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# WISCONSIN NATURAL RESOURCES

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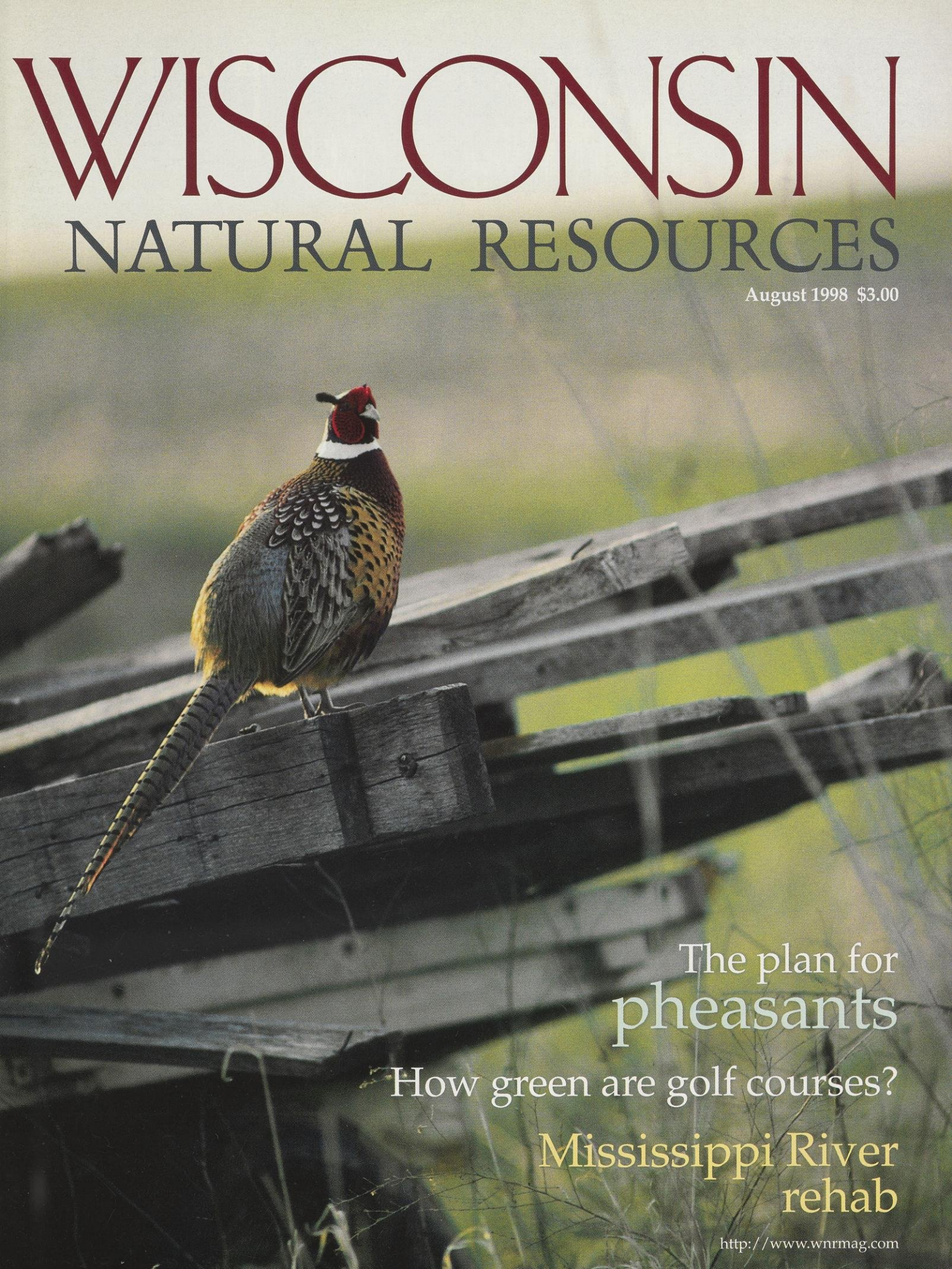


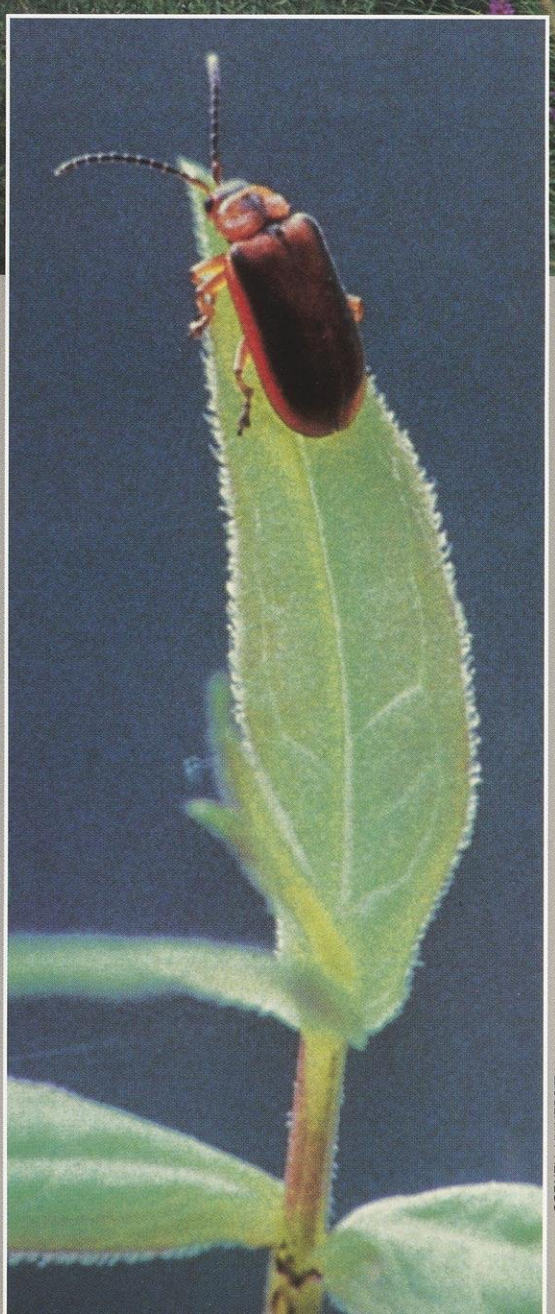
The plan for pheasants

How green are golf courses?

Mississippi River rehab

http://www.wnrmag.com

# An invasion beaten by eatin'?



CORNELL UNIVERSITY

*(above)* Beetles that feed only on purple loosestrife can help control the invasive wetland plant and the use of pesticides. *(right)* Galerucella beetles specialize in eating loosestrife leaves, which weakens the plant.

## These voracious beetles can't get enough of that purple stuff.

*Brock Woods*

Though it's a beautiful summer bloomer, purple loosestrife is a persistent threat to Wisconsin wetlands. This aggressive European perennial with its spike of bright purple flowers was introduced into the state as a colorful garden flower after the turn of the century. Free from natural controls found in its European homeland, loosestrife has infiltrated more than 40,000 acres of wetlands in the state, mostly during the last 20 years, and continues to spread.

Uncontrolled in a wetland, purple loosestrife outcompetes and replaces native plants (even cattails), often forming thick, impenetrable stands. Waterfowl, muskrats and other animals decline significantly as the invading plant smothers good habitat.

Traditional control methods, such as cutting, pulling, flooding and treating with herbicides, often injures neighboring plants. Also, it's too costly and impractical to hand-treat loosestrife that has spread across a landscape. Perhaps the best long-term solution, and certainly the cheapest, is to enlist nature itself in the campaign to eradicate the plant.

Biological controls import some of the disease organisms, insects or other animals that naturally control invasive species in their native lands. The trick is to find agents that can control "pest" species without disrupting other natural cycles and becoming pests themselves.

*continued on page 28*

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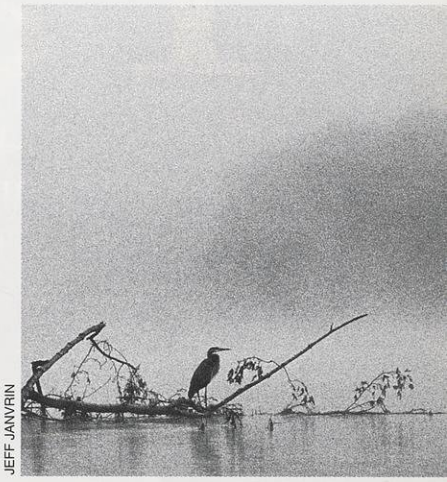
# WISCONSIN NATURAL RESOURCES

August 1998 Volume 22, Number 4

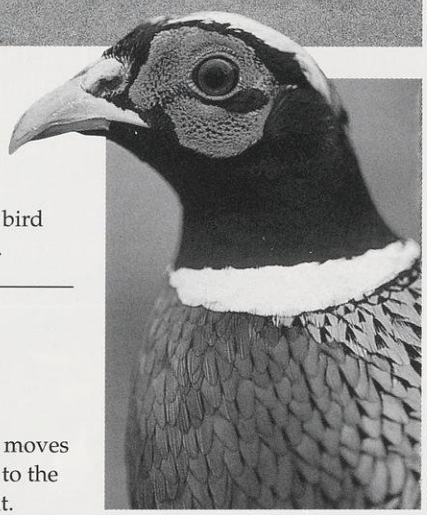


ROBERT QUEEN



JEFF JANVRIN





ROBERT QUEEN



FRONT COVER: Farm country pheasant.
HERBERT LANGE, Hazel Green, Wis.

BACK COVER: Sohlberg Silver Lake SNA has some plants more typically found on the Atlantic Coast.
THOMAS A. MEYER, Mount Horeb, Wis.

# Fairways in the rough

Habitat loss and erosion: Are these environmental hazards par for the course when new golf facilities are constructed?

*Katherine Esposito*

Jake Niesen never expected the Town of Vermont Plan Commission to send him packing.

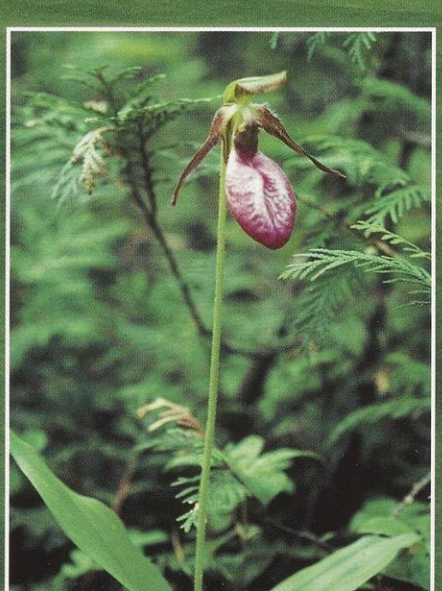
He'd hoped to develop some land he owned in rural Dane County with rolling grassy hills, mature woods and a reborn marsh, a shallow creek on one edge, an imposing brick church next door.

An ideal spot for a golf course, so he thought. Niesen, owner of a Cross Plains landscaping firm and over 100 acres just a beginner's putt away from the Vermont Lutheran Church, stood before town planners about five years ago and pitched just that idea. He had every reason to expect success.

The 18-hole course would follow the land's natural contours, with wetlands filtering runoff before it reached Vermont Creek and only a few acres of trees lost to fairways, claims Niesen. "It would have been just the same; it would've been even prettier," he says. "When you drive up the road, instead of seeing weeds and stubble, it would be a nice green carpet."

But to Niesen's surprise, the planning commission, in his words, "shot us right down." He and his partners faced a congregation of opposition ranging from the chance of errant golf balls hurtling through church windows to the possibility of chemicals sullying the brook that drains to Black Earth Creek.

If the course were built, all those golfers would arrive in a parade of cars, remarks Warren Gaskill, a current Vermont plan commissioner. "This has largely been an agricultural area," he says. "A rural golf course just seems kind of bizarre, to my eye."



In occasional showdowns between preservationists and developers, it's usually a 200-home subdivision getting criticized, not a golf course. But a golf course, after all, isn't natural either. It is a contrived Arcadia, with oases of marsh or pockets of trees left standing largely for aesthetic appeal. As courses unfurl over more and more of Wisconsin's countryside, it's prudent to ask just how well their trim eighth-inch turf chimes with the rough-and-tumble world just beyond.

## What comes with the turf

Golf, which traces its roots back to 15th century Scotland, is seen as a perfect way to relax amid nature while bonding and competing with coworkers and friends. Statewide, courses are being proposed and built so fast that those

paid to monitor construction sites don't even know where some of them are, says Bruce Moore, a water resources engineer in DNR's South Central Region.

The tidal wave of new courses is good news for golf lovers and brings cheery smiles to tourism promoters. But Wisconsin is also known for serene, untrammeled beauty, and highly manicured golf courses smack of suburbia. Traffic may increase. Subdivisions sometimes follow, or are part of the original plan. For those who loved what a parcel looked like, who admired the tall trees, the marshes, or just remembered corn that stretched skyward every summer, change can come hard.

KATHERINE ESPOSITO

Siting a golf course is more than designing challenging links. Courses change the look of the landscape, attract home development, bring traffic and alter habitat.
*(left)* The Bog course in Cedarburg adjoins wetlands and forests that are home to orchids like the pink moccasin-flower *(Cypripedium acaule)*.
*(above)* Vermont Township Plan Commissioners felt Jake Niesen's proposed course would change the agricultural flavor of their rural community.

Any development, urban infill excepting, can rock the senses of people concerned about habitat preservation. But a golf course, unlike a subdivision, tries to create the impression of harmony with nature. Depending on where and how carefully it is built, a golf course can be an asset or a detriment to the local environment. In some cases, it may have no noticeable impact at all.

Lawrence Woolbright, a biology professor at Siena College in Albany, New York, who is spearheading research into the effects of golf courses on wildlife, has a short answer when asked whether a builder should consider placing a course in a pristine area: "Don't." He urges people to locate their courses in places where the course improves land use, such as old landfills, degraded cropland, and industrial sites. One such course is now being built near the Dane County airport on a closed landfill and cornfields that were wetlands prior to 1940, but it's the only example of a course built on reclaimed land that DNR staff recall.

Voluntary programs, such as the Sanctuary and Signature Programs, sponsored by a New York environmental group, Audubon International, (no relation to the National Audubon Society) encourage developers and course managers to abide by certain conservation principles as they plot a new project or update an old one. In some places, such prodding has helped courses reestablish wetlands, mount martin houses and reduce chemical use. Those results garner favorable publicity and lower operating expenses.

Of course, it isn't necessary to rely on Audubon to achieve these kinds of results. In Ozaukee County, Terry Wakefield, the man behind The Bog golf course, relied on a roundtable of local experts, including several from the DNR and the University of Wisconsin-Milwaukee, when designing his course.

But lofty principles can't force a determined landowner to leave land untouched. In the end, provided local, state and federal permits are issued, it is the owner's choice whether and how sensitively a golf course is built.

## Driving the landscape's character

When the owners of the Teal Lake Lodge east of Hayward decided to carve a golf course out of their 230-acre resort in the middle of the Chequamegon National Forest in 1992, they made a big statement.

