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SPECIAL INSERT: HITCHING A RIDE

WISCONSIN NATURAL RESOURCES

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Algae that
are bad news
for the nose

Citizen scientists

Taking better outdoor photos

Bonus Insert: Conservation Reserve Enhancement for rural property

A nettlesome question

Anita Carpenter

In the moist soils of lowland woods, dense stands of a nondescript, non-showy plant thrive. The waist-high vegetation is often overlooked unless you carelessly brush exposed skin against its bristle-covered leaves. Then stinging nettle makes its presence known. Within moments, your skin burns, followed by intense itching. Prudence suggests avoiding a stroll through stinging nettle, but this plant need not be feared nor should it be dismissed.

Stinging nettle, *Urtica dioica*, is an herbaceous perennial that prefers low, wet habitats but also grows along fencerows, the edges of upland forests and railroad rights-of-way. Stinging nettle may form large, almost impenetrable colonies. Each year the colony enlarges as the plant sends up new shoots from spreading underground rhizomes. The fibrous, unbranched stems grow three to four feet high. Two- to three-inch serrated leaves that resemble elm leaves grow from regular intervals along each stem.

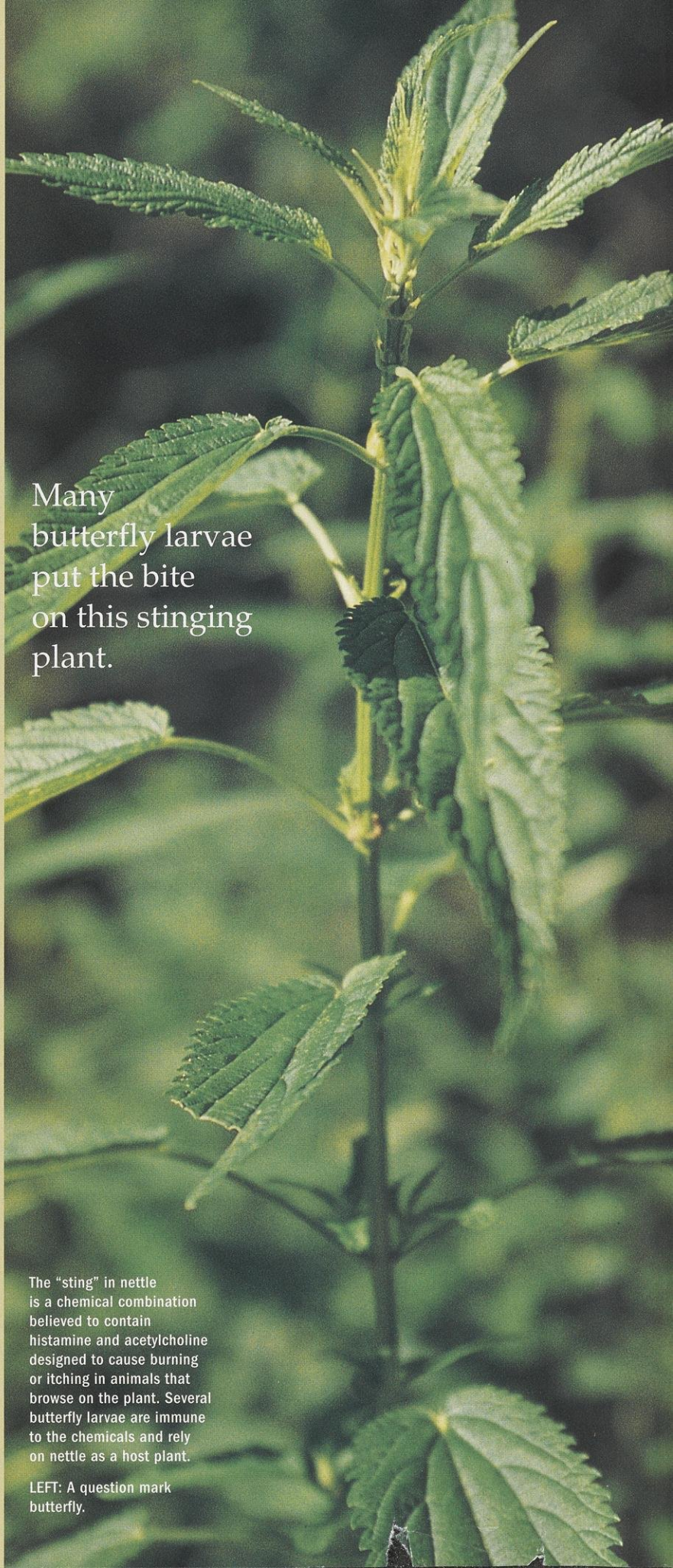
Stinging nettle flowers from July into September. Slender non-showy yellow-green flowers grow in clusters where the leaves attach to the stem. Some clusters are composed entirely of female flowers, some are totally male flowers, while others contain both types. The anther-tipped filaments bend over, much like a person trying to touch his toes. When the flower matures, its covering dehisces or breaks open and the spring-like filaments straighten up, hurling pollen aloft. Drifting on summer winds, the pollen settles on receptive female flowers. Only one small achene or fruit, resembling a miniature tan pumpkin seed, is produced per female flower but each plant may produce several hundred seeds. The seeds remain on the plant until the first frost, then fall to the ground.

