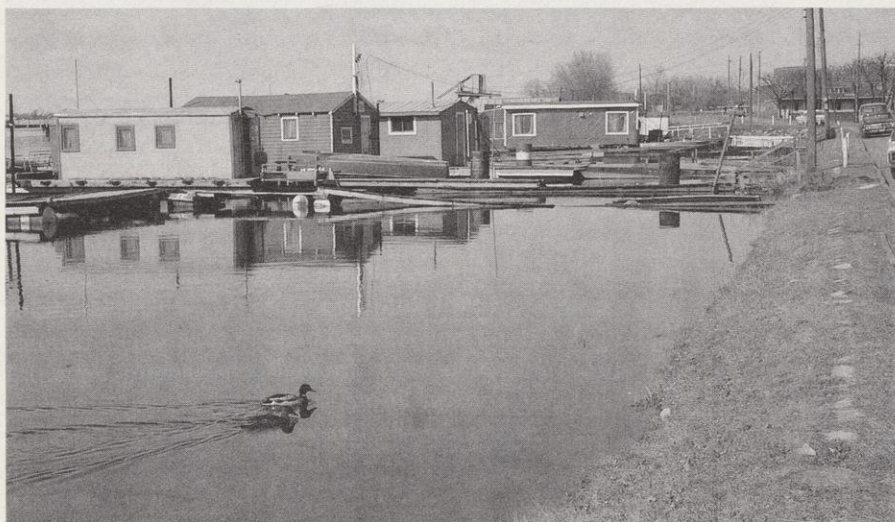
change rights to the shoreline. When the water is higher, the public can use all areas that are wet. When the water is lower than normal, the riparian has exclusive rights to the exposed land until the water rises.

Zoning laws are created around shorelands to protect public rights to this fluctuating zone, to preserve shoreland scenery and to buffer the water environment from human development. This nearshore area serves as nursery for most fish and as grocery shelf for most aquatic organisms. It's a fragile zone that is especially susceptible to pollution from er-

that rose up to a sandbar before sloping down to the deeper waters of Plum Lake. Hixon had heart trouble, and he had a tough time negotiating the shallow waters between his land and the deeper part of the lake. He hired a contractor to dig a channel out to the sandbar, sink pilings, enclose the pilings with pine, fill the box with rock and tamp it full of sand and earth to form a hook-shaped breakwater. The state took Hixon to court because the breakwater filled in public waters, blocked navigation and impeded the free flow of water. In a landmark decision of the 1966 case, the court stated: *"There are over 9,000 navigable lakes in Wisconsin covering an area of over 54,000 square miles. A little fill here and there may seem to be nothing to become excited about. But one fill though comparatively inconsequential, may lead to another, and another, and before long a great body of water may be eaten away until it no longer exists."*

One area where the public good has made special concessions to riparians is in the construction of piers, boat shelters and swimming rafts. Piers guarantee landowners' rights to navigable waters at least three feet deep during summer. Boat shelters are used to cover watercraft, but their precursors, boat houses did much more. Many were actually elaborate extensions of the main house with verandas, rooms, storage areas, and, oh yes, several slips for boats. A La Crosse-area custom allowed floating mobile homes under the guise of boat houses. Equally elaborate rafts and homes jut out into the Wolf River. Some are elegant, some are eyesores, but all occupy public waters. Since 1979, laws have prohibited permanent boat houses below the Ordinary High Water Mark.

In 1988, the State Legislature revamped laws to allow boat shelter construction while protecting shoreline aesthetics and vistas along river and lakefront property. The lawmakers directed the Department of Natural Resources to set the guidelines for future boat shelters. Hearings



COURTESY OF THE BUREAU OF WATER REGULATION AND ZONING

Gray areas in the law continually test the trust doctrine. Floating house boats anchored to shore were historically permitted in Copeland Park, La Crosse.

years of case law to keep the private land-public water border from shifting with the sands and changing with the tide.

The legal boundary between public and private ownership on most waterways is called the Ordinary High Water Mark. It's the point on the shoreline where water is present often enough to make the lakebed or streambed look different from shorelands. You can usually see this point on the bank where water or wave action leave a line or mark that stains the rocks, erodes the bank or changes the vegetation. The "water" side of the mark is protected by the public trust doctrine for public use; the "land" side is considered owned by the riparian.

Fluctuating water can temporarily

oding soil, fertilizers, failing septic tanks, and the like. By protecting their investment in lakeside property, riparians also protect the public trust.

## Extending private reach into public waters

The public trust doctrine prohibits placing structures that are unrelated to navigation on the bed of navigable waters, but it does not prevent all minor alterations of the natural boundaries between land and water. The Legislature and the courts determine whether such minor boundary changes are appropriate.

One such case in June 1958 tested the legal waters. The waters off Mr. F.C. Hixon's property in Vilas County were quite shallow, less than two feet deep for a 75-foot stretch



## PUBLIC TRUST DOCTRINE

to discuss various options opened up a floating can of worms. A wide range of proposals are currently under review. They vary from banning future permanent boat shelters to restricting permanent shelters, from placing tighter limits on seasonal shelters to relaxing limits on seasonal shelters that have roofs but no permanent sides.

Shoreland owners feel on opposite sides of a philosophical fence from the rest of the public. Property owners invest an arm and a leg, if not their life savings, to buy a place on the water. They expect to enjoy the view, a little boating, a little swimming, and some peace and quiet. Nonresidents want to use the water while enjoying a natural shoreline. Riparians talk about their "rights" to build towards the water. The unlanded seadogs talk about public "privileges" that are being traded off to private landowners.