Resort owners Tim and Prudence Ross wanted to build an 18-hole golf course on land owned by the Ross family for three generations. Nestled on the shore of Teal Lake, the land was thickly wooded with yellow birch and hemlocks, with a mile of river frontage and acres of wetlands. At local permitting hearings many people criticized the plan, but local officials decided to approve it and the project received the required permits. In planning meetings, the Rosses consulted DNR experts who encouraged them to bridge wetlands instead of filling them, among other things.

"Most land use decisions are made locally by community government." said DNR Regional Director William H. Smith. "The Department of Natural Resources makes decisions where we have authority to judge potential impacts on wetlands and waterways. But the character of the landscape and the kinds of development communities allow is determined locally, through their authority to issue or deny zoning and building permits. Ultimately, communities decide if, where and how they site shopping malls, roads or golf courses."

John Gozdzialski, DNR water programs supervisor from Spooner, recalls the controversy at the local level. "People were comfortable with the resort; it had been there forever," he says. "But now the character of the country off the lake — rolling, wooded hills — was going to be changed. Now, if you're on the Teal River, enjoying the rights of the public, and look to the Ross property, there's less mature forest there. It's mowed grass greens and fairways. The change from feeling 'wild' to seeing signs of development jars people who want to maintain a 'Northwoods flavor' in the region."

Despite the logging that was necessary to create the course, the Rosses now hope to win a special seal of approval from Audubon International.

Does the finished product shelter wild animals, encourage native plants and keep pesticides and fertilizers out of discharge water? The Rosses believe

it will. They are limiting chemical use and retaining areas of old-growth trees and wetlands. One hole near the river is fringed with scattered trees, shrubs and flowers. Did building the course destroy habitat, even as deer and foxes are spied on fairways now? "It certainly did," says Nancy Richardson, director of Audubon International's Signature program, which bestows its award on new courses that abide by a stringent set of environmental principles.

In a larger sense, golf course siting and construction, wherever it occurs, differs little from any other building project. There are good places to build and bad, and a thousand interpretations of each.

"One could argue that in the Northwoods, if you're trying to keep the North the North, with scenic beauty and woods, then a golf course doesn't belong. But that might be unrealistic," says John Gozdzialski. "It gets to be an age-old issue: what's good land use planning?" he adds.

For her part, Prudence Ross says "the areas that have been taken out were mature popple. They were due to be taken out anyway. An infinitely greater number of people were delighted in the way we were doing it than there were complainers."

Preserving wildlife habitat has not been as large an issue in the north as in southern Wisconsin, but that is changing. As expensive lakeshore homes and new courses are built on undeveloped northern land, animals that can't live near open spaces or humans move or perish. In southern California, new housing and golf course construction has been implicated in the decline of the peninsular bighorn sheep, recently listed as federally endangered.

While no species is immediately threatened by such development in Wisconsin, one observer is not pacified. The Ross course is "another piece of the puzzle, and it's a permanent opening, maintained in a non-natural state," says Sawyer County wildlife manager Sam Moore.

In more populous areas, where new subdivisions and stores seem almost preordained, shoulders are shrugged when new golf courses are mentioned. But not all onlookers accept that logic.

"My big concern is not so much with management after they're built, but where golf courses are built in the first place," says Randy Hoffman, a conservation biologist with DNR's South Central Region. "It's always a situation of comparing to something else that may not be as good. If wetlands and forests are splintered to make room for a golf course, Hoffman continues, "then it's going to be a net loss rather than an improvement. The landscape may not be able to recover, no matter how environmentally friendly the operation."

## Water hazards

People assume that golf courses, with their expanses of lush, Irish green grass, achieve that look through heavy doses of insecticides, fungicides, and fertilizers, and that chemicals find their ways into streams and groundwater. In Wisconsin, no herbicides nor insecticides traceable to golf courses have been detected in groundwater, though herbicides have been found in surface waters downstream of golf courses, says Jim Vandenbrook, a groundwater program supervisor with the state Department of

## Erosion handicapping

A golf course was under construction in Waunakee when the rains came. Aicardo Roa checked to see if water flowing across the bare, saturated soil was reaching nearby Six Mile Creek, and it was. But there was a big difference between this site and what has happened at other places when the deluge hit and the waters ran brown. At Waunakee, by the time runoff entered the creek, it was virtually clear. The main reason? A completely new approach to erosion control.

Outside of Dane County, where Roa works as an urban conservationist, state erosion regulations require that anyone disturbing over five acres of land obtain a stormwater discharge permit. The applicant attests that an erosion control plan has already been developed and will be implemented. The Department of Natural Resources usually does not ask to see the plan. If the plan turns out to be inadequate, it is commonly discovered only after the erosion has occurred.

But within Dane County, many municipalities are subject to much stricter rules that limit how much soil can wash off newly opened land. An engineer working for the developer takes that information and works backwards, using a formula called the Universal Soil Loss Equation, to determine what measures must be in place to prevent those limits from being exceeded. Then the county reviews — and sometimes rejects — their plan.

While the DNR may strongly recommend certain steps, Dane County can require them, such as insisting that builders only grade portions of the site at any one time, a method called phasing.

In sensitive areas near wetlands, lakes, or rivers, the amount of soil loss allowable under Dane County's ordinance is five to ten times less than what can erode from similar sites elsewhere, says Roa. If the county rules had been in place during the Bishop's Bay episode, Roa contends, far less soil would have washed into Lake Mendota.

Jim Bertolacini, a DNR wastewater specialist, calls the county methods "innovative."

Roa and others will be traveling to Europe in September to talk at a conference on nonpoint pollution. The federal Environmental Protection Agency has expressed interest in the county's approach. There's no returning to the old ways, he says.

"The only way to scrutinize things well is through a calculation," Roa says. "Otherwise, it's your word against mine."

ROBERT QUEEN

DNR SOUTH CENTRAL REGION

Erosion and runoff during course development has proven to be a bigger environmental concern than pesticides and fertilizers used to maintain established courses.
*(below)* Heavy rains when the Bishop's Bay course was developed in Madison carried soil and silt into Lake Mendota resulting in fines.

Agriculture. Those detections were below current health standards, he says.

With the schooling and certification of many superintendents and the price of chemicals, course managers say less is used today than in the past. Once turf is established and runoff is directed to specially crafted ponds or wetlands, few chances remain for tainted water to leave the course. "It's more of a science than it used to be," says Ed Bergman, of the Agriculture Department.

But before that grass has grown, a heavy rainfall can spell trouble. Compared with any other sport, a golf course requires enormously more land, typically up to 200 acres. Just the act of grading and shaping that land can expose the ground to the elements like a raw wound, ready to hemorrhage soil at the first rainstorm.

Erosion during golf course construction can damage the flora and fauna of lakes and streams as much as any other building projects, and while some developers do a good job of controlling it, others have exasperated regulators by their apparent indifference. "It's your job as a developer to be aware of environmental laws," says Tim Coughlin, an enforcement specialist with DNR's South Central Region. "Some developers do not appear to be aware of the law."

Coughlin's frustration is shared by others in his office. Controlling runoff from acre after acre of bare soil has often been given back-burner status by developers, and areas adjacent to lakes and streams have run brown — "like the coffee in my cup," Coughlin says — after a storm.

DNR regulators often find that builders aren't even prepared for even milder rains. Some haven't completed required erosion control plans before requesting construction permits; others fail to carry out the plan as written, says Bruce Moore.

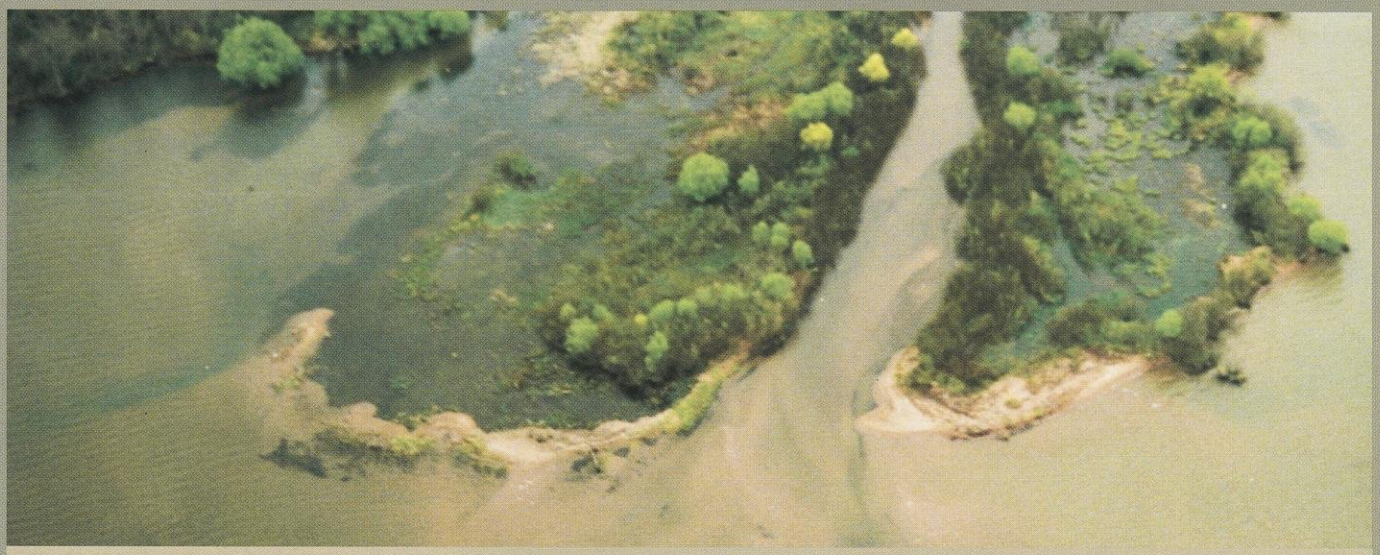
One project along the north shore of Lake Mendota in Madison, called Bishop's Bay, grabbed the headlines in 1993 after the contractor didn't fully install promised erosion controls, including sediment ponds. During a series of torrential summer storms, one pond overflowed and dirty water streamed into the lake. A neighbor called the DNR, which investigated and sought damages under the state's Public Nuisance Statute.

Defendants named in a court stipulation agreed to comply with the erosion controls and complete certain other measures. The country club agreed to pay $20,000 to establish a northern pike rearing pond, to benefit Lake Mendota.

That was admittedly a bad construction year, Coughlin says. It was the year of the floods, with basements and backyards everywhere turned into temporary wading pools. However, officials from the Dane County Land Conservation Department, which passed strict erosion control regulations the next year, agree that the company's plan was not implemented.

Erosion control was a contentious issue on another golf course under construction a few years later, in the city of Jefferson. Stormwater from the Meadow Springs course flowed into the Rock River. Course developers were cited for failing to obtain a permit to discharge stormwater from a construction site and failure to develop and implement an erosion control plan. In addition to fines, the developer made a $18,652 payment to the DNR for a future fishway on the Rock River.

The two scenarios illustrate contra-



HENRY QUINLAN

High groundwater and spongy soil proved to provide poor conditions for a golf course near Ashland. Whittlesey Creek's wetlands and waters will become a federal wildlife refuge if funds can be raised.

# The course not taken

Two starkly different scenarios were in store for the spongy land bordering Whittlesey Creek, which drains into Chequamegon Bay, just two miles west of the city of Ashland.

One script: development; the other: 540 acres of new national wildlife refuge, adjacent to established parks and wetlands. Development would involve filling nearshore wetlands to build an 18-hole golf course, with various buildings likely to follow. The refuge alternative would concede the area's unique history as prime trout and salmon spawning waters, and restore it to its former glory.

"We had a choice to go in one direction or another," says Tom Busiahn, a fisheries biologist in the U.S. Fish and Wildlife Service's Ashland office. "One direction was a golf course, and it would have been a poor golf course because of the nature of the land."

"We were proposing another direction," he continues, "to bring the land back to a healthy state and benefit the stream as a result."

Aerial photographs from the summer of 1997 make Busiahn's point. The stream's inky clarity is cleft by a ribbon of silt-laden water the color of caramel, flowing northeast into Chequamegon Bay. Years ago, the upwellings of spring water and natural gravel beds provided perfect spawning grounds for coaster brook trout. Large catches were reported in the Ashland Daily Press in the late 1800s. Those have virtually been eliminated due to sedimentation, but the stream's consistently cold temperatures still support huge numbers of salmon. In fact, one-third of the region's coho salmon spawn in Whittlesey Creek, warranting the stream's listing as an Outstanding Resource Water.

It wasn't just the erosion from on-again, off-again golf course that was degrading the trout beds. Runoff from farm fields, urban development, and scouring along bridges over the creek hurt too. But it was the very real chance that the Ondassogami Links golf course would finally be built at the intersection of Highways 2 and 13, at the mouth of Whittlesey Creek, that got the Fish and Wildlife Service excited.

The golf course had been first proposed in 1989. State and federal permits were acquired, but the financing fell apart after some fields were graded and a few ponds dug. Meanwhile, stricter state wetlands regulations were passed. When the developers returned in 1997 to continue the idle project, they were told that their old permits had expired. It became apparent to all agencies, including the U.S. Army Corps of Engineers, that the types of wetlands and presence of several endangered plant and animal species would likely preclude issuing new permits. In March, 1997, the Bayfield County Zoning committee tabled the proposal, pending the developers' requests for more approvals.

The developers had said they would place buffers between the course and the creek, and limit chemical use, says Duane Lahti, DNR water regulation specialist in Brule. But the high water table and natural springs caused grave concerns about possible groundwater pollution, he says. "I'm not opposed to golf course development, but this is not a site that's accommodating," Lahti says.

Busiahn has another theory why the plan didn't fly this time around: an alternative was all ready to go. "It's quite likely the county would have issued the permits if there was not an idea for the use of the land," he says.

Now all that is needed to begin acquiring the land for the Whittlesey Creek National Wildlife Refuge is money. The refuge has been federally approved but not established until $650,000 is authorized or raised. For more information, contact Maureen Gallagher at the USFWS, 715/682-6185.

dictions inherent in nonpoint pollution control: There is theory, and then there is practice. Placing hay bales and silt fences strategically, seeding grass promptly, and opening up the earth in phases, to limit the amount of bare soil exposed at any time, sound reasonable. However, when confronted with real construction schedules and capricious weather, even well-intentioned contractors may find erosion control turning into their biggest headache.

## A lighter grip, a gentler swing

At first blush, edging the historic 2,500-acre Cedarburg Bog, home to endangered prairie orchids and the pink moccasin-flower, with a golf course might seem inappropriate. To Jim Reinartz, it still is. To Joanne Kline, however, the road that led to the design and construction of The Bog serves as a lesson in compromise and cooperation, and left her pleasantly surprised.

"When we first found out about the proposal to put the course next to the Bog, the DNR staff were concerned. At the time, golf course developers had a pretty bad reputation," says Kline, a wetland and water specialist with DNR's Southeast Region. A meeting was held of DNR staff and scientists, including Reinartz, a wetlands ecologist from the University of Wisconsin-Milwaukee's field station located on the bog's southwest corner. The group talked with Terry Wakefield, who had proposed the course for 300 acres of former cornfields.