Continued on page 29

Many butterfly larvae put the bite on this stinging plant.

The "sting" in nettle is a chemical combination believed to contain histamine and acetylcholine designed to cause burning or itching in animals that browse on the plant. Several butterfly larvae are immune to the chemicals and rely on nettle as a host plant.

LEFT: A question mark butterfly.



DON BLEGEN

WISCONSIN NATURAL RESOURCES

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FRONT COVER: Mary Gansberg, DNR stream and lakes biologist, measures water conductivity, temperature and dissolved oxygen as part of a team investigating *Cladophora* outbreaks along the Lake Michigan coast.

PAUL PEETERS, DNR STURGEON BAY OFFICE

BACK COVER: Floodplain forest at Milwaukee River and Swamp State Natural Area, Fond du Lac County. For more information, contact the State Natural Areas Program, DNR Bureau of Endangered Resources, P.O. Box 7921, Madison, WI 53707 or visit www.dnr.wi.gov/org/land/er/sna.

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Deadly



Even a tough snapping turtle isn't armored well enough to take on the traffic at Horicon National Wildlife Refuge in Dodge County. The marsh habitat is home to a stunning array of amphibians, birds, reptiles and mammals.

A stretch of highway through Horicon Marsh takes its toll on wildlife trying to reach habitat on the other side. Can we bypass the damage?



Muskrets are active at Horicon year-round. Frogs, toads and muskrats are the most common victims of animal/car collisions on this road.



Highway 49 cuts across 2.5 miles of the largest cattail marsh in the nation. Researchers documented that more than 4,200 animals of 91 different species died here in the last three years of research.



A highway forms an artificial but very real barrier to migrating birds that move between resting and feeding areas and nesting birds, like this yellow-headed blackbird, that tried to defend a mating territory.

crossing

Story by Scott Craven and Jamie Nack
Story photos by Jack Bartholmai

Road kill! To most drivers the term conjures up images of mangled deer carcasses along the roadside, yellow signs sporting the black outline of a buck, or the occasional headline reporting human death or injury when deer and car collide.

As described in the October 2004 issue of this magazine, deer-vehicle collisions are a serious reality of driving in Wisconsin. Progress on strategies to reduce crashes has been countered by more roads, more cars and higher speeds.

Road-killed deer are costly and traumatic on both sides of the bumper, but they don't endanger deer populations from a biological or wildlife management standpoint. Repair costs and human safety aside, the loss of 20-50,000 deer doesn't raise much concern given that hunters take ten times that

many, and we are told that even those harvests are not enough to restore ideal population sizes, given the herd size. But what about some 500 other species of wild animals also in harm's way on the highway? What about damage to birds, mammals, reptiles and amphibians killed by cars and trucks?


Tens of thousands of small creatures create little more than a thud or bump when they are in the wrong place at the wrong time. Most drivers probably don't even notice the garter snakes, songbirds or frogs killed on impact with tires.

If you doubt the magnitude of the problem, do your own survey! Simply keep your eyes open for road kill as you drive to work or head out on vacation. Wisconsin naturalist and historian A. W. Schorger did just that as he made regular trips from Madison to Freeport, Illinois from 1932 to 1950, when the

number of vehicles on the road was relatively small and wildlife habitat was much more abundant than now. In 97,020 miles of driving, Schorger recorded 4,939 dead birds alone, representing 64 species! Losses are so common that there is even a satirical field guide to "Flattened Fauna" to help identify road-killed animals. How serious are the losses and can anything really be done to reduce the carnage?