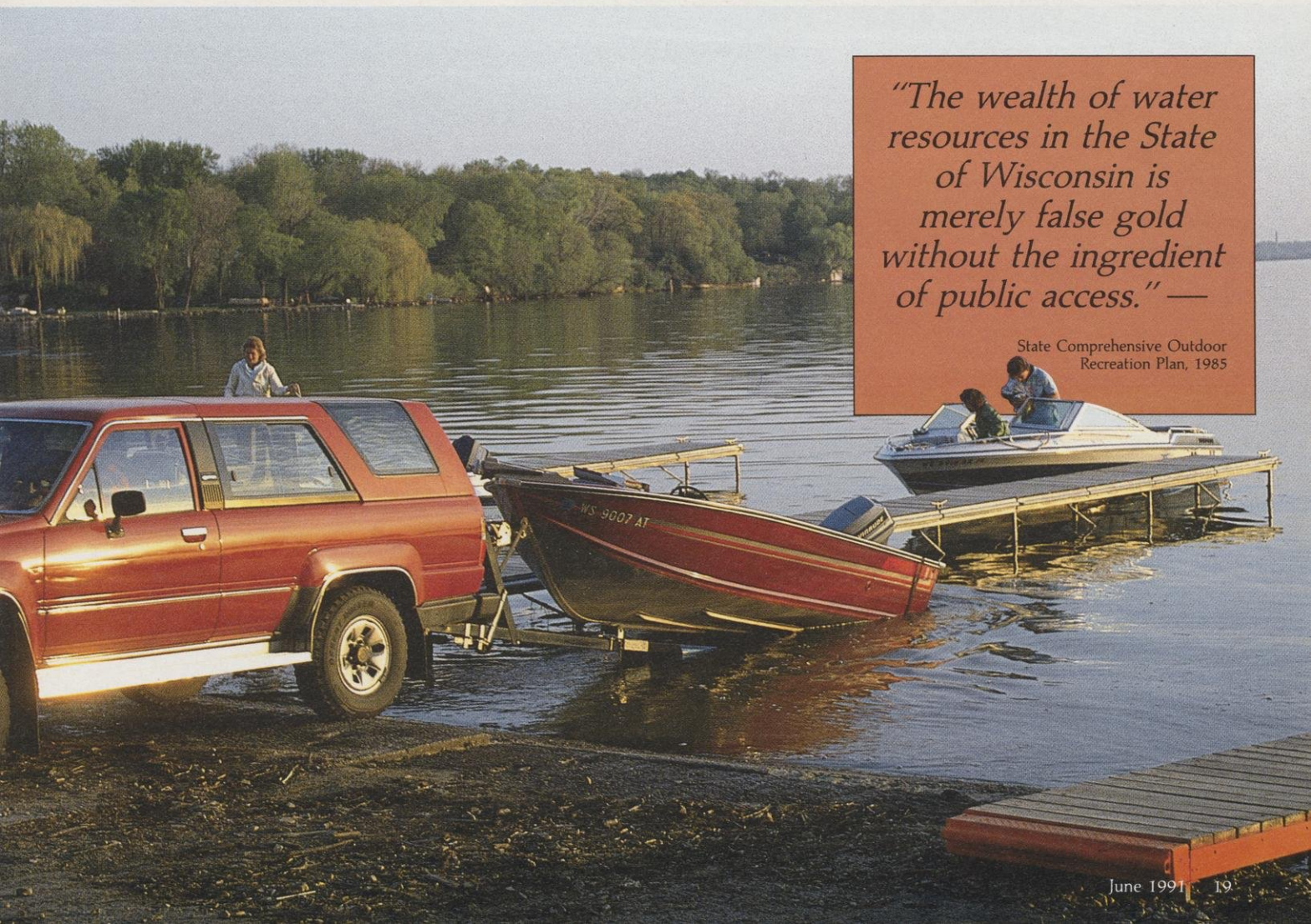


COURTESY OF GENEVA LAKE PROPERTY OWNERS ASSOCIATION

Proposed guidelines raised questions about boat shelters that intrude into waterways held in trust for public use. Open-sided, grouped shelters that blend in close to the shoreline are more desirable than separate ones that occupy a lot of space . . . but should they be allowed at all?

*"The wealth of water resources in the State of Wisconsin is merely false gold without the ingredient of public access." —*

State Comprehensive Outdoor Recreation Plan, 1985







Access to water is as equally important a right for sunbathers and swimmers as sailors. Communities decide how much of the shorelands will be opened for group enjoyment or closed for private solitude. Balancing these needs determines the character of a waterway and a vicinity.

## Getting onto the water

Even Wisconsinites who don't live on the shoreline spend a lot of their play time on the water. Thirty percent of us use the Great Lakes, 40 percent ply state rivers and more than half enjoy spending time on our inland lakes. Public funds have developed thousands of beaches, ramps and roads leading to water, but the public need is even greater. Public accesses reach 90 percent of the lake acreage in Wisconsin, yet only 41 percent of the lakes. How can that be? Well, nearly 80 percent of Wisconsin's lakes are smaller than 25 acres and relatively few of these have or may warrant public access.

Statistics mask other concerns about equal, adequate access to water. A DNR survey of recreational conditions noted that "Much of the existing access consists of a road ending at the water's edge without a boat launch, parking or public restrooms. In some instances, the public way to

water may consist of a simple walk-in trail."

Some people like it that way, others are looking for lighted ramps, dockside fueling and gourmet restaurants. Even ramps and beachfronts that most would consider fully developed are often inaccessible to disabled people and others who have difficulty negotiating long walks over uneven terrain.

Regional needs for public access to water vary dramatically. The need is much greater near populous southeastern Wisconsin cities where lake frontage is primarily locked up in private ownership. Recreational surveys suggest that southern Wisconsin waters need more, high-quality, affordable ramps and beaches; launch sites on northern Wisconsin lakes need to be repaired or improved to better handle demand.

Then, of course, there are conflicts between shore property owners and nonresidents who want to use the water. By tradition, county and town

zoning set the tone for the kinds of shoreland homes and businesses residents can build. Public access to water reflects community sentiment. Where towns view local lakes and rivers as a business opportunity, boat launches, beaches and motels encourage vacationers and tourism. By contrast, shorelands developed as second homes and weekend cottages for city folks aim to protect privacy and seclusion; fewer accesses are developed. Questions about public access and competing lake interests become a community pressure point and a battleground. The state recreation plan in 1986 summed it up: "Riparian users do not want more use of 'their' lakes and nonriparians 'want in.'"