"That was probably the best thing we did," Kline says. "[Wakefield] wanted to get the course done as soon as possible, with as few problems as possible with the regulations."

Wakefield, a Mequon resident, agrees. "It's a very environmentally sensitive piece of property, which we understood from day one," he says. To keep any runoff from reaching groundwater, drains were built underneath tees and greens to channel water into specially created wetlands, which supplemented existing wetlands. To allay concerns aired by Jim Reinartz and others that course irrigation would deplete groundwater stocks, Wakefield voluntarily drilled a deeper well.

Wakefield and course superintendent, Pat Shaw, also are trying to use as little pesticide and fertilizer as possible, frequently sending soil samples to the O. J. Noer Turfgrass Facility near Madison for analysis, before deciding how to treat a fungus or pest outbreak. "We spend more money testing than we do actually applying pesticides," Shaw says.

The spirit of conciliation that threaded the discussions over The Bog is echoed in those taking place over a 27-hole, 200-acre course proposed along the Sugar River, south of Madison near Verona. In early spring, the developer took state and county conservationists on a site tour, identifying their concerns before seeking approvals. The company also has hired an environmental consultant to help with design and permitting.

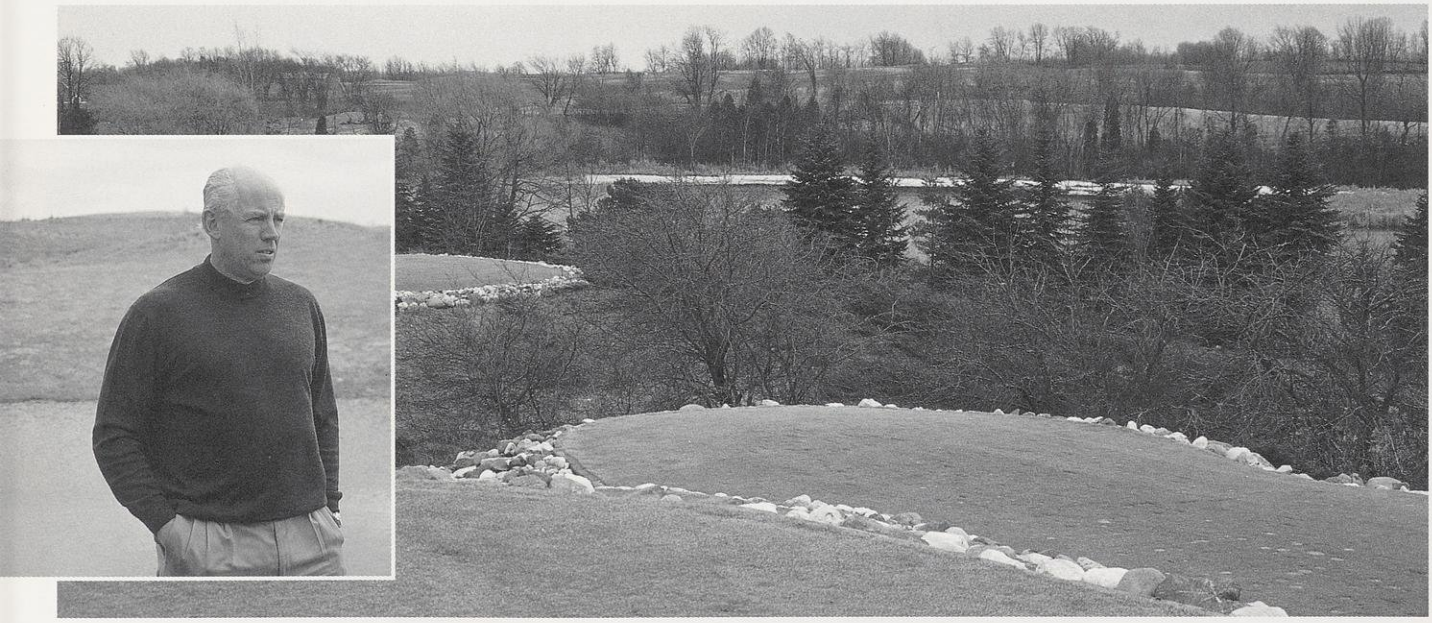
Careful siting, sensitive design, and patience in construction and operation go a long way toward allowing a golf course to tread lightly in its neighborhood. Sometimes, however, the best plan may be no plan at all.

Jake Niesen's old hay and wheat fields are now enrolled in the Conservation Reserve Program, a 10-year set-aside which pays him not to farm. He shoots over to Middleton when he wants to golf. And he really isn't complaining. Really.

"The kids do a lot of hunting down there, and they goof around with their ATVs," Niesen says. "I'd like to leave it just the way it is. It's not hurting anybody. It's nice and quiet and pretty down there." □

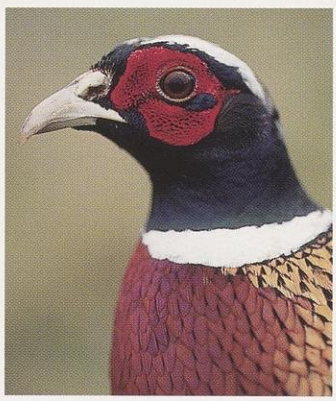
*Katherine Esposito is a magazine staff writer in Madison.*

Water under tees and greens is channeled and filtered through artificial wetlands at The Bog course in Cedarburg. Buffers and swales drain water toward retention ponds to minimize groundwater concerns. "It's a very environmentally sensitive piece of property, which we understood from day one," says course developer Terry Wakefield *(left)*.



(BOTH PHOTOS) KATHERINE ESPOSITO

# More pleasant for P·H·E·A·S·A·N·T



ROBERT QUEEN

## Populations of a favorite game bird can recover if there's enough good habitat to go around.

*Keith Warnke*

All species need one thing to survive: habitat. Without suitable food or cover, even the most prolific wildlife species cannot maintain a healthy population. To persist, habitat must be at the heart of any game management program.

Consider the ring-necked pheasant *(Phasianus colchicus)*; once prolific, this grassland bird has declined as rural land uses changed in Wisconsin. These birds need three things: 1) good nesting and brood cover, such as permanent grasslands; 2) adequate escape and winter cover, such as cattail marshes or stands of willow and red osier dogwood; and 3) a reliable winter food supply. Suitable pheasant habitat has been shrinking in Wisconsin for the last 40–50 years, until recently.

Wild pheasants adapt readily to agricultural land if farming is not too intensive. But the wide fencerows that formerly provided good pheasant nesting and escape cover have been eliminated or reduced to narrow strips as farmers aimed to maximize production on every acre. Federal farm subsidies reduced the amount of idle or fallow lands by rewarding farmers for producing more crops. Gone were the weedy cornfields pheasants used for food and cover thanks to greater use of more effective herbicides. Also, fall plowing of fields to get a jump on spring planting eliminated many winter food sources for pheasants. The development of early varieties of alfalfa (a key dairy crop and favored pheasant nesting habitat) enabled farmers to increase hay production and harvest earlier. The early harvest came at a time when the majority of pheasants were incubating eggs. Nests were inadvertently destroyed and nesting hens were killed. Meantime, pesticides killed insects that were important sources of food for pheasant chicks.

Another significant factor reducing pheasant habitat? Our large urban centers — Milwaukee, Madison, and the Fox River Valley cities — are located in prime pheasant range.

Reviving grassland, like Clark Prairie, provides ideal habitat for nesting pheasants.

ELLEN BARTH

As human populations increased, these cities and their suburbs spread into the outlying pheasant habitat.

After a peak harvest of 802,000 roosters in 1942, populations dropped steadily except for minor, momentary rises in the 1950s and early '70s. Stocking of farm-raised birds to bolster wild populations — a common practice in Wisconsin ever since Gustave Pabst (of beer brewing fame) stocked game birds in Waukesha County from 1910 through 1927 — couldn't keep pheasant numbers stable. By the 1960s, research showed pheasants bred from stock raised in captivity for several generations were not adapted to survive in the wild. Still, large numbers of birds survived through the late 1970s.

Then came a record severe winter in 1978–79 which caused pheasant populations to truly crash. The number of pheasant hunters dropped, too. By the 1980s, population trends predicted wild pheasants would disappear from Wisconsin by the end of the century.

## A renewed focus

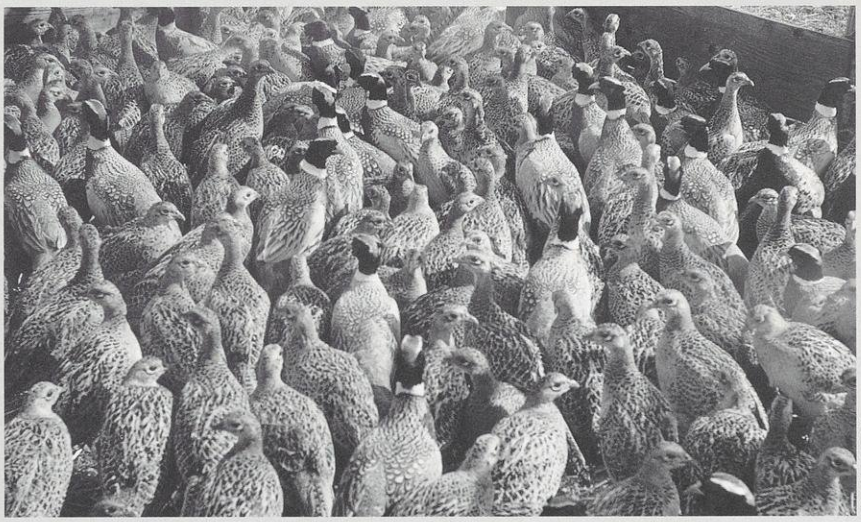
Something needed to be done to boost pheasant populations. The Department of Natural Resources, together with partners in the conservation community, developed a management plan in the late 80s to improve grassland habitat and increase winter cover for pheasants.

It was clear the plan would succeed only with the cooperation of private landowners — particularly farmers who owned large parcels of undeveloped grasslands. To provide a source of funds for wild pheasant management, the Legislature authorized the sale of pheasant stamps in 1992. Anyone hunting the birds in the pheasant management counties — those counties with the strongest pheasant populations and best habitat — had to purchase a pheasant stamp. Funds from the stamp sales help farmers, landowners, the Department of Natural Resources and conservation groups pay the costs of restoring and improving pheasant habitat.

The approximate $350,000 raised annually is used to lease grassland nesting cover, share the costs of keeping grasslands idle, grow grass on former cropland, plant winter food plots, and maintain existing habitat.

Seed planters, mowers and other pieces of equipment used to manage habitat have been purchased with stamp fees. And stamp revenue also

New seed cultivars, farming equipment and rural home development all reduced grasslands and winter cover critical to pheasant survival. Populations dropped steadily from the 1940s. It appeared wild pheasants would disappear from Wisconsin by the year 2000.



STABER REESE

Raising pheasants circa 1970. Now birds are raised in larger pens with grassy vegetation. The wild stock is raised in isolated areas where human contact is kept low to preserve the birds' wary characteristics that increase survival when they are released.

### Pheasant Management Counties

GEORGINE PRICE

## Why stock game farm pheasants?

The Wisconsin Department of Natural Resources has stocked pheasants for decades, and has sold hundreds of thousands of day-old pheasant chicks to conservation clubs throughout Wisconsin. These stocking programs will never increase wild populations, but they do provide thousands of hunters who are unable to hunt wild pheasants on private lands, or don't choose to pay to hunt pheasants at a shooting preserve or game farm, with the chance to bag a bird. This fall, about 50,000 pheasants will be released on public hunting grounds and wildlife management areas, and more than 60,000 day-old chicks will be available to clubs to raise and stock.

ROBERT QUEEN

Pheasant populations have been rebounding for a decade. CRP, grassland restoration, wild bird stocking on quality habitat, partnerships with conservation groups and projects with private landowners all strengthen pheasant flocks.

pays for three DNR wildlife biologists who work with private landowners to restore pheasant populations and maintain habitat.

To date, tens of thousands of acres of habitat have been established, restored and maintained in the pheasant management counties. The DNR's Pheasant Advisory Committee — wildlife biologists, researchers and representatives of the Conservation Congress, Pheasants Forever, and Wings Over Wisconsin — review and recommend which pheasant stamp projects should be funded.

## Bring on the birds

Since 1988, DNR biologists have been raising and releasing wild pheasants to see if adding birds to suitable habitat would expand pheasant range and populations. Offspring of wild pheasants trapped in Iowa, and pheasants raised from wild eggs collected in China's Jilin Province, have been released at more than 20 sites in Wisconsin.

The wild Iowa birds are propagated in special pens at the Poynette Game Farm designed to minimize contact with humans. These truly wild pheasants are better adapted for survival once released. They display predator avoidance behaviors, in contrast to birds that have been raised in captivity for several generations.

Release sites are selected which have few birds now and have at least 8,000 contiguous acres with a proven mix of attributes pheasants need for survival — agricultural lands with high-quality nesting cover that are not subject to mowing, grazing or flooding. The site also must have suitable winter cover, like cattail marshes, and must be less than 15 percent forested.

## A federal boon to wild pheasants

Wild pheasant populations in Wisconsin benefited greatly from the United States Department of Agriculture's Conservation Reserve Program (CRP). CRP paid landowners to take marginal farmland out of production and establish wildlife cover on the property for a 10-year period. Hundreds of thousands of acres across the state were enrolled in CRP, many in primary pheasant range. As a result, pheasant populations rose steadily in the early 1990s in places like Rock County, where CRP was popular.

The original Conservation Reserve Program expired in 1995, and many of the grassland acres enrolled could have been returned to intensive agriculture. Fortunately, Congress reauthorized CRP in 1997, thanks in large part to support from outdoor enthusiasts. DNR staff spent thousands of hours helping farmers sign up for the program or stay in it. Today, Wisconsin has more than 600,000 acres enrolled in CRP.

## Pheasants forever?

Since 1988, nearly 40,000 wild pheasants have been released to repopulate prime pheasant range. We'll track population trends to monitor program success. Stocking wild birds isn't the full answer to strengthening pheasant populations, but it appears successful where good habitat is available and there were no remnant pheasant populations. One of the original release sites, which had no birds in 1988, was stocked for only three years; it now has a stable population of 10 hens per square mile.

Even though the Department of Natural Resources targets pheasant stamp dollars to prime pheasant counties, we know that big improvements will require managing more parcels. DNR biologists work with conservation organizations and federal farm programs to stretch pheasant stamp dollars further through cost-sharing arrangements.

Partners such as Pheasants Forever and Wings Over Wisconsin are especially adept at raising matching funds and making habitat improvements on private lands. These conservation groups attract motivated volunteers and contribute funds to purchase equipment to get the work done. Rising pheasant populations in the last decade owe a great deal to their dedication and effort.

The Conservation Reserve Program will keep pheasant habitat improvements, including buffer strips, field windbreaks and shelterbelts, affordable to farmers for 10 more years.

Recent surveys have shown pheasant populations are responding to the improvements. Due to Wisconsin's more diverse landscape, large dairy economy, and an expanding number of rural homes, it's unlikely our pheasant populations will reach the densities seen in Iowa or South Dakota. But with a renewed focus on habitat, there is hope of a brighter future for Wisconsin pheasants and pheasant hunters. □

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*Keith Warnke is DNR's upland wildlife ecologist in the Wildlife Management program.*

# A time for action

## A mix of projects shows how we're doing as ecosystem management moves from theory to practice.

*Natasha Kassulke*

Two key components of the revamped DNR are managing resources along natural geographic boundaries and getting more staff into field offices that are closer to the resources they manage.

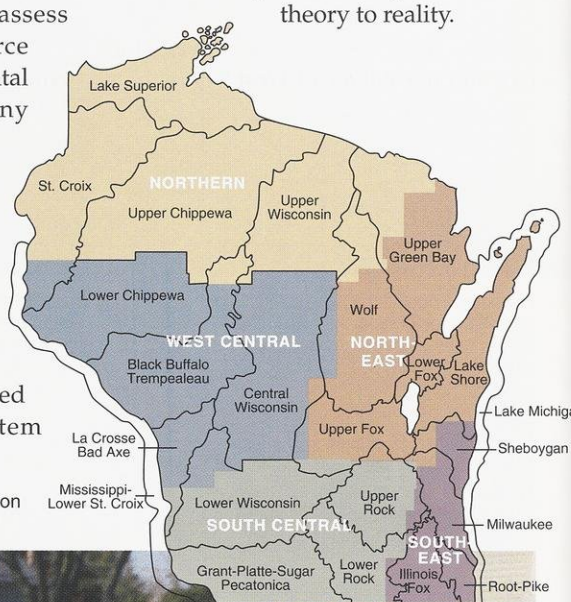
The state has been carved into 22 Geographic Management Units (GMU), the borders of which are defined by nature rather than road maps. The boundaries follow natural drainage patterns.

DNR employees with diverse training are assigned to water, land and technology teams in each GMU. Biologists, botanists, engineers and technicians focus on the same issues to assess natural resource and environmental needs from many perspectives.

"The goal is to protect sensitive habitat and solve problems in a more comprehensive, more efficient way," says Susan Sylvester, division administrator for DNR's water program.

To steer toward this direction, each GMU team was directed to develop Integrated Ecosystem Management projects to test if staff can pool their skills and budgets, and work effectively with the public to benefit natural resources.

In all, 49 projects (22 on public waters, 20 on public lands and seven on combined water and land) were funded and will be tracked this year. From revising the Brule River State Forest Master Plan which guides forest management decisions for the next 15 years to removing a dam on the Iron River to improve sportfishing, IEM projects aim to move ecosystem management from theory to reality.




Can DNR teams get more done through stronger public partnerships? Time will tell. Projects are starting in each GMU. Here, carp are removed from Bass Bay to improve water quality and fishing on Big Muskego Lake and Wind Lake.

RANDY SCHUMACHER

## Building partnerships

An important goal for each project is to form partnerships with people who have a stake in the outcome. Whether that means forming work agreements with other agencies, planning with other levels of government, seeking grants with citizen groups or meeting with individuals, partners have a place as planners, workers, fund-raisers and goal setters.

The projects bring people together who have a collective investment in protecting resources. For example, in the La Crosse River valley between the city and the Village of West Salem, bottomlands are feeling the squeeze from rapid development. The DNR, the Gunderson Lutheran Medical Facility (a major landowner in the area), and the La Crosse County Department of Zoning and Land Information are creating a land-use plan for the area.

"We want to work with partners to highlight the value of the river valley and promote its protection locally," says Craig Thompson, the La Crosse/Bad Axe Water GMU leader. Partners hope to restore an unbroken stretch of 250 acres of contiguous wetland for wildlife and recreational activities.

On-ground surveys supplemented with computer mapping will show options for roads, homes and nature. The partners are measuring water quality, and documenting the populations of several endangered and threatened plants, animals and insects, including Blanding's turtles, great egrets and blue suckers.

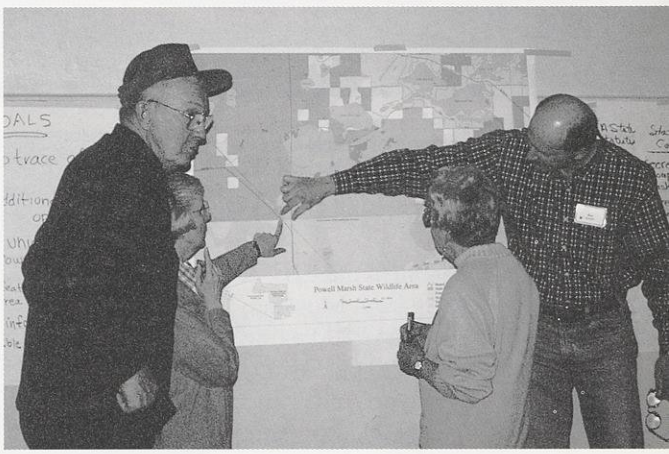
## Balancing user needs

Another IEM project taking the long view stretches across Oneida, Iron and Vilas counties. The public is helping develop goals and visions to manage our largest property — the 221,000-acre Northern Highland-American Legion State Forest, the nearby 18-mile Bearskin State Trail, and the 4,096-acre Powell Marsh Wildlife Area.

The master plan will guide decisions and actions for the next 15 years, says Dennis Leith, forest superintendent. The plan will examine the land and the social climate, taking into account economics, ecological conditions, and the forest's two million annual visitors.

To launch the project, potential partners were invited to attend open houses. Last spring, more than 80 people visited with DNR staff during the two-day introduction. Public meetings got people talking about goals. Since then, forest managers have been meeting local, regional, and statewide organizations; forest users; Native American tribes; fish and game groups; neighbors; and other interested individuals.

"Our strength is very committed team members who bring a variety of skills to our planning process," says Lyle Hannahs, a planner for DNR's Northeast Region. "There's a real commitment to communicate with the public." Those who choose can receive newsletters and other mailings, attend open houses, and stay up-to-date by visiting a Web site that tracks master plan progress.



LYLE HANNAHS

A new master plan will guide timber harvest, ecological conditions and the recreational future of the Northern Highland-American Legion state forests, the Bearskin Trail and the Powell Marsh Wildlife Area for 15 years.

Balancing needs on a big landscape also is at the heart of the Buena Vista Marsh partnership project in Portage County. This 84-square-mile marshy area, formerly tamarack and alder swamp, has been cleared twice — once during the logging cut-over, then a second time for dairy and grain crops, which proved impractical. The area reverted to grazing lands and bluegrass farms. During the droughty 1930s, dams and ditches were constructed to store water for firefighting and irrigation. Many of the ditches now contain some of the best populations of native brook trout found in the state.

In the 1960s, center-pivot irrigation made possible the vast fields of potatoes and other vegetables we see there today. The flat, wet country with networks of drainage ditches also seems a natural area for expanding cranberry cultivation. The stage is set for a classic struggle over water use, quality and quantity.

The goal of the Buena Vista Marsh project, according to Tod Planer, a county agricultural agent for UW-Extension in Wood County, is to protect the brook trout population and maintain water quality in the drainage district while providing for sustainable agriculture. The project seeks working solutions to environmental problems like silt buildup and low flow in the ditches that support brook trout.

The groups coming to the table to talk include the Wisconsin Department of Natural Resources, the Portage County Drainage District, area cranberry growers, the Natural Resources Conservation Service, and sporting groups. The Wisconsin Department of Natural Resources is a major landowner, managing 10,000 acres of prairie chicken habitat. Early discussions have focused on different interests' needs, projects and future plans. Along the way, everyone is learning about the unique value of the Buena Vista Marsh, the agricultural industry it supports and the natural habitat it provides.

"It is difficult work because potential partners have divergent viewpoints," says Tom Jerow, project leader. "Getting all these people to the table is difficult, but I think it's worthwhile."

## Local leadership

Local leaders and residents are major partners in the Big Muskego Lake project. The 2,177-acre lake in southeastern Waukesha County suffered annual algal blooms fed by nutrients from agricultural runoff and discharges from a

ROBERT QUEEN

Ditches adjoining cranberry bogs in Portage County contain excellent brook trout populations. Can a GMU project reduce silt, maintain trout and sustain cranberry production?

sewage treatment plant.

Residents from Muskego and nearby Wind Lake discussed their expectations with DNR staff, city and township officials, sporting groups and lakeside property owners. Big Muskego couldn't be changed into a deep, clear, Northwoods-type fishing lake, but it could be a much higher quality freshwater marsh. They focused on a plan to raise water quality, improve habitat for wildlife, and increase the fishery.

"On Sept. 15, 1995 the gates opened on Big Muskego," says Randy Schumacher, one of the project managers. Water levels were drawn down to expose about 1,200 acres of lakebed. Non-native plants (about 80–90 percent of which was Eurasian water milfoil) dried out and native plants grew back. Today, less than five percent of the vegetation is cattails and milfoil. Swaying bulrushes temper the wind and allow other natural vegetation to return.

In 1996, game fish were transferred to other waters, and 390,000 pounds of carp were removed from the lake and feeder ditches. By November 1996, the lake was ready for stocking. Today, yellow perch, largemouth bass, bluegill, northern pike and walleye are establishing populations in Big Muskego.

"Before the project, the water clarity was less than one foot," Jim Jackley, DNR's wildlife biologist for the area, says. "Now you can see three to six feet to the bottom of Big Muskego."

An electric fish barrier constructed at the outlet of the dam in Muskego prevents carp from entering through a creek. If power fails, there's a back-up generator and alarms will alert three neighbors (a local landowner, an alderman, and a Lake District manager).

"The fact that these people are willing to be called in the middle of the night if there is a problem with the barrier shows an amazing level of commitment by our project partners," Schumacher says.

In addition to the state investment of $850,000, a local sportsmen club donated $37,000 to build a public boat launch; another group donated the land. Ducks Unlimited donated $150,000 to build three one-acre waterfowl nesting sites. Wisconsin Electric Power Company donated $3,000 to build six osprey nesting platforms. The Audubon Society is considering hatching osprey young here to bring the osprey back to Southeastern Wisconsin.

The birds are already back. Waterfowl populations of mallards, teal, pintails, Canada geese and others are expected to start nesting at Big Muskego, and about 53 of the endangered Forster's Tern call this area home.

"DNR staff have more than 20,000 hours invested here, but a project of this scale couldn't have been done without partners," Schumacher says.

RANDY SCHUMACHER

Carp removal, lake weed control and water drawdowns are part of the plan to restore freshwater marsh conditions at Big Muskego Lake in Waukesha County.

## Lessons learned

Each project has found some common strategies to success. Creating incentives rather than relying solely on regulations, focusing on habitat and ecological communities rather than on individual species, and identifying geographical boundaries can help frame the issues and drive action. Balancing user needs fairly and sharing data with all interested parties keeps participants motivated. Using results from on-going monitoring to adapt approaches means projects can be refined as they move forward.

Above all, trust, cooperation and patience are the keys to success. Through sincere and frank discussion, a measure of good faith, and commitment from all parties to support the effort for the long haul, the IEM projects can usher in a new era of managing our resources and ourselves for a healthier, more sustainable environment. □

*Natasha Kassulke writes about environmental issues and programs for DNR's Water Division.*

# A fair to remember

## For Wisconsin's centennial celebration, a tiny corner of West Allis was transformed into the Great Northwoods.

*Harold A. Steinke*


CENTENNIAL STATE FAIR PHOTOS BY STABER REESE

The Sesquicentennial is bringing its fair share of parties and parades, but back in 1948, the Centennial brought property! To celebrate 100 years of statehood, the old Wisconsin Conservation Department (WCD) bought a small parcel of land within State Fair Park in West Allis and developed it into a relaxing nature area. It's the same green oasis that fair visitors enjoy today.

As a reminder of our pioneer past, the state built a large lumberjack cabin and a split-rail fence near the entrance of the WCD park area. In the large cabin, WCD staff simulated the life of the early loggers. This cabin had a mess hall and bunkhouse divided by a public walk-through.

The east half of the building housed the kitchen and mess hall. A lumber camp cook prepared all of the meals for the WCD crews. This cookie was normally employed to feed the fisheries crews that each spring and summer collected spawning fish for hatcheries, forage fish to feed the hatchery-raised fish, and removed rough fish from lakes. He was accustomed to putting on a feed for a hungry crowd. The men ate their meals while visitors passed through the cabin.

The west half was furnished with bunks, benches, and an old cast iron stove. A screen par-


COURTESY OF HAROLD A. STEINKE

Harold Steinke and Norbert "Nibbs" Damaske managed the Conservation Department's Centennial State Fair exhibit for half of its month-long run.

tition separated the area from the public walkway. The cabin was closed each night at 11 p.m. so the men could retire to the bunkhouse.

As people passed through the cabin, they entered a well planned world of nature we called the Centennial Garden. A meandering stream channel had been created within the grounds and a rock waterfall surrounded by shrubs was constructed near the entrance. Pathways bordered the stream. Native trees, bushes and flowers were planted to show our natural heritage and create a setting for an eye-pleasing adventure.

Hidden pipelines carried Milwaukee city water into the WCD park. It was aerated as it cascaded down a waterfall into a pool that contained live panfish and a sturgeon. The artificial stream was stocked with trout and northern pike. The lower portion of the stream flowed through a fenced area where two fawns and a mother deer lived and shared their home site with several beavers.

Downstream, the artificial brook flowed under a foot bridge and entered a muskrat pond. As it left the pond, it continued on to the east side of the park and exited into a city drain.