Both sides raise valid arguments. Water law and the public trust doctrine don't give landowners first rights or exclusive rights to water. In fact, the trust doctrine tips the scales in favor of the public by justifying access to all waters, even those with de-



veloped shorelines. On the other hand, lakefront property owners don't typically object to the concept of public access; they object to the noise, litter, crowding and on-water congestion that boat launches and marinas can bring.

Some landowners on lakes with no public access points argue that private boat ramps, beaches and parks, which are available for a fee, open up the lakes to the public. Legislators and recreational planners don't see it that way. The State views lake overuse as a consequence of overdevelopment and commercialization more than pressure from public accesses. Second, fees for private boat launches on public waters should be reasonable and affordable — about the same price as access to state parks and forests. Third, public accesses should still be sought on lakes with private launches and livery services because these businesses will not remain open indefinitely. Many of these small resorts and mom-and-pop campgrounds are subsequently sold to developers for homes or condominiums. Then the access is gone.

## Safety offshore

The public trust evolved to guarantee people equal opportunity to use and enjoy the water, but once you are offshore, you're on your own.

Historically, the rules of the water have been a lot less restrictive than the rules of the road. These days, people are equally concerned for their rights and safety once on the water.

Local laws and ordinances define common rights where speed boats, fishing rigs, jet-skiers, sailors, sailboarders, canoeists, divers and swimmers vie for the same space, but water safety still works on the honor system. You have to carry safety equipment, but you don't have to know how to use it. Skippers are encouraged, but not required, to take safety courses that protect their passengers and their craft as well as other boaters. On-water crowding and the vast array of maneuverable watercraft demand alert, skillful and courteous practices.

To protect and accommodate the wide variety of water users, communities can set standards for expected behavior on the water. Some consider zoning portions of a lake or times of day when certain water sports can be enjoyed. Some set traffic patterns and establish slow-no-wake zones in crowded areas and around

When development issues raise the stakes, water rights cases end up on the judicial doormat. When riparians want to build shelters for a fleet of boats, when people want to live on boats, when cities envision floating entertainment barges and restaurants, when new building techniques make it feasible to cantilever buildings over



Different users need different kinds of access to water. Some can make do with a small clearing, others need paved ramps and lighted piers. All users need to know their craft and behave safely to equally enjoy lakes and streams.

nonmechanical craft like rowboats, sailboards, sailboats and canoes. Some would like minimum training and certification programs for boaters. Some question if sobriety standards are warranted for boaters since alcohol-impaired judgement has been a factor in many accidents.

Most of these on-water behavior issues get resolved over backyard fences, in town meeting halls, at county hearings and in legislative committee rooms. Very few create a tangled, philosophical logjam that jurists must sort out.

the water — when reasonable people can't reach reasoned decisions, the courts often draw an answer from the public trust doctrine — a body of common law that has provided a sturdy but flexible framework for resolving disputes over troubled waters. □

*David L. Sperling edits Wisconsin Natural Resources.*

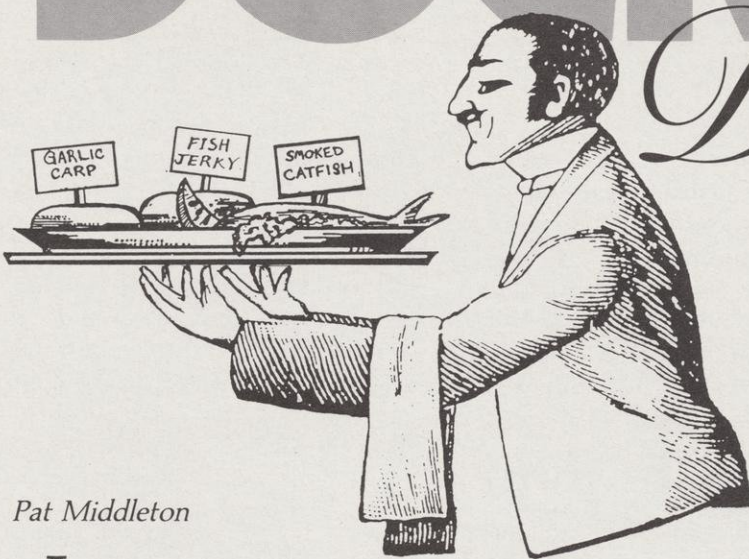






# DOCKSIDE

## Delicacies



Pat Middleton

Fish bologna?

Smoked catfish?

It's a new niche  
for old-time fish markets  
along the Great River Road.

In a day when mega-supermarkets and quick-stop shops are the norm, the small fish markets that dot the Upper Mississippi River are disappearing. For the dwindling number of commercial fishermen, threatened by declining markets for fresh fish and abundant southern "farm-grown" catfish, survival has meant cornering specialty markets. The smells, sounds and sights of these riverside fish markets give visitors distinctly sensual rewards and a rare glimpse of a vanishing river lifestyle.

A trip to the riverside fish markets is a sure hit with visitors to Wisconsin's "west coast." Stacks of fishing gear, jumbled nets, dilapidated sheds and the swashbuckling demeanor of the fishermen bring a taste of the sea to the heartland. The pungent smell of fresh and smoked fish reminds us that here is "real" food, wrested from nature itself.

Morning is a busy time around the market. Fishermen jostle through the market door hauling washtubs filled with carp, bullhead, sheepshead, buffalo, or catfish to be weighed. A forty-pound snapping turtle with bear-sized claws hisses angrily as sev-

eral men try gingerly to prod it out of a rough gunnysack. An old fisherman cusses, dumping the creature unceremoniously into a garbage pail in the walk-in refrigerator. It will hibernate there until someone orders "fresh" turtle for soup at \$2.50 per pound.



Workers take a break after the morning rush at Beck's Fishery in Genoa.

By noon, the rush is over and visitors may be invited to see the fisherman's personal collection of river oddities. Be prepared. The odor in the market (though well-scrubbed) is distinctly fish and river! You may find, as I did, a 57-pound buffalo fish mounted on the wall, a 45-pound catfish, frozen for future mounting, or a prehistoric-looking paddlefish sulking in a live tank. A semi-retired fisherman told

me that's part of why he always enjoyed fishing: "You never knew what would come up on the line each day."

The fishermen themselves are a vanishing breed. According to Ken Von Ruden, a fish technician with DNR's Mississippi River Work Unit, only 40 people seriously use setlines along the Wisconsin shore of the Mississippi. All but a handful of these must also work a second job.

"I haven't had a kid ask me in 10 years where to buy a setline," Roger Beck of Genoa confirms. "There were 25 fishermen in Genoa when I was a kid, and every boy had his own setline. When we're gone, there just won't be any more commercial fisherman." Beck has discouraged his own sons from the business. "You could make a good living years ago, but not today. The market's not there. People's tastes have changed. Today you do better by going to school, but it wasn't always that way."

Indeed, the daily routine of setting lines (yes, even through the ice) and bringing in the catch is rough work, considering the vagaries of Midwestern weather and a huge brooding river. Every fisherman has his story of 80 mph winds and boat-eating waves.

Each day starts about 5:30 a.m. The commercial fisherman motors out to his white flagged poles that anchor

◀ All in a day's work. Butch Engh is one of the few who haul in a daily catch of rough fish for commercial markets along the upper Mississippi River.



setlines laid out the night before. Each setline has dozens of sharp hooks baited with grasshoppers, leeches, minnows or whatever the fish are biting on. Hook by hook, the lines are brought up, cleared of fish debris and carefully untangled. Many of us have experienced the bite of a fish hook. Dealing with dozens of hooks simultaneously is treacherous — particularly in a rocking boat, when a cantankerous 35-pound catfish is thrashing about with nine hooks imbedded in its thick upper lip! The fish are tossed to the center of the 26-foot johnboat and lines are carefully arranged in boxes.

After breakfast, the haul is cleaned and processed for market. The lines are cleaned, and each hook is baited (worth a nickel-a-hook for an enterprising child) and set back into its own slot on the edge of a long wooden box. By mid-afternoon, the fisherman is back on the water, this time with monofilament gill nets which are used solely to catch carp and other rough fish. The re-baited setlines go out during the early evening. There's time for supper around 9 p.m.

Local cafes that specialize in river fare add a special flavor to the river towns of Alma, Genoa, DeSoto, and at the Swing-Inn in Ferryville, Wisconsin. Pier 4 in Alma has offered blackened catfish, Cajun-style. Catfish cheeks at the Big River Inn, Genoa, are light, tender, sweet and tasty. Local fish are also served at the Bright Spot in DeSoto, where a rare paddlefish is mounted over the bar.

While most fish markets along the river offer a variety of fresh and delectably smoked river fish, Boardman's, just south of DeSoto, specializes in variety processing. Boardman's makes and ships fish jerky, fish bologna and fish summer sausage throughout the United States. Pepin Fisheries, in Pepin, still ships whole fish, scales on, in refrigerated trucks for fresh sale in Chicago, New York

and other large population centers. Growing Asian communities in the United States provide one of the few new markets for the 2.5 million pounds of Mississippi River fish harvested annually in Wisconsin.

**H**as the river changed noticeably in the years that Roger Beck and Butch Engh have worked it? Both say, yes, definitely. Beck expresses concern about the multiplying carp population in pools south of Trempealeau.

"It's like having millions of pigs rooting around the bottom the river!" he says. "I see 9,000 pounds of buf-

gin to make a profit by harvesting this almost unthinkable volume of rough fish."

Butch Engh immediately mentions sedimentation. "It's the biggest problem I see," he offers. "The shorelines and islands are being eroded and the wash, or sediment, is filling in many of the deeper holes and ravines in the river. Yes, the Army Corps of Engineers is maintaining a nine-foot deep shipping channel, but backwater areas that used to be eight or 10 feet deep are now two to four feet deep. There seems to be a lot of water out there, but most is too shallow to take a boat into."

There is very little worry right now about PCB levels in river fish caught downriver of Lake Pepin. Most contaminants from upriver cities and businesses settle out of the water above Lake Pepin. The U.S. Food and Drug Administration has lowered tolerances in commercially caught fish from five parts per million just five years ago, to two parts per million currently. Yet Engh notes most commercially-harvested fish tested contain a trace — less than 0.2 parts per million — of PCBs. Only carp larger than 24 inches and channel catfish larger than 21 inches pose a PCB risk according to State Division of Health and DNR guidelines set for sport anglers.

Does the Engh family eat fish? "You bet," Butch grins, "usually three or four times a week — and sometimes three times a day!" □



Readying setlines. Strings of sharp hooks will be baited, anchored and set out overnight. You never know what will come up on the line the next morning.

falo and sheepshead every week. I believe they are becoming thinner and smaller on average than they were even four years ago. (The rough fish we want) are being starved out." Carp have disturbed the bottom to such an extent that the water is constantly cloudy and vegetation is being stripped away for vast stretches of river bottom.

Beck thinks carp could provide a new business opportunity. "I think we have to come up with some kind of processing industry," he said. "Whether for animal feed, fertilizers, or whatever, (some business) can be-

*Pat Middleton is an international traveler, Wisconsin native, and Mississippi River writer and speaker. She is the author of Discover! America's Great River Road, A Guide to the Heritage, Natural History, and Recreational Resources of the Upper Mississippi River Valley, which is available from bookstores or directly from Heritage Press, Stoddard, Wisconsin, 54658, for \$11.95.*





# Mercurial nature

Researchers tracking the toxic element in Wisconsin waters discover that a little goes a long, long way.

Sunset on a Vilas County lake under study.

*Steven Claas*

On a cool June dawn, a hardy angler rows across a secluded Wisconsin lake, baits up in a small bay and starts jigging for panfish. The first strike of the morning doesn't yield a crappie, but a fat 26-inch walleye! The angler eases the fish up, carefully removes the tiny jig, admires the fish for a brief moment and releases it. A walleye would be both a welcome and tasty bonus to a mess of panfish, so why was this prize catch released? First, there are plenty of smaller fish that provide better eating. Second, this angler suspects it's unwise to eat

large walleye from this particular lake: the large game fish here are contaminated with the toxic metal, mercury.