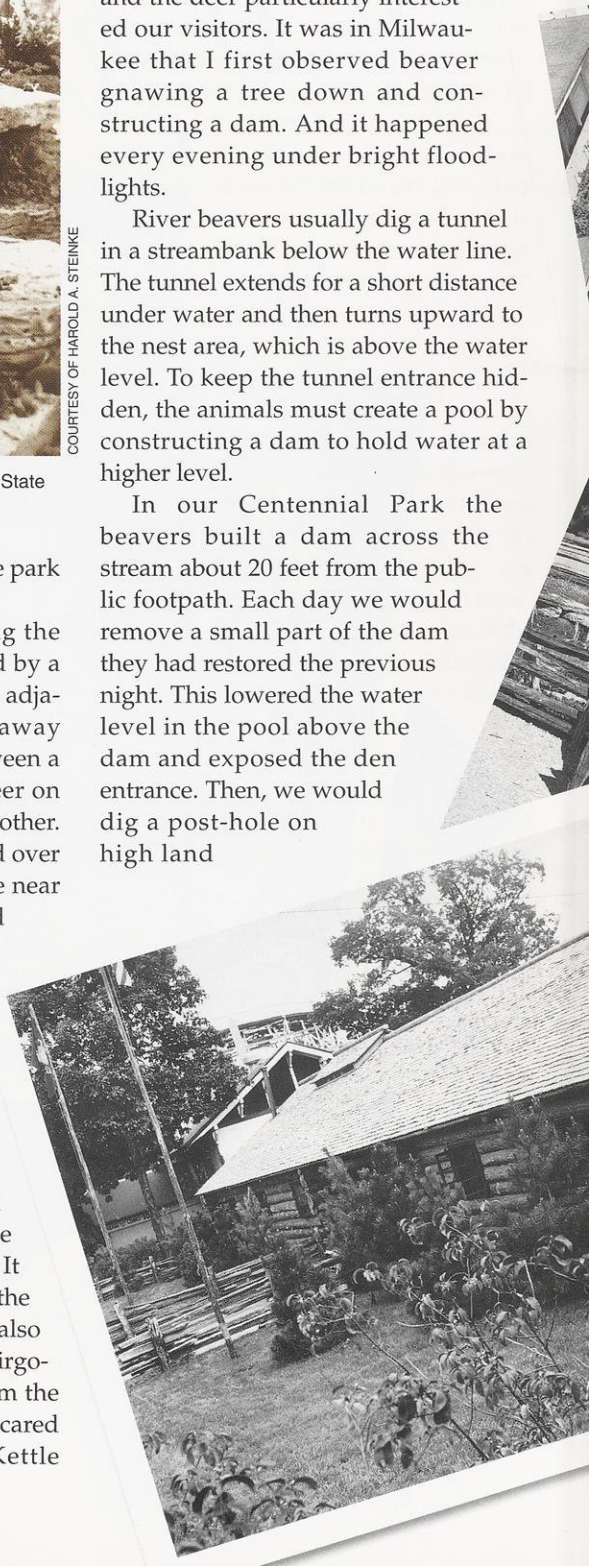
The visitors could walk along the wide, graveled footpath bordered by a split-rail fence to view fish in the adjacent stream. The path turned away from the stream, and passed between a woven-wire enclosure for the deer on one side, and a grassy park on the other. The path turned again and crossed over the stream by way of a footbridge near the beaver dam. As it continued on, the path went past the muskrat pond and a series of large wire cages containing fox, mink, raccoon and badgers. Following the path, visitors would return to the waterfall and pool, completing the visit to the Centennial Garden.

Norbert "Nibbs" Damaske and I were chosen to manage the site for half of the celebration month. It was our duty to feed and care for the live animals in the park area and also act as full-time docents, helping fairgoers enjoy their visit. Two men from the Wild Rose Fish Hatchery fed and cared for the fish; personnel from Kettle Moraine Forest maintained the landscaping and policed the park. They also supplied cut green popple trees for beaver food and dam material. Conservation wardens joined our staff to meet the visitors and answer questions. It was a fine, relaxing display and we all enjoyed working together during Wisconsin's Centennial Celebration.

I remember that the beavers and the deer particularly interested our visitors. It was in Milwaukee that I first observed beaver gnawing a tree down and constructing a dam. And it happened every evening under bright floodlights.

River beavers usually dig a tunnel in a streambank below the water line. The tunnel extends for a short distance under water and then turns upward to the nest area, which is above the water level. To keep the tunnel entrance hidden, the animals must create a pool by constructing a dam to hold water at a higher level.

In our Centennial Park the beavers built a dam across the stream about 20 feet from the public footpath. Each day we would remove a small part of the dam they had restored the previous night. This lowered the water level in the pool above the dam and exposed the den entrance. Then, we would dig a post-hole on high land



near the water's edge and set a 10-foot-tall popple tree firmly in the ground.

Each evening shortly after sunset, the beavers would come out of the den. Since the water level had dropped below the den entrance, they would go immediately to the dam. They would inspect the opening where the water was rushing through. Looking around, they would see the live popple tree standing above the streambank, and they set to work.

The overhead floodlights and the large group of people did not frighten the animals. We had prepared the fence for this daily crowd by fastening a wooden rail along the top of the wire fence.

After checking the hole in the dam, the beavers would go to the tree, sit upright and start gnawing on the tree trunk. In a short time, the trunk of the tree was severed and the tree would fall, always toward the stream.

Now the beavers could enjoy a meal of fresh popple leaves, twigs, and tender green bark. The freshly cut green popple trees are vital food for the animals; their incisors or fore teeth continue to grow daily and the beavers control their tooth growth by gnawing on wood. The inner side of beavers' incisors are composed of a softer tooth material and the gnawing process wears it away, leaving a sharp front edge of harder tooth surface, useful for chiseling into tree wood.

A short time later the animals would gnaw the tree trunk into baseball-bat size pieces and tug or push them to the water. After the pieces were in the water, the beavers floated them to the gap in the dam. Small limbs were wedged into the water opening and then sealed with mud. The beavers carried the mud to the dam by holding it against their chests with their forefeet while swimming or walking upright.

Once again the dam was sealed, and the water level slowly rose to hide the den entrance at the base of the streambank.

During the day, visitors were charmed by the friendly deer fawns that came to the fence to nuzzle the children.

There were times when we had a people problem. Occasionally some boys would pick up stones from the gravel path and throw them at the beavers. Our major concern was to prevent some of the visitors from giving candy, snacks and even cigarettes to the deer. The fawns would eat anything that was offered to them, and we could not permit this. Feeding could get out of control and injure the animals' health.

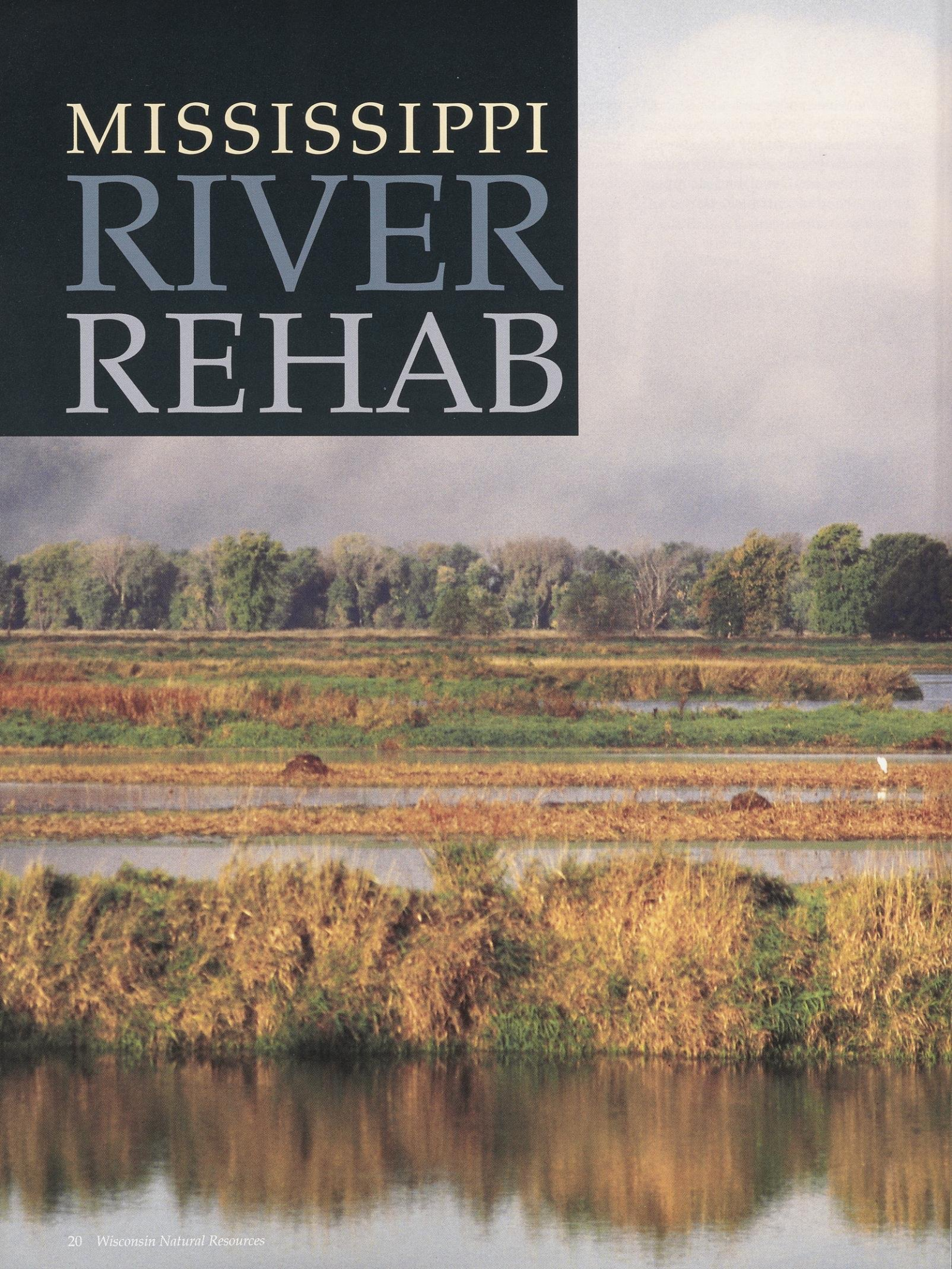
I remember the weather was sunny and warm for most of my two-week stay — ideal for enjoying the many outdoor events, concerts, dances and exhibits held during the Wisconsin State Centennial month at the State Fair grounds. It was an outstanding celebration for our 100 years of statehood, and I was really glad to be part of it. □

PHOTOS BY STABER REESE

*(clockwise from bottom)* The log cabin at the exhibit entrance, the artificial duck and goose pond, the view from the top of the fire tower and the frustrated beaver that rebuilt a dam...daily!

*Harold A. Steinke was a Wisconsin Conservation Department game manager from 1938 through 1974. He's retired and living in Oshkosh.*

# MISSISSIPPI RIVER REHAB



# Restoring the Big River's islands and backwaters for wildlife benefits the human community in unexpected ways.

*Story and Photos by Jeff Janvrin*

How often have you heard the following: "Back in the good ol' days we caught buckets full of fish here, but not now." Or "When I was a boy, we used to see thousands of ducks in this wetland. Now we're lucky to see a single coot." People are concerned about habitat loss in and along rivers, streams and lakes. They want to know what's being done to protect existing habitat or restore what's been lost.

For some good examples, they need look no further than Wisconsin's wet western border.

The Mississippi River has long been the platform for engineering projects large and small. The greatest of these — the system of locks and dams built in the 1930s to provide a minimum nine-foot-deep stairway of water from St. Paul to St. Louis — had an enormous impact on river habitat. Since locks and dams were installed, more than 80 percent of the islands in Pool 8 between Genoa and Stoddard have been lost due to erosion. Some backwater lakes, the preferred home of bluegills, largemouth bass and waterfowl, have filled in at an average rate of a half-inch per year.

While it is impossible to reverse all of the habitat losses on the river, one federal program bears responsibility for restoring and improving Mississippi River fish and wildlife habitat.

Since 1986, the Environmental Management Program (EMP) has provided funding to monitor the Mississippi and Illinois rivers and to restore habitat on these rivers in Minnesota, Wisconsin, Iowa, Illinois and Missouri. The five upper Mississippi River states, U.S. Fish and Wildlife Service, U.S. Geological Survey and three Corps of Engineers districts coordinate habitat projects with the EMP, and citizens are encouraged to share their ideas on projects at public meetings.

## Getting to know the river

The methods used to restore or create Mississippi River fish and wildlife habitat along Wisconsin's border depend on where the site is located in a "pool" — the water between each set of locks and dams. (Eleven of 26 pools in the river are located along Wisconsin's border.) Habitat problems change as one travels downstream through a pool.

Each pool essentially has three sections: the upper one-third (the section flowing immediately downstream of a lock-and-dam) looks very much as it did before the locks and dams were built. From the air, this area of a pool reveals the maze of flowing and dead-end channels, shallow water marshes, wetlands and wooded islands that make up the backwaters of the Mississippi River. When the earthen dikes of the locks and dams were built, some of these backwaters were cut off from flowing water. Most habitat projects in the upper third of a pool aim to restore this connection to rejuvenate river currents and help keep oxygen levels high enough for fish to survive during the extreme temperatures of summer and winter.

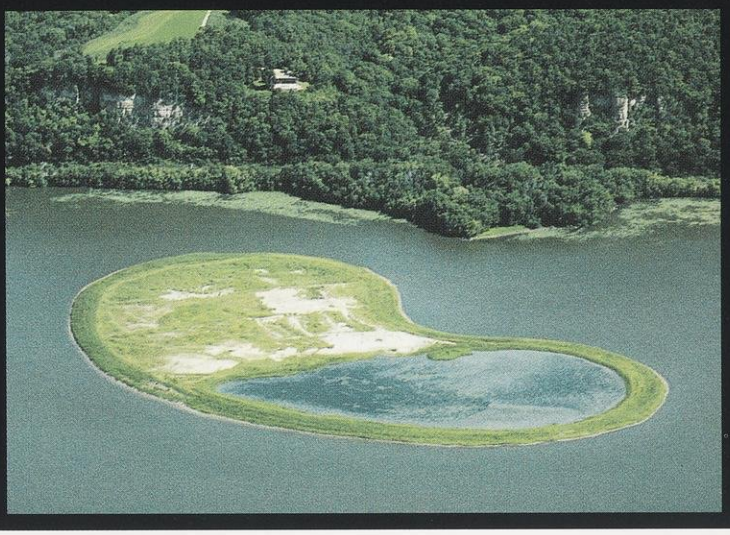
Hummingbird Slough shows the upper third of Pool 9 — chock full of channels, marshes and backwaters where fish and wildlife thrive if water flow keeps oxygen levels high.

Backwater habitat gives way to riverine lakes in the middle third of a pool. Here, there will be fewer islands and many more wetlands. Due to higher water elevations, the soils on many islands are too saturated to support trees, so grasses predominate. The Mississippi's powerful current slows down, unable to carry further its burden of silt and sand from tributaries. The result: an unnaturally fast rate of sediment accumulates in backwater lakes.

Habitat projects in the middle section of a pool typically attempt to maintain habitat diversity. Techniques include dredging and altering flows in side channels to oxygenate the backwaters and keep sediment out of sensitive areas.

In the lower third of a pool you'll find numerous islands created where water levels were increased the most by locks. Islands serve many roles in the

Better habitat through engineering — At Bertom and McCartney lakes, a 1,500-foot, rock-lined channel connects backwater pools, oxygenates water and provides winter habitat for fish.



Sediment dredged from the channel project was formed into a 22-acre island that breaks up waves, and provides food and shelter for birds and turtles.

Mississippi River's complex web of life: deer, raccoons, mink and otters take shelter on them; ducks nest in the lush vegetation; turtles lay their eggs in the golden sand. Islands in the lower third of a pool protect aquatic vegetation by deflecting the current and breaking up waves as they roll across the large expanses of water immediately above the locks and dams. Aquatic vegetation located in the "shadow zone" behind islands is used for food by migrating waterfowl and as shelter by aquatic life.

Erosion has reduced the number and acreage of islands in the lower sections of many Mississippi pools. When an island is lost, a disturbing chain of events begins. River currents now enter the once-protected area, uprooting some of the aquatic vegetation. More vegetation beds are uprooted and lost because of the unchecked energy of waves rolling across miles of open water. The waves continue to build in size, eventually stirring up sediment from the bottom. Once the sediment is suspended in the water, it acts like a liquid veil, shading out light the underwater plants need to grow. Plants die, and valuable habitat is lost. Restoration here is aimed at reconstructing the islands.