**U**seful, but potentially toxic

Mercury, a.k.a. quicksilver, is a shiny, bright, volatile liquid metal with a number of unique and useful properties. It's used in thermometers because the metal expands and contracts at a constant rate as temperatures change. Fluorescent lamps and some dental fillings also contain mercury. Since mercury conducts electric-

ity, it's widely used in batteries, silent light switches and household thermostats. Mercury and mercury compounds are commonly blended into mildew resistant paints and agricultural pesticides because the metal is a fungicide.

Ironically, mercury's toxicity has been recognized as long as its many uses. The Mad Hatter in Lewis Carroll's novel *Alice in Wonderland* was a mercury victim. Haberdashers of the mid-1800s spent hours with their hands immersed in open vats of mercury shaping felt hats. Acutely poisoned, hatters suffered a high incidence of nervous conditions and madness.

Many mercury compounds can easily penetrate the body's natural defenses. Symptoms from serious exposures like those hatters received range from tunnel vision and numbness to deafness, impaired speech and loss of movement. Kidney failure and birth defects have also been linked to mercury poisoning.



Concern over mercury poisoning reached a new high during the mid-1950s when more than 100 people died in Minamata, Japan. The tragedy gave rise to a flurry of research about mercury chemistry and toxicology.

Recent research about much, much smaller exposures in Wisconsin raises other concerns. Certain species and sizes of game fish concentrate mercury at greater than the 0.5 part per million (ppm) limit set by the state as safe for human consumption. Since concentrations of mercury in air and water are naturally very low, expo-

(right) Getting to the bottom of an environmental puzzle. A researcher from the University of Wisconsin-La Crosse collects lakebed sediments. The core samples are analyzed to measure how small amounts of mercury are changed by living organisms to more toxic compounds.



TOM BOULDEN

sure to ambient mercury generally is not viewed as a health threat. It is very important, however, to limit exposure to food, like large game fish, that can accumulate the element.

Each year, as more of our state's lakes are sampled, more are listed in a sport fish health advisory produced by the Department of Natural Resources and the Division of Health. Currently, about a third of our lakes that have been sampled are on the list. The situation is similar in Minnesota and Ontario.

The state of Michigan has placed all of its 10,000 lakes on an advisory list. Surprisingly,

## K

### eeping it clean

If people have been aware that mercury can be toxic for so long, why are researchers only now asking basic questions about it?

Actually, people have been measuring mercury in lakes for years, even in northern Wisconsin. Unfortunately, much of the environmental mercury data collected for more than 60 years before the mid-1980s had to be discarded. Lakes in pristine areas contain extraordinarily low concentrations of mercury. Many of the techniques used to collect and analyze samples actually added huge amounts of mercury to the samples. This contamination led scientists to believe environmental mercury levels were substantially higher than they really are.

Knowing that simply breathing into a sample bottle can artificially double mercury concentrations, MTL researchers employ special "clean techniques" when handling mercury samples.

During field collection and lab analysis, technicians don plastic gloves, lint-free suits and hoods to



ROBERT QUEEN

Technicians don lint-free suits and plastic gloves to sample water. Mercury concentrations in lakes are so small that touching the sampling bottles or breathing into test equipment could contaminate the specimens and invalidate the tests.

keep dust out of samples. All sampling equipment such as water-pumping lines and bottles are constructed of Teflon and have been rigorously cleaned in hot acid to remove trace amounts of mercury. Lake samples are collected from a thoroughly cleaned non-metallic boat.

Samples are analyzed in specially constructed clean laboratories equipped with mercury-free work areas. These labs receive a constant flow of clean outside air. The air entering the clean lab passes through a

series of super-fine filters removing dust and other airborne particles which can contaminate samples.

By using these careful procedures along with innovative analytical techniques developed by project scientist Nicolas Bloom of Brooks-Rand Ltd., Seattle, MTL investigators can be assured they have collected reliable data. Armed with these new and accurate measurements of environmental concentrations, scientists can continue to piece together the tiny pieces of the mercury puzzle.



many of the contaminated lakes are located in remote areas, far from obvious sources of contamination.

## B Building a research team

In the summer of 1988, the Wisconsin Department of Natural Resources pioneered a four-year research project to investigate how mercury moves through aquatic food chains in remote lakes. The study, dubbed Project MTL, for Mercury in Temperate Lakes, is also funded by the Electric Power Research Institute, a research arm of the nation's power utilities.

Scientists from the DNR's Bureau of Research, four universities, two consulting firms, and two federal agencies form a team of more than 20 individuals trying to unravel the mysteries of mercury in our state's lakes and fish.

Information from past surveys and research, led Project MTL coordinators to study seven lakes in Vilas County whose chemical characteristics were previously studied. Through field observations and comparisons among the lakes under study, investigators want to determine the source or sources of mercury in northern Wisconsin's nearly pristine lakes. Secondly, researchers want to learn what happens to the mercury once it enters lakes.

## H How mercury reaches lakes

The seven lakes under study are all isolated seepage lakes — no streams or rivers flow into or out of these waters. Any traces of environmental contamination likely come from dust particles or water droplets which scavenge mercury from the air and fall as polluted rain or snow, or from groundwater seeping through the lake bottoms.

"One of the most significant things we've learned is that the sky is the major source of mercury to our lakes," says MTL Chief Scientist, Carl Watras, of the DNR's Water Resources Research Section. Rain and



STEVEN CLAAS

Snow, rain, dust and ice are all analyzed to piece together the clues that show how minute quantities of mercury are carried long distances to lakes and what happens as mercury moves through the food chain.

snow samples collected in the study area demonstrate that precipitation carries enough mercury into the lakes to account for all the mercury found in these fish and waters. Rain and snow carry a steady but minuscule concentration of about 10 parts per trillion mercury. Dust, soot, smoke and other particles carry about a third of the total amount of mercury into the study lakes.