## A breath of air

The Bertom and McCartney Lakes Habitat Rehabilitation and Enhancement Project, located in the middle section of Pool 11, is an example of a project designed to help bluegills and largemouth bass survive harsh winters. Low levels of dissolved oxygen due to lack of depth, lack of flow and decomposing vegetation occasionally caused fish kills. River managers took a three-pronged approach to enhance fish and wildlife habitat.

The first step was construction of a 1,500-foot channel to improve habitat for current-loving fish (walleye, sauger, smallmouth bass and catfish). By lining the bottom of the channel with six different sizes of rock, managers created freshwater mussel habitat as well. A submerged rock barrier in the channel helped regulate the current and prevent sediment from coming into the backwater.

Next, many backwater pockets were dredged and made deeper, and "connecting channels" were dug from one pocket to the next to provide escape routes for the fish. If oxygen levels became too low in the winter in one of the pockets, the fish could follow a channel to another pocket.

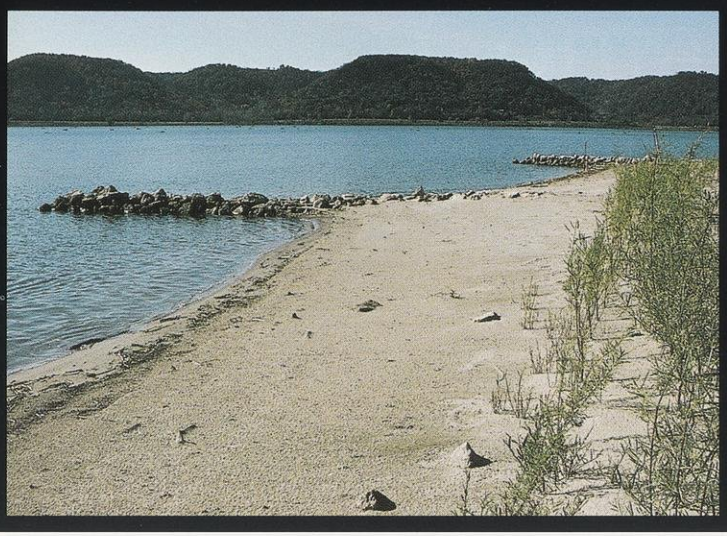
Getting oxygen-rich water into an isolated backwater lake would seem fairly straightforward; just dig deep and let the current flow. But too much current can make the area inhospitable for bluegills and largemouth bass in winter. Recent studies show bluegills will travel two to three miles, and largemouth bass up to 18 miles, to find the right combination of four different conditions for a winter home: Adequate water depth (three feet or deeper), 5 ppm or more of dissolved oxygen in the water, essentially undetectable current, and "warm" water temperatures (32 degrees Fahrenheit or higher).

Over 400,000 cubic yards of silt and clay were removed to create deep-water areas. A 22-acre kidney-shaped island, the project's third feature, was built to hold the dredged sediment and break up waves in McCartney Lake. The island also provided food and shelter for shorebirds, waterfowl and turtles. A unique feature of the project was creating a 10-acre wetland on the island interior.

## Rebuilding what's been lost

Some islands are restored simply by building a rock breakwater to protect an area from waves and currents that provides sheltered places for aquatic vegetation to grow. (An example of this island-building technique is the Pool 9 islands habitat project near Ferryville.

Another island restoration technique uses a bit more human engineering to help nature along. At the Pool 8 Islands Phase One project site, each island begins as a base of sand placed by a hydraulic dredge. Like a huge vacuum



Rock groins trap sand and silt carried in the Mississippi's turbid water. As the current slows, solids form a beach and stabilize the islands.


Skilled heavy equipment operators pile sand and sculpt islands. Their designs work with nature so upstream portions are protected and downstream sides flood as the river rises.

cleaner, the dredge sucks up sand and some water into a pipe. The slurry is then pumped through the pipe and deposited on the island site. A bulldozer pushes the sand into a rough configuration of the island's final shape. Next comes a layer of topsoil "borrowed" by a crane and bucket from the river. The finishing touch: planting the islands with a mixture of native vegetation and trees.

To ensure the restored islands do not suffer the same fate as their predecessors, rock riprap was placed along vulnerable sections of the islands' shores. A combination of three other less conventional techniques were used to maximize fish and wildlife benefits and assure the islands will be around for at least 50 years. The first was planting two rows of willows along the shorelines at a safe distance from the water. This was determined by surveying willow growth on natural islands. Rock groins, the second technique used, stick out perpendicular from the shoreline into the water about 30 feet to capture sand and form a beach. Rock groins have two advantages over riprap: Turtles, shorebirds and other wildlife have access to the water's edge, and building a series of groins is cheaper than riprapping an equivalent length of shore.

Third, the design of the islands themselves is perhaps the best erosion-control method of all. By design, a portion of each island's shoreline will gradually be washed away by waves and current to form a beach with a one to 20 slope. This slope was determined by surveying stable natural islands. The islands also are designed so the downstream portions will be flooded first when river levels rise. That way, the entire island chain slowly becomes submerged as the flood waters rise, equalizing water levels on both sides. This feature proved successful during flooding in 1993 and 1997, when portions of the islands were submerged by as much as four feet.

A sanderling *(Calidris alba)* enjoys the pickings on river island habitat.

## "If you build it, they will come"

The project aims to improve habitat and water quality for a variety of fish and wildlife. We make the assumption that if certain environmental conditions are enhanced, fish and wildlife will "find" and use these improved areas. Determining if a project successfully provided the predicted dissolved oxygen levels, current, temperature, or reduced sediment is fairly easy and can be done shortly after a project is constructed.

By 2002, the multi-state, multi-agency teams will have completed 50 projects restoring 97,000 acres of fish and wildlife habitat along 1,000 miles of the Mississippi and Illinois rivers.

Determining how fish, wildlife and plants respond to a project is more difficult and takes more time.

Consider Bertom and McCartney Lake. Monitoring immediately showed an improvement in dissolved oxygen and water depths in the area. But fish populations took six years to respond.

In 1987/88, before the project began, we saw several little fish, but few big fish. The big fish were dying from lack of dissolved oxygen and water depth in the winter. After the project was completed in 1990/91, the fish populations didn't seem to be responding to the improvements. For four years, we saw little change in fish populations.

Then, in 1996, our monitoring began to reveal what was going on. Simply put, once we eliminated many of the limiting factors for a fish's life cycle, we had to give the fish time to do their part. They needed time to grow up, reproduce and repopulate the restored habitat before we could proclaim it a success or failure.

It also takes some time for the river's plants and animals to respond to island projects. Turtle, great blue heron and muskrat tracks on shore are some of the obvious signs wildlife use restored islands. Two island monitoring projects by the Long-Term Resource Monitoring Component of the EMP show that what's underwater is working as well. Use of the islands' "shadow zones" is more extensive than predicted. Aquatic vegetation also appears to be establishing faster in the protected areas of the islands than elsewhere in the lower ends of the pools.

Some projects have far exceeded their predicted benefits. Even the ones that may not have fully met expectations are a success, thanks to what they have taught us. Each new project is built on a base of knowledge gleaned from the successes and shortcomings of those already completed. Monitoring the projects has provided valuable insight into habitat requirements for Mississippi River fish and wildlife, and also has given river managers new tools to aid the Mississippi in creating and sustaining habitat on its own.

## What's next?

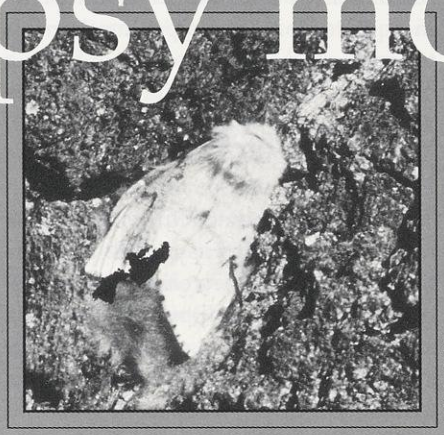
In 1986 the Environmental Management Program was an experiment. Never before had such a large undertaking of environmental monitoring or restoration been attempted in the world. Today, the EMP is a model for this type of work. Tangible benefits of the program include the wealth of knowledge we have gained about the Mississippi and Illinois rivers, but perhaps the greatest benefit is the hardest to quantify: The EMP has fostered a previously unknown level of cooperation among the state and federal agencies responsible for the river's management.

The first Wisconsin-sponsored project, Lake Onalaska Islands and Dredge Cuts, began construction in 1989. Since then, 17 EMP habitat projects have been built along Wisconsin's portion of the Mississippi River, with 12 more planned for construction before the scheduled end of the program in 2002. In all, more than 50 projects affecting more than 97,000 acres will have been built to restore fish and wildlife habitat along a thousand miles of the Mississippi and Illinois rivers.

Congress is now considering reauthorization of this historic and successful program. The Environmental Management Program got its start through the hard work and support of the people who live near and use the Mississippi River. The future of restoring and protecting the river's fish and wildlife habitat is once again in the hands of the people who care about this great resource. □

*Jeff Janvrin is a Mississippi River Habitat Specialist with the Mississippi/Lower St. Croix Rivers Team stationed in La Crosse, Wisconsin.*

# Containing gypsy moth



ANDREA DISS

As gypsy moth spreads across the state and country, there are lots of options in the arsenal to slow it down.

*Andrea Diss*

Gypsy moth *(Lymantria dispar)* continues to spread through Wisconsin. Populations of the moth and its destructive caterpillar can explode in early summer every five to 15 years and have defoliated large forest tracts in the northeastern states and Michigan. We can expect similar outbreaks in Wisconsin: Our forests are full of the gypsy moth's favorite trees, and the climate here is similar to that in infested areas. However, there are many steps communities and forest managers can take to delay outbreaks and minimize the damage.

To slow the spread of gypsy moth, the Department of Natural Resources, Department of Agriculture, Trade and Consumer Protection, the University of Wisconsin, the USDA Forest Service, and the Animal and Plant Health Inspection Service have cooperatively monitored Wisconsin's forests to trap adults and search for egg masses. We've attacked pioneering colonies to delay the moth's spread. Unfortunately, the moth is constantly introduced from traveling vehicles, imported vegetation, on wood products and other sources, and is naturally spreading west. First found in widespread areas of Wisconsin in 1988, gypsy moth has now established a foothold in counties along the Lake Michigan shoreline.

Once it's established, we can't eradicate the moth, but we have several strategies to reduce the damage it does. Management tactics include biological controls to slow the population growth, silvicultural controls (changes in tree planting and harvesting) to make the forest less hospitable and limit damage from outbreaks, removing egg masses, killing caterpillars, and using insecticides to protect especially valuable woodlands and scenic plots like campgrounds.

## Introducing biological controls

Gypsy moth is a European and Asian native with few natural predators in North America. Researchers sample moth populations to find parasites and diseases that could slow the population growth and reduce the frequency of outbreaks without changing native plant and animal communities. In the northeastern states and Michigan, nine species of parasites and two diseases have been isolated that afflict gypsy moth at various stages of growth.

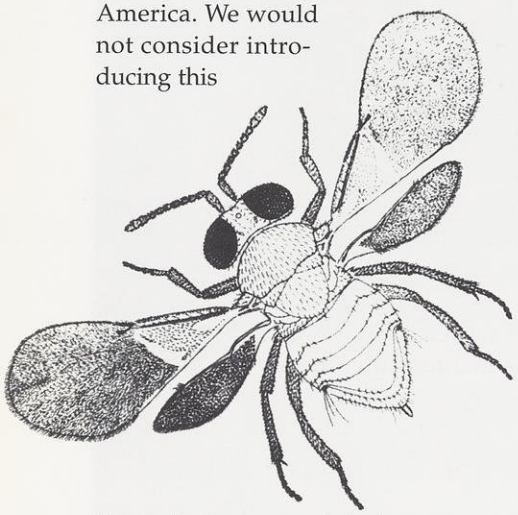
In Wisconsin, our research team collected and reared gypsy moth caterpillars in labs to find any causes of premature death. We also collected egg masses and examined them for parasites or other natural enemies.

We were excited to find a variety of gypsy moth enemies. A miniature parasitic wasp, *Ooencyrtus kuvanae*, about the size of a gnat, is already established in four counties at the base of the Door peninsula. This wasp parasitizes gypsy moth eggs, typically killing about 20 percent of the egg mass. Four generations of this wasp can grow each year on a single egg mass. A second parasitic wasp, *Cotesia melanoscela*, has attacked gypsy moth caterpillars in southern Oconto County.

Two diseases specific to the moth also were found in Wisconsin. Nucleopolyhedrosis virus (NPV) attacks caterpillars under stress. And the fungal disease *Entomorphaga maimaiga*, was found near the base of Door County —exciting news, because this fungus has decimated gypsy moth populations elsewhere in the United States.

The only non-native natural enemy of the gypsy moth we found in the counties sampled has been a parasitic

fly, *Compsilura concinnata*. The fly was first introduced in New England in 1911. Since it lives on a huge range of caterpillar species, it spread rapidly throughout North America. We would not consider introducing this fly as it also parasitizes a variety of our native caterpillars.



UW-MADISON

*Ooencyrtus kuvanae*, a gnat-sized wasp parasitizes gypsy moth eggs.

Following the survey work, we've elected to introduce *E. maimaiga, O. kuvanae* and *C. melanoscela* because they are hardy in the tough Wisconsin climate, will selectively attack gypsy moth, and can survive in the environment even if the gypsy moth population is sparse. Research shows these species rarely affect other insects and do not appear to affect other animals or people in any way.

These natural moth enemies were released in places with habitat to match their needs. For instance, the fungal disease is only effective where there is a layer of woody debris and leaf litter around trees. The fungal spores overwinter in the soil and infect caterpillars crawling across the spores — we know that gypsy moth caterpillars crawl out of the trees every day once they are half-grown to avoid being eaten by birds. The caterpillars hide in the woody debris and under leaves that could hold the deadly fungal spores. We released this fungus at 20 sites in northeastern and southeastern Wisconsin.

The wasp *O. kuvanae* was released at eight sites; *C. melanoscela* has been released at three sites in northeastern Wisconsin. Parasitic wasps will be released at fewer sites since it's more difficult to collect and rear wasps than to collect millions of fungal spores.

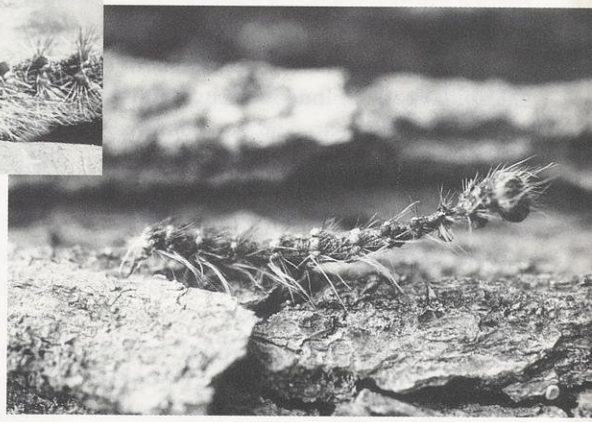
In coming years, we will monitor the release sites and introduce more of these predators into gypsy moth infestations.