You have to think really small to appreciate the tiny amounts of mercury researchers are measuring. Investigators calculated the total amount of mercury falling into a 20-acre study lake in a year is a mere 0.8 grams — less than 3/100 of an ounce, less than the weight of two paper clips, less than the amount of mercury in a fever thermometer. Amazingly, analysis of lake sediments and other samples show that this scant drop of mercury is still two to three times the amount that fell into this lake during pre-colonial times. Human activities today account for 30-50 percent of this mercury; burning fossil fuels accounts for half of that amount.

Even smaller amounts of mercury were measured in groundwater seeping into the study lakes. Researchers conclude mercury contamination from groundwater in the study area is minor compared with atmospheric contributions. "This may not be true for lakes in different geologic settings," advises project scientist Dave Krabbenhoft of the U.S. Geological Survey.

## H How mercury moves and builds up in water and fish

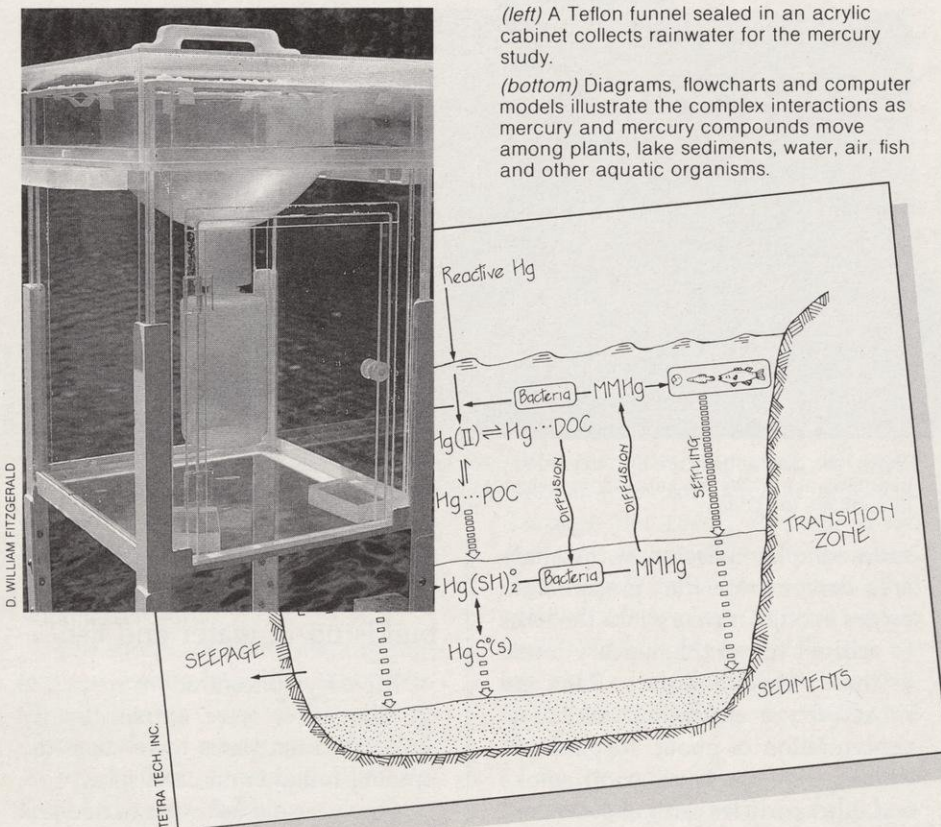
Mercury concentrations measured in lake water were extraordinarily low, often ten times lower than the amount found in rain and snow.

One-year-old fish were netted and analyzed for mercury. Researchers were not surprised that fish contained 0.1 ppm mercury. Many fish species are contaminant "sponges," readily accumulating pollutants such as PCBs and heavy metals. Highest levels of environmental pollutants are often found in large sport fish that prey on smaller fish. Scientists were intrigued, however, to discover that fish can build up toxic levels of mercury from lakes that have minuscule concentrations. In some study lakes, fish accumulate a million times more mercury than the water they live in.

Data from Project MTL reaffirms findings from previous state surveys and research. Acidic lakes and lakes sensitive to acid rain contain fish with higher levels of mercury than acid-tolerant lakes. For example, year-old perch taken from a high-acid study lake (pH 5.2) concentrate twice as much mercury as fish sampled from a low-acid lake (pH 6.1).

Accurate measurements of mercury concentrations in rain, snow, lake water and fish created as many mysteries as answers. One of the most interesting findings is that mercury falling into the lakes is chemi-





(left) A Teflon funnel sealed in an acrylic cabinet collects rainwater for the mercury study.

(bottom) Diagrams, flowcharts and computer models illustrate the complex interactions as mercury and mercury compounds move among plants, lake sediments, water, air, fish and other aquatic organisms.

about the 'how and why,' " says Watras. How methylmercury is produced and why lakes produce different amounts of this toxicant is the next frontier.

Novel sampling equipment enabled Watras' team to take electronic "snapshots" that locate and sample the thin layers of bacteria and algae between the water's surface and the lakebed. We know micro-organisms can produce methylmercury, Watras relates, and we suspect certain ones are converting inorganic mercury to this toxic form.

William Fitzgerald of the University of Connecticut plans to continue studying the mercury that stays in elemental form and is released as a gas.

Jim Hurley, DNR Water Resources researcher, Dave Krabbenhoft and Anders Andren of UW-Madison will take a closer look at mercury in lake sediments. Learning how, when, and why mercury recycles back into lake water will help compare the importance of mercury "recycling" with new atmospheric sources.

A computer model based on this field research, developed by Steve Gherini and Bob Hudson of Tetra Tech, Inc., will simulate how mercury travels through lake ecosystems. Lake researchers will use the model to test pollution management strategies before trying them on real lakes.

Each of these new approaches will help explain how mercury behaves in aquatic systems. Armed with a deeper understanding of mercury movement, lake managers want to be part of the team that will break this cycle. As manufacturers find nonhazardous substitutes for mercury, as we either curtail or clean up fossil fuel emissions, as each piece of the research puzzle fits into place, Wisconsin moves closer to the day when mercury health advisory lists will no longer be necessary and all fish plucked from all lakes will be safer to eat. □

*Steven Claas, DNR lake researcher, works at the UW-Madison's Trout Lake Research Station near Boulder Junction.*

cally different from the compound found in fish and other organisms. Mercury falling from the sky is mainly dissolved vapors of the familiar quicksilver found in thermometers. However, the mercury that accumulates in fish is mainly methylmercury, which is poisonous to people.

Research suggests that elemental mercury is transformed into this more toxic form that is more readily absorbed by aquatic plants, insects and fish, says Carl Watras. Researchers suspect the chemical and biological changes in acidified lakes may enhance this conversion. If this theory is correct, all northern Wisconsin lakes could receive the same tiny amounts of mercury in rain, snow and dust, but only some of these lakes would manufacture the toxic methylmercury that contaminates fish.

## How tiny pollutants cause big problems

An overall picture of aquatic mercury pollution begins to emerge.

Inorganic mercury from the atmos-

phere falls into lakes in rain, snow, and attached to dust. Once in the lake, mercury follows one of two pathways, depending on the chemical and biological character of the lake. On one path, mercury is converted to methylmercury and carried throughout the food chain. Some fish readily absorb methylmercury through their diet and gills, but cannot easily eliminate the pollutant. These fish accumulate dangerous levels of methylmercury even in waters with low concentrations. Fish and other organisms die and sink to the bottom. Sediments seal the mercury in the lakebed, or winds, currents and bottom-feeding organisms resuspend this mercury into the food chain again. On the other path, mercury is not transformed. It settles in the water and is released back into the atmosphere as mercury vapor.

Even considering uncertainties, this theory leads researchers to focus on other aspects of mercury contamination.

"We understand more about the 'what and where' of the mercury problem, now we need to learn more



Continued from page 7



fits, just as their forebears did 100 years ago.

### What kind of water is it?

Across the country, about 475 plants produce bottled water under 600 different brand labels. Shoppers out to buy this simple, uncomplicated beverage should be prepared to do some label deciphering.

The International Bottled Water Association established the following guidelines for labeling:

*Natural water* is spring, mineral, artesian or well water taken from an underground formation, not a municipal water system. Natural water cannot be blended with water from another source.

*Well water* is natural water that must be pumped to the surface.

*Spring water* is natural water that flows naturally to the surface.

*Mineral water* is water that naturally contains mineral salts or gases or has salts or gases added.

*Distilled water* is boiled and its vapor collected. The process removes many impurities, including salt.

*Purified water* can be distilled, or have impurities filtered out by deionization (water passes through resins that remove most of the dissolved minerals); or by reverse osmosis (water is forced under pressure through membranes that remove about 90 percent of the dissolved minerals).

*Ozonation* (injecting ozone into water) is sometimes used to disinfect water instead of using chlorine, which can impart taste and odor to the water. Ozone is unstable in water and breaks down to oxygen within a few hours.

Although most bottlers follow these voluntary guidelines, a few take liberties with their labels. For instance, several bottlers in Wisconsin use the word "spring" in their product name even though they don't get the water from a spring.

Despite the sometimes lax labeling, consumers can rest assured that the bottled water sold in Wisconsin is safe. The Food Division of the Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP) requires that all water bottled as "drinking water" in the state must meet state drinking water standards, which are equal to or more

stringent than federal standards.

To receive and keep a state water-bottling license, bottlers must test for bacteria, nitrates and other chemicals at specified intervals and submit test results to DATCP upon request. DATCP laboratory staff also purchase bottled waters at random for testing and publish an annual survey of the results.

Because bottled water is produced and regulated as a food, state companies in the bottling business must take extra precautions to ensure the purity of their product. They need special sanitation and testing equipment, protective clothing for workers, warehouse licenses for storage areas — it's no surprise that something as common as water becomes so expensive once it's in a jug or can and has to be transported to a store.

Consumers who like to "bottle their own" at the bulk water-vending machines commonly seen in grocery stores should beware. The water dispensed is usually city tap water with the chlorine removed by reverse osmosis or deionization. The machines aren't regulated or licensed, so there's no guarantee that the water is tested or filters changed regularly, if at all. Other customers who don't clean out refillable water jugs well enough may contaminate the spout. If you buy water at vending machines, check with the store owner about the source of the water and insist on frequent machine maintenance.

Although it's no longer free, as proclaimed in the *History of Waukesha County*, the water nature provided in the springs and aquifers of Wisconsin is still delicious. You just have to decide if you want to drink it plain, with minerals, ozonated, carbonated or spiked with essence of passion fruit. □

*Barbara Gear is a hydrogeologist with DNR's Bureau of Solid and Hazardous Waste Management in Madison. Howard Kanetzke is Curator of Education for the State Historical Society of Wisconsin.*

Bulk vending machines in food stores typically dispense tap water that is filtered and treated. These machines need to be carefully cleaned and maintained to produce a better tasting, healthier product than you can draw from your home taps.



JEAN B. MEYER



# Readers Write

## LES MISERABLES

The "Haute courture" piece in the February issue of the Wisconsin Traveler appears to be nothing more than a free subsidy for the multi-millionaires of the professional sports business at the expense of your subscribers. Did they pay even \$6.97 for that ad? It appears to have no redeeming value (or even connection) with the natural resources of Wisconsin.

Further ineptness is displayed by the misspelled "Haute." The French adjective is spelled haut, meaning high.

*William A. Autio  
Menomonee Falls, Wis.*

*Come, come now — how can a team called the Bucks not have anything to do with natural resources? We're sorry you took offense at the mention of Wisconsin's professional basketball team in Wisconsin Traveler. This section of the magazine aimed to acquaint readers with the variety of recreational activities offered in the state, outdoors and indoors, nonprofit and for-profit. Recreation covers a lot of territory, from cross-country skiing to a cross-court pass. We think our brief note on pro basketball games at Milwaukee's new Bradley Center was appropriate to Traveler's mission.*

*To answer your second observation: French adjectives are feminine or masculine, depending on the word being modified. In this case, we're making a play on the phrase haute couture, "high fashion." Couture is a feminine noun; the feminine version of high is spelled haute. C'est la vie!*

## AND

## THE WINNER IS . . .

I'm pleased to inform you that your magazine's 1990 series of environmental supplements about ground-water, wetlands, nonpoint source pollution and harbor restoration has been selected as one of five winners in the National Association of Professional Environmental Communicators' 1990 awards competition.