## Changing silvicultural techniques

The selection and spacing of trees can reduce how fast gypsy moth populations increase and decrease tree mortality if outbreaks occur. Standard practices for good forestry need only be modified a bit to make woodlands less hospitable to this pest.

The types of trees you choose can also determine how many will die following disease outbreaks. Gypsy moth defoliates trees, and those trees that succumb are usually in poor condition before the moth strikes. Woodlots need to be thinned or stocked at proper densities. Crowded trees may not survive one defoliation. Conversely, trees spaced too far apart have more lower branches that give gypsy moth many places to hide from predators. Trees grown at the proper density have long, straight trunks where predators can easily find the moth. Healthy trees also have greater reserves to survive the waves of fungal diseases and insects that often rage through forests following a major gypsy moth invasion.

The variety of trees in a woodlot can also slow an outbreak. While gypsy moth can feed on many tree types, the caterpillar favors oak, aspen, birch, basswood, tamarack and apple. Gypsy moth avoids green, white and black ash, cedar, locust, balsam fir and scotch pine. Maple, pine, nut trees, beech, spruce and hemlock are less palatable to gypsy moth caterpillars as well. Increasing the proportions of species the caterpillars avoid or dislike can slow the population growth and delay outbreaks. For tips on silvicultural options to reduce damage from gypsy moth, send for Forestry Facts pamphlet # 83, "Forest Management Strategies to Minimize the Impact of Gypsy Moth" from the UW-Cooperative Extension office near you. Check your phone book under county government listings for the address.



*(above)* Gypsy moths have sharp hairs and don't taste good to larger predators. Entomologists are enlisting a smaller army to fight the moths.
*(right)* A fungus, *Entomorphaga maimaiga*, kills gypsy moth caterpillars that crawl across its spores in woody debris.

## Hand-to-moth combat

Mechanical controls require scouting, finding and destroying egg masses and caterpillars. The technique will work in a small area in the city or on a suburban lot, but would not be practical in a woodlot or forest. Most people wait to put up the barriers described here until the pest is commonly seen.

Your best bet is destroying egg masses, each of which could hatch into 500-1,000 caterpillars come spring. Gypsy moth egg masses are about 1½ inches long, shaped like a teardrop, and look like they are made of buff-tan felt. Egg masses typically are laid on rough bark at the base of a tree, in holes, cracks or broken limbs, and under loose bark.

PHOTO COURTESY OF ANDREA DISS

Gypsy moth egg masses contain 500–1,000 larvae. Remove them from fall through early spring before the caterpillars hatch.

You'll need to scout around, as egg masses also can be laid on any outdoor object with a crevice where moths can hide — wood piles, undersides of vehicles, trailers or campers, outdoor furniture, decks, playground equipment, signs attached to trees and permanent trash heaps like junked cars and tire piles.

Search for egg masses from fall (after the leaves have fallen) through early spring when the masses are easier to find. Any masses you find from early May through early August are likely to be empty — the caterpillars have hatched. Always wear gloves when collecting egg masses; the skin is often irritated by the fine hairs covering the egg sacs. If you find egg masses, scrape them into a sealed plastic bag. Don't just drop them on the ground, because the masses will still hatch. Kill egg masses by cooking in a microwave for two minutes or coating with an equal mixture of vegetable oil and water. Then dispose of the treated egg masses in the trash.

Reduce the number of gypsy moth caterpillars in your trees by putting up barrier bands before the caterpillars start to hatch in mid-May. Caterpillars crawling up the trees will mire down in the sticky material and die. Bands can keep caterpillars from migrating to other trees or from climbing back up if they fall off the tree (surprisingly common!).

Make barrier bands using duct tape and a waterproof, sticky material such as the tree goo Tanglefoot or even petroleum jelly. When the bark is dry, wrap duct tape around the tree, shiny side out, pressing the tape firmly into the bark cracks to prevent caterpillars from slipping under the bands. The tape should be wrapped a few inches wide and placed around the tree trunk at chest height — about four feet above the ground. A band of duct tape is needed to protect the tree bark from the sticky material, which could disfigure or kill the tree if applied directly. Smear the sticky material along the center of the band. (If you choose to use petroleum jelly, allow at least two inches of uncoated band under the jelly as it can melt and flow downward.) Periodically check the barrier bands to make sure they have not been clogged with insects, dirt or debris. Apply more sticky material as needed; check especially after a rain. You can take the barrier bands down in late July after the gypsy moth caterpillars have pupated.

You have a third chance to kill gypsy moth if you put up and tend burlap bands. After the caterpillars get about an inch long in mid-June, they will move down the trunk to hide from predators during the day. The caterpillars will hide under the burlap and you can collect and kill large numbers of them.

To make a band, cut a strip of burlap 12–18 inches wide and long enough to reach around the tree and overlap a few inches. Tie a string around the center of the band and allow the top six inches to flop over to make a two-layered skirt. Tie the band around the tree above the sticky band (if you have one in place). Check the bands every day from early afternoon until about 6 p.m. Use rubber gloves or forceps to collect all caterpillars, pupae, adults and egg masses. Kill the caterpillars, adults and pupae by placing them in a cup of soapy water. Once the insects are dead, drain off the water and throw the insects in the trash. Take the burlap bands down in August.

BOTH PHOTOS ROBERT QUEEN

Sticky barriers can trap caterpillars from May through July; burlap bands are effective June through August.

## Spraying is a last resort

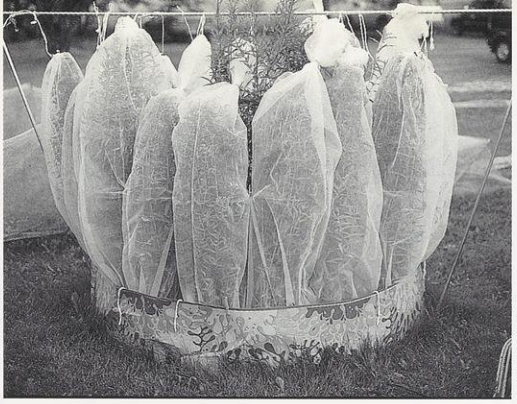
Gypsy moth can be killed by certain insecticides if their populations are very high and they threaten to severely damage very valuable trees. We expect it will be several years before populations are high enough in Wisconsin to warrant such treatment given that most insecticides kill more species than just gypsy moth.

Spraying will not eliminate gypsy moth from an area, but it can be an effective means of reducing the level of defoliation to a tolerable level and protecting scenic campgrounds, scattered residential trees and stands of veneer-quality hardwoods. It's difficult to justify spraying other areas.

Unfortunately, the gypsy moth is here to stay. But Wisconsin is lucky. We've had time to learn how to handle gypsy moth from the experiences of other states. We'll certainly lose leaves and trees, but with continuing research, constant vigilance, and a citizenry prepared to battle the moth on the home front, we can minimize the ravages the moth has caused elsewhere. □

*Andrea Diss is a DNR forest entomologist stationed in Madison.*

*continued from page 2*



BROCK WOODS

A simple nursery raises thousands of beetles that can be released to control purple loosestrife throughout the growing season.

In the 1980s and early 90s, the Department of Natural Resources worked with the U.S. Dept. of Agriculture to find, study and import "single-host" insects that only crave purple loosestrife. An ideal biocontrol agent would attack its chosen host and no other — a sort of botanical *Fatal Attraction.* The insects should find the plant, feed on loosestrife and either kill it or decrease its vigor, giving native plants a chance to reestablish.

Several species of beetles seemed like good candidates and in 1994 field trials, DNR researchers released 4,000 insects of some promising beetle species. Through 1997, researchers have released 90,000 foliage-eating beetles (two *Galerucella* species), 6,000 *Hylobius* beetles that mine loosestrife roots, and 500 flower-feeding beetles (*Nanophyes*) at 50 sites across the state. All four insect species thrive in our state.

Researchers monitor all the release sites, assisted by volunteers, and are conducting longer-term studies at a few places. Though the effects of *Hylobius* and *Nanophyes* on purple loosestrife are yet uncertain, the effects of *Galerucella* are often obvious and extremely encouraging.

The *Galerucella* beetle eats foliage quickly, stops the plant from flowering and badly weakens loosestrife plants on smaller sites in only two to three years! Larger sites may take much longer, but results from tests elsewhere in the country show the beetle can be very effective. The only limitation to date is that *Galerucella* does not seem to spread to new sites quickly, so it's necessary to start new colonies of *Galerucella* beetles in as many stands of purple loosestrife as possible to successfully control the plant.

Some citizen groups have already helped with this work, but more volunteers will be needed to control loosestrife statewide. DNR researchers are ready to help volunteers learn how to raise *Galerucella* in a beetle nursery, identify loosestrife stands, learn when to release beetles, and monitor progress. All tasks are easy and require little time. It's a great community project for wetland enthusiasts and for teachers who want to provide students with meaningful outdoor studies that provide a community service.

DNR researchers are working with other states to develop classroom materials to make it easier for teachers to consider such a project.

The Department of Natural Resources will supply directions, technical know-how and initial insect stocks as long as funding is available. Once a group rears beetles successfully, its program can continue without further DNR guidance. Last year three such groups raised and released beetles. Several more have already raised beetles this summer.

Please consider joining this program to control purple loosestrife by calling 608-221-6349 or 608-267-5066, by sending e-mail to woodsb@dnr.state.wi.us, or by writing the Purple Loosestrife Biocontrol Project, DNR Research Center, 1350 Femrite Drive, Monona, WI 53716. If interested, call now. Beetles are available this summer and fall while supplies last, but limited funding for this project makes future distributions uncertain. □

*Brock Woods is a research ecologist stationed at DNR's Research Center in Monona.*

# Readers Write

## BOAT TRAILERS

The spring boating article ("Get ready for spring boating," April 1998) was timely and informative. As an extra hint, I recommend that boaters check that their trailer is equipped with true trailer tires. As most boaters trade up to a bigger boat, they also need heavier boat-trailer packages. Car size tires, especially those with radial construction, have thin sidewalls and these are vulnerable to sharp gravel and stones at launch sites. Get heavier tires.

Boat ramps around Wisconsin present a real mixed bag of conditions. Some are horrendous, others are predictable, paved launches. Many owners who have invested more than $50,000 in a fancy bass boat and sports utility vehicle prefer the better launch sites.

You also suggest safe boating courses. I think Wisconsin should follow the lead of eastern states that now require operator training for boaters of all ages. That would help.

*John Bartosz*
*Lac du Flambeau*

As an auto mechanic for more than 10 years and a parts man for 18+ years, I saw and learned many solutions to some of the problems described in your boating maintenance article. My solution for preventing loose bolts on trailer tires was to use a silicone grease on the bolt and nut. I had particularly good luck with American Grease Stick brand's Syl-Glide. We used to install these bolts with self-locking nuts, the kind that have nylon inserts. I never saw one of these shake loose and once that grease coated the bolt threads, it never rusted. I used this same grease to coat every electrical connector that pushed together. A thin coating seems to effectively exclude water and oxygen which either prevents or certainly reduces corrosion. Long-term corrosion is a major downfall of both auto and boat electrical systems. I even applied a thin coat of silicone grease to the base of the lightbulbs on the trailer to stop corrosion of the socket.

I'm also a great believer in soldered electrical connections rather than crimp-style terminals. Almost all crimp terminals are aluminum. It's difficult to find tin- or cadmium-plated brass terminals, but that's what you need for soldering. Aluminum terminals won't stay soldered to copper wires. In the

presence of moisture, aluminum and copper set up a galvanic action and the result is poor electrical performance. The crimp-style terminals don't exclude moisture and there are very few good, reliable crimping tools. One of the best (and most expensive) I used was an over-center locking-type crimper. Every crimp was uniform whether you made one or 500. I am also a great believer in wire grounding trailer lights. I don't advise grounding the lights to the trailer frame — there are too many metal-to-metal joints in a trailer. If you take the time to run a soldered ground wire from each light to the trailer connector and then run a wire ground from the trailer connector to the ground cable clamp of the towing vehicle, you can eliminate almost all grounding problems.

Boat trailer springs are also prone to breaking and corrosion, probably due to frequent immersion in water. It's worth the strenuous effort to remove the springs from the trailer, disassemble them, remove dirt and rust, coat each spring with silicone grease, assemble and reinstall them.

There are some very good wheel bearing greases for boat trailers. Fiske Brothers Refinery makes a white grease, Lubriplate No. 70, which is highly resistant to water. Also, if it's necessary to replace a trailer wheel bearing, make sure you replace the entire bearing including the chase. Seating a new bearing inside the ring of an old chase is a waste of time and money — the repair won't last.

Finally, I found that batteries work well for a longer period of time if they are kept charged — either with a trickle charger or a solar panel battery maintainer, which keeps the battery charged, but not overcharged.

*Robert J. Albers*
*Green Bay*

## BEAR PERMITS

I'm a Conservation Patron and I like that you have separated bear hunting permits from the CP license because it should reduce the number who are assumed to be interested in hunting bear but never send in a permit request.

I think the DNR is unfair to bear hunters who use dogs. It sure seems they are required to spend an extra $8 to hunt with their dogs. If your reasoning behind this is to let the public know at a glance what type of hunting someone is doing, why not issue different colored back tags for the different hunting methods — one for hunting with dogs, one for bait hunters and one for combination?

*Joe Peterson*
*La Crosse*

*Assistant Big Game Ecologist Kevin Wallenfang responds: All people participating in the bear hunting season or summer bear-dog training sessions must purchase the $8 Class B bear license. The rule applies to everyone, whether one is training dogs or not. This is not an additional fee, it is simply the fee required to assist the holder of a Class A bear harvest permit. Even those preparing for the bear season in other ways are required to purchase a Class B license.*

*There is no fee for back tags; it's included in the license fee, regardless of the hunting method. However, those who are running bears with dogs are required to wear the back tag. Many people who hunt bear with dogs also place bait in the woods, and those hunters are not required to wear the back tag while placing bait. Why? Because someone might also be in the woods placing bait for deer hunting as the two seasons overlap. We are unable to determine who is baiting for deer rather than bear. If bear baiters had to wear their back tags when placing bait, then deer baiters would have to meet the same mandates; that seems like an unnecessary restriction.*

*The back tag came about to relieve confrontations and identify those hunting with dogs. Most of the hunters using dogs agree with the Wisconsin Bear Hunters Association that a back tag is a small inconvenience if it helps reduce conflicts with nonhunters.*

## TALL SHIP

Where is the tall ship being built that you described in the April 1998 issue?

*Don De Clerc*
*Green Bay*

*The schooner is being constructed by the Wisconsin Lake Schooner, Ltd., 500 N. Harbor Drive along Milwaukee's lakeshore. It is scheduled for completion by April, 1999 and will start educational programs, concerts and private bookings. We wrote about the projects and the days of commercial schooner traffic on the Great Lakes in "Seafaring Days," February 1994.*

## WEASEL TALE

I wanted to add to your enjoyable article on weasels (February 1998). Last winter I observed and photographed a short-tailed weasel as it ran down and killed a cottontail in my yard — amazing considering the size of the rabbit. After a week or so of watching the carcass, I picked it up. There was nothing left except the hide and legs. It had been completely consumed from the inside out.