The NAPEC Awards recognize outstanding work that fosters understanding and promotes open dialogue on environmental issues. NAPEC was founded last year in the belief that sound environmental policy depends upon communication among all parties involved in environmental issues.

Congratulations!

*Ted J. Rulseh  
NAPEC Publicity Chair  
Chicago, Ill.*

## RAPPING LOCAL CENTERS

Your article about The Raptor Center in Minnesota made no mention of a number of superb wildlife rehabilitation centers in Milwaukee, La Crosse, Minocqua, Green Bay and Appleton, to name a few. Many people are licensed and trained to handle and heal injured wildlife in their homes with help from veterinarians. We feel this information had a place in your article.

*Maggie Jones  
Blue River, Wis.*

*One hundred to 200 people are licensed wildlife rehabilitators in Wisconsin. Most provide emergency and convalescent care for a*

*variety of animals. That TLC is a very important part of healing, and many injured animals neither need nor would survive a long journey to an animal hospital. Certainly, few home rehabilitators could take on complicated cases that need the hospital-quality medicine available at The Raptor Center. We highlighted the center because it specializes in birds of prey and accepts lots of injured birds from Wisconsin.*

## RAGIN' CAJUN

Regarding your February 1991 article "Something Fishy in the Air": I think Wisconsin folk are spoiled. As a former resident I cannot recall ever tasting a bad fish or one having unpleasant odors. How I miss those Friday night lake perch fish fries!

Louisiana, as you know, also has great fish, which are caught in very warm, slow moving water in mud-bottomed bays or marshes. The Cajuns have made these fish rather palatable by using spices, sauces, wines and three peppers — black, white and cayenne.

Wisconsin people, enjoy your excellent fish! I look forward to each summer vacation, to eat my fill of lake perch on those wonderful Fridays.

*A Wisconsinite at heart,  
Eldor Bittner  
Harvey, La.*

## MAGAZINE DIPLOMACY

My last issues of your nice magazine went to Taiwan. My pen friend, Mr. Eddy Chen, wanted to know more about Wisconsin. I could not think of a better publication to send him.

Now I plan to send Wisconsin Natural Resources all over the world, to 20 other pen friends. I'd like to encourage WNR readers to share back issues with people across the globe. Anyone, young or old, can make pen friends in 188 countries. If you're interested, please contact me at International Pen Friends, P.O. Box 207, Milwaukee WI 53209.

*E.F. Kontusch  
Milwaukee, Wis.*

*What a great way to make new friends and recycle your back issues of Wisconsin Natural Resources! We'd be delighted to know that people are reading WNR in such far-flung places as Zanzibar, Burma and Djibouti. How about it, readers?*

## RECYCLED PAPER

Bravo for your decision to print on recycled paper.

If more firms requested recycled paper, costs would go down as volume goes up. Once it is established that profits can be made by providing recycled paper, more paper manufacturers would get into the business, creating competition and lowering prices.

We can do our share by making deliberate choices to buy recycled and recyclable products, and by informing manufacturers that whether or not they use recycled goods in their products will influence consumer demand.

Incidentally, the excerpt from *Those of the Forest* in the February 1991 issue was wonderful.

*Susan K. Cook  
Springstead, Wis.*





ARTHUR A. ALLEN COURTESY OF CORNELL LABORATORY OF ORNITHOLOGY

Continued from page 2

confirmed sightings of only five to 10 breeding pairs were recorded each year. Pesticides reduced the supply of insects and affected the shrike's reproductive physiology, and the loss of breeding habitat and wintering areas hastened the decline of the loggerhead in the eastern United States.

The grasslands and pastures of western Pierce and St. Croix counties are the last strongholds of nesting shrikes in Wisconsin. Recent nests have been found near houses and subdivisions in the area.

Shrikes perch on top of trees, shrubs, fences and power lines, scanning open fields for insects, reptiles, small rodents and other songbirds. When prey is sighted, a loggerhead drops from its perch, flies low over the grass to make the kill, and swoops up into the next perch.

Loggerheads arrive in Wisconsin in late March or early April from winter ranges in the southern states. An occasional loggerhead may be seen in the winter, but it's more likely that the bird is a northern shrike (*L. exubitor*), a close look-alike that's often a winter resident here.

For nesting, loggerheads favor hawthorns, locusts, crab apples and other trees and shrubs with thorns, as well as densely foliated red cedars. Individuals often return to the areas where they nested the previous year, but may select a different mate.

The pair builds a nest made of thick twigs lined with roots, mud and feathers. Four to six light yellow, dark-speckled eggs are laid in May or early June. Incubation begins with the second-to-last egg laid and continues for

16 days, the male feeding the female on the nest during that time.

Naked and helpless when hatched, the downy, buff-colored chicks grow rapidly, leaving the nest in 16 to 20 days. Feeding the voracious fledglings requires considerable quantities of food; a good grasshopper hatch makes parenting easier for the nesting shrikes. Adults feed the young birds for two to three weeks after they leave the nest.

By September, loggerhead shrikes begin migrating south. Look for the distinctive black mask and entirely black bill that distinguish the loggerhead from the northern shrike, which has a paler head and a light-colored lower bill, or mandible. In October, northern shrikes come down from summer ranges in Canada to take up winter residence in Wisconsin.

DNR wildlife researchers monitor the tiny loggerhead shrike population whenever possible to collect valuable data on this rare and unusual species. Should you see the gray, black and white songbird that's more of a hunter than a harmonizer, please contact the Bureau of Endangered Resources at (608) 266-7012. □

*DNR Wildlife Manager Bruce R. Bacon (at loggerheads with neither shrikes nor any other species) keeps tabs on the natural world from his post in Brule.*