DONALD R. FLIETNER

In March, I saw another weasel hunting on the ground — appearing then disappearing in the snow. Suddenly the weasel climbed straight up a large tree clear into the top branches. After searching the tree, it came down head first and went up another tree, repeating the process. I had never heard that weasels climb trees and it was a fascinating sight.

*Donald R. Flietner*
*Phillips*

*Weasels are accomplished climbers. We have seen them at suet feeders in winter. Two of the larger members of the family tree – the pine marten and the fisher – spend most of their time in deep forest stands.*

## RAINBOW COLORS

I enjoyed Anita Carpenter's "Moon rings and rainbows" in the February 1998 issue. As a physics teacher, one of the incorrect concepts that I discuss is how many colors the rainbow has. The red through violet range is roughly six 500 nanometer intervals we see as red, orange, yellow, green, blue and violet. To insert a color between blue and violet one would truly need to insert a color between each of the others as well. I teach that the rainbow only has six colors. Thanks for letting me set the record straight in an otherwise fine article which presented scientific concepts in easy-to-understand language.

*Jim Huhn*
*Watertown High School*
*Watertown*

## MAG FAN

I think you have an excellent Web site, though I like the printed version of everything better, which is why I subscribe. I really like that you carry no advertising and the articles are well thought-out and creative. Keep up the excellent work and continue making me homesick!

*Brian Gardner*
*Wilmington, Del.*

## LIKED GROUSE

Your article about grouse was great ("A practical grouse hunter's guide," October 1997) — real information from real sportsmen and women.

I hunt grouse in Washington state and love the experience. Among growing pressure from urban growth, Native American harvests, growing numbers of hunters, deer and elk populations, our grouse population here is taking a beating.

*Brad Fransen*
*Puget Sound area, Wash.*

## KILLDEER KORNER

*Killdeer seem to be popping up all over from Canada to Georgia, and many visitors are coming to our Web site for answers. They especially enjoyed Anita Carpenter's April 1997 piece "A call from above." Here's a sampling of the correspondence:*

I have a killdeer nest in my driveway and we watch the birds every day. The first egg was laid last Monday, the next on Thursday. I have been watching for the parents to return, but there's no sign of them. What are the chances the eggs can survive or I could incubate them under a light?

*Trudi Carroll*
*Brampton, Ontario*
*Canada*

I'm not a bird watcher, and I have a pair of killdeer nesting in my vegetable garden. I haven't tilled yet. What should I do?

*Warren Powell*
*Hamlin, NY*

Someone captured a baby killdeer chick and gave it to my son. I wish they had left it alone as I'm afraid it won't survive now. Your story was very informative and provided specifics on the birds' habits.

*Beverly Akers*
*Lithia Springs, Geo.*

I was looking for information on killdeer and your site was the only one I found that gave me the detailed information I needed in a short period of time.

For the last two years, my father has had a killdeer nest not far from his house – the first year in his gravel driveway. My father is an animal lover and was concerned that someone might run over the nest. He put up wire fencing around the nest with orange flags, then banned us from using the driveway until the three birds hatched and left. This year, the killdeer are nesting in his garden. One of the parents has striking white markings and the nest has four eggs. We are anticipating their birth and thank you for your help.

*Sandra Bradley*
*Plattsburgh, NY*

We hatched out three killdeer chicks today and needed suggestions quick on how to care for them. You had the information. Thanks!

*Robert Douglas*
*Kirksville, Mo.*

Thanks bunches for your page, I love it. It helped me find out about killdeer. I had found some eggs; we were plowing a field and ran over the nest. Luckily the eggs didn't break. I had to find out if it was possible to raise the eggs, but I guess it will be very hard to raise the chicks once they hatch.

*Loni Amos*
*Whitehall, Mont.*

## CONCERN FOR SHORELINES

Please set the record straight. A few months ago you carried an article about declining undeveloped shorelands in Wisconsin. Now I see on one of the last undeveloped lakes in Douglas County an ugly scare worse than development—little Derosier Lake has been dredged, drained and pumped into a cranberry bog. The site makes me sick.

A piece in Audubon magazine last November/December titled "Whittling Dixie" talked about devouring vast tracts of southern forest lands. It could just as easily have been written about Wisconsin. With logging roads left open to freewheeling four-wheelers, there is simply no place left to hide.

*David B. Donahue*
*Baldwin*

John Haack, former DNR water management specialist in Spooner, responded: *You are correct that the Department of Natural Resources is assigned to protect public waters. Wisconsin has a rich body of common law, statutory law and Constitutional law collectively called the "Public Trust Doctrine" that provides basic tools to protect the public interest from the adverse effects you describe. However, the Cranberry Laws of 1878 and 1883 provided broad exemptions to cranberry growers to divert and use waters from publicly-owned lakes and streams. Those special privileges were reaffirmed by the State Supreme Court as recently as 1980.*

*In the case you cite, DNR testified before the Douglas County Zoning Committee asking that the parcel not be rezoned from a forest district to an agricultural district as this rezoning would remove county options to enforce conditional use controls. DNR did not have regulatory control over this matter and the grower convinced the county to rezone the property.*

*The marsh is being constructed on uplands rather than in the wetlands and as proposed would have 50 acres of beds upon completion. Constructing beds on uplands avoided detailed review that would have happened had the site been required to procure an Army Corps of Engineers permit, but development farther from the shore also reduced impacts on the wetlands. We have visited the site three times with the grower and the Corps to respond to erosion complaints and dredged channels. State controls are quite limited where water is legally diverted to form upland cranberry beds.*

## BIRD HUNTERS, GET HIP

Beginning this year, anyone who hunts ducks, geese, woodcock, snipe, rails, gallinules and coots anywhere in the country must complete a one-page registration form. The Harvest Information Program (HIP) form takes less than five minutes to fill out, it is cost-free and will be available whether you buy your license at a DNR Service Center or at other license outlets in Wisconsin. All resident and nonresident annual license holders, Senior Citizen Recreation Card holders, first-year hunter safety graduates and armed forces personnel home on leave **must** complete the form and keep a copy with them while hunting migratory game birds. HIP registration forms need to be completed in each state where hunters intend to hunt migratory game birds.

HIP forms will be used by wildlife biologists to better estimate how hunting may affect future bird populations. The U.S. Fish and Wildlife Service may also ask HIP-registered hunters to participate in harvest surveys or express opinions about hunting season regulations. Information provided will help wildlife professionals learn more about migratory game bird hunters to better manage game bird resources. Contact your regional DNR office or DNR's Migratory Game Bird Specialist at (608) 266-8204 with questions about the HIP registration.

UKRAINIAN EGGS BY BETTY CHRISTENSON

# Home is where the art is

WISCONSIN TRAVELER

No need to check your ears and eyes: If you happened to be in our nation's capital recently, it's quite likely you *did* hear the sweet familiar strains of "The Beer Barrel Polka" booming across the National Mall. And yes, that *was* a Green Bay-style tailgate party you saw in full swing at the foot of the Washington Monument.

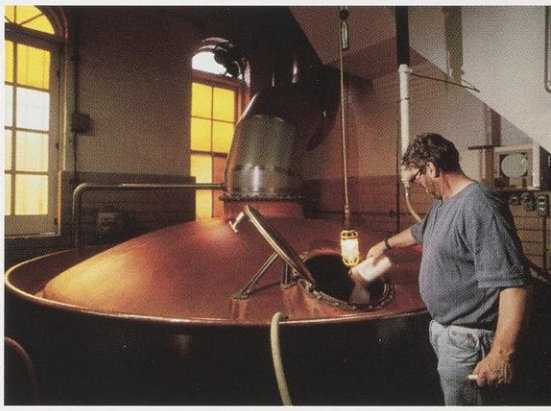
The Smithsonian Institution's annual Festival of American Folklife, a living cultural exhibition presenting the traditions of different peoples, states or regions, paid homage this year to the Wisconsin way of life. Wisconsin musicians, artists, workers and cooks sang, danced, told stories, made crafts and prepared the foods for which the Badger State is famous for more than one million visitors. And that, friend, is a lot of kringle.

Now the party is coming to our own capital, Madison. From August 20–23, the Capitol Square will be turned into a sprawling marketplace of Wisconsin traditions during the **Wisconsin Folklife Festival.** Under canvas and on stage, hundreds of Wisconsinites will demonstrate their talents and skills alongside folk artists from Wisconsin's sister states in Chiba, Japan; Hessen, Germany; Heilongjiang, China; and Arcateo, Nicaragua.

The Wisconsin Folklife Festival celebrates the senses. You'll be serenaded by Scandinavian fiddlers, Native American drummers, gospel choirs and oompah orchestras. Stop for a moment to listen to a long Northwoods yarn told by a veteran logger, or wander over to the "tavern" for a good fish story (is there any other kind?) shared over a hand of euchre or sheepshead.

Let your nose lead the way through the festival grounds; you'll smell the vast outdoor kitchen before you see it. There, master cooks tend steaming cauldrons of booyah, spin maple sugar into a crackly treat, and serve up cranberry-and-venision pies, pasties, cream puffs, wild rice, fresh cheese curds, kringle and many other local sweets and savories.

Though it's been said a person should never watch two things being made — sausages and laws — make an exception and take in the sausagemaking demonstrations. You can see exhibits of other workplace traditions as well, including brewing, cheesemaking, logging, machining, commercial fishing and pig showing.



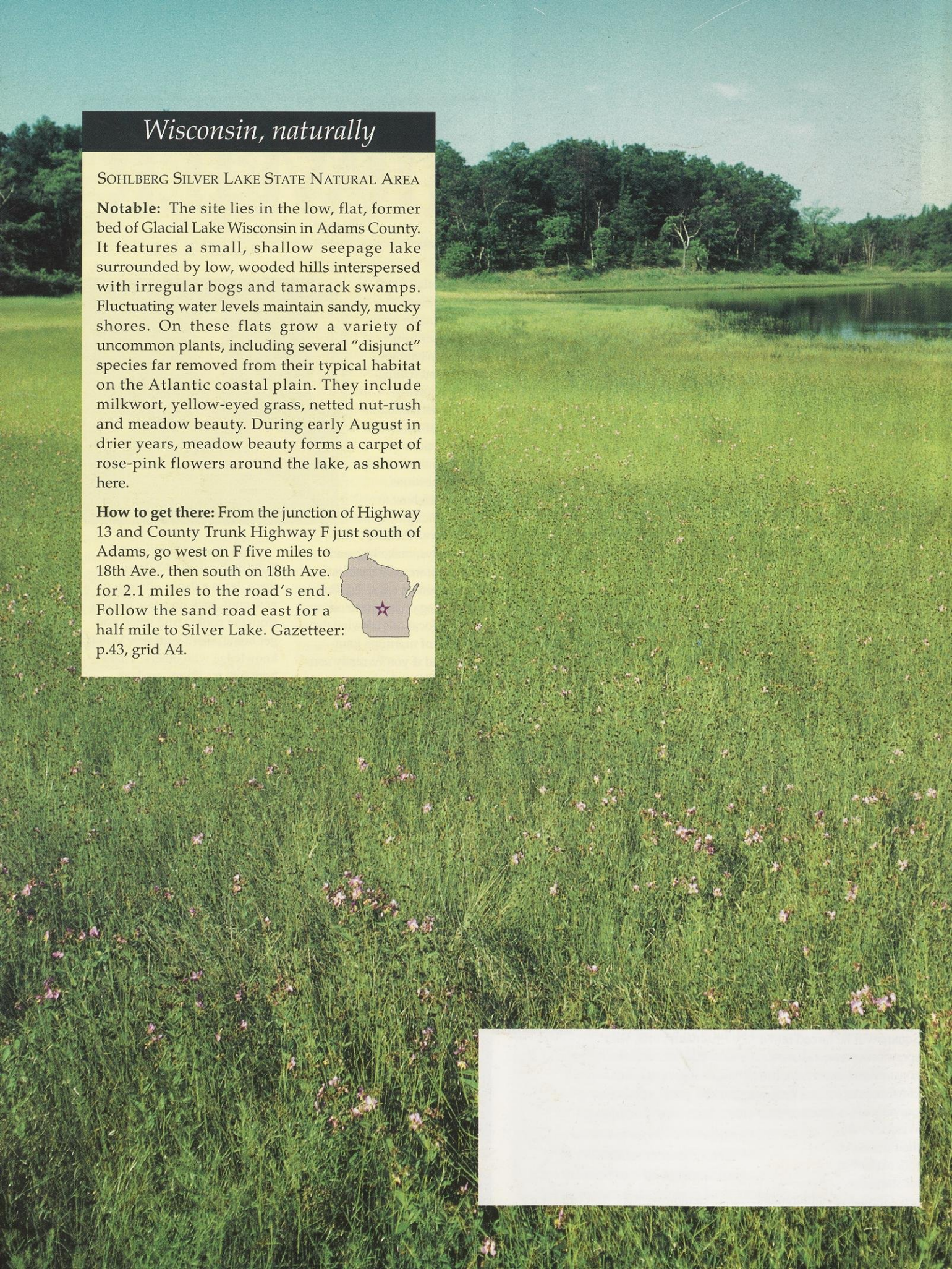
PHOTOS COURTESY OF THE WISCONSIN ARTS BOARD

Artisans skilled in a variety of fields will display their work, show techniques, and answer questions. You'll learn how to make a porcupine quill basket, carve fish and duck decoys, make lace and moccasins, weave wheat and paint Ukrainian eggs. Try Polish papercutting or Japanese origami. Let a local salt untwine the mysteries of maritime knottying. (And if you're really serious about tying the knot, a Hmong marriage broker will be reviewing the credentials of prospective clients.)

Plan to visit the Wisconsin Folklife Festival. While you're there, learn a dance or song, try a new craft, pick up a few recipes from the cooks. And when you get home, share your new skill or knowledge with others. That's how folk traditions are kept alive. □

Skilled artisans will make it, bake it, and wail on it at the Wisconsin Folklife Festival, August 20–23 in Madison.

D. YANG PLAYS THE GEEJ. PHOTO BY MAI ZONG VUE



## *Wisconsin, naturally*

SOHLBERG SILVER LAKE STATE NATURAL AREA

**Notable:** The site lies in the low, flat, former bed of Glacial Lake Wisconsin in Adams County. It features a small, shallow seepage lake surrounded by low, wooded hills interspersed with irregular bogs and tamarack swamps. Fluctuating water levels maintain sandy, mucky shores. On these flats grow a variety of uncommon plants, including several "disjunct" species far removed from their typical habitat on the Atlantic coastal plain. They include milkwort, yellow-eyed grass, netted nut-rush and meadow beauty. During early August in drier years, meadow beauty forms a carpet of rose-pink flowers around the lake, as shown here.

**How to get there:** From the junction of Highway 13 and County Trunk Highway F just south of Adams, go west on F five miles to 18th Ave., then south on 18th Ave. for 2.1 miles to the road's end. Follow the sand road east for a half mile to Silver Lake. Gazetteer: p.43, grid A4.