Lots of traffic down the highway and across it

Signs warning of wildlife crossings and reduced speed limits seem to be largely ignored by the driving public. Fences and other barriers, underpasses, overpasses and high-tech motion detectors are expensive. Despite the obstacles, many citizens and biologists believe the problem needs attention and there are



Horicon Marsh is equally a destination for thousands of nature watchers who come to get a close look at wildlife. Highway shoulders are convenient stopping places, but they are also used by wildlife. Please stop at the designated parking/viewing areas.

calls for creative solutions, especially along stretches of Wisconsin's highways that are notorious as death traps for wildlife.

One such stretch is the 2.5-mile segment of Wisconsin Highway 49 that bisects the northern end of the Horicon National Wildlife Refuge just east of Waupun. And one such group of concerned citizens and biologists is an ad hoc task force that came together in early 2004 to tackle the Highway 49 problem head-on. Wildlife refuge staff, Wisconsin Department of Transportation staff, UW and Wisconsin DNR biologists and citizens from the Friends of Horicon National Wildlife Refuge continue to meet, hopeful of finding a workable solution to the problem.

It is definitely a problem that war-rants that kind of attention, says Carol Sykes of the Friends group. Over 32,000 acres in size, Horicon is the largest freshwater cattail marsh in the U.S. and is a critical rest stop for thousands of migrating ducks, geese and shorebirds. The marsh area is also a magnet that attracts visitors for whom the Highway 49 lookouts and roadsides are not just a

commuting route but a destination. The Horicon Marsh complex is recognized as a Wetland of International Importance, a Globally Important Bird Area and a unit of the Ice Age National Scientific Reserve. Each year over 400,000 people visit Horicon National Wildlife Refuge on the northern two-thirds of the marsh.

For the past three years, refuge biologists and volunteers have systematically searched the road in all seasons for road kill. During the three-year study, they found 4,244 dead animals, representing 91 species or species groups (such as "frogs").

"In the spring, there can be days where the number of dead frogs is too numerous to count," says Wendy Woyczik, refuge wildlife biologist. Moreover, the numbers of dead animals we can document should be considered as the absolute minimum because an unknown number of carcasses are removed by scavengers, fall undetected in the grass, or are carried away on the grilles and bumpers of the vehicles that killed them, Woyczik says.

The recent research shows that about

three-quarters of the total mortality consists of frogs, toads and muskrats, all extremely common animals in that wetland environment, yet many other popular, charismatic and uncommon species are also represented. Thankfully, there are no state or federal, threatened or endangered species on the list of dead species recovered to date. However, visitors to the refuge would certainly miss the chance to observe the 54 least bitterns, six river otters and 27 yellow-headed blackbirds found in these road kill surveys.

Options to reduce road kill losses

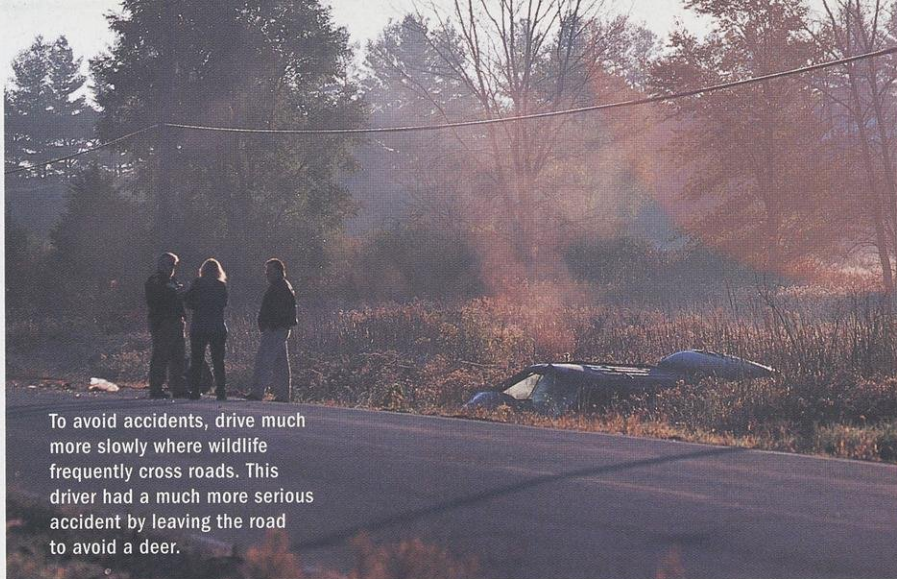
Highway 49 presents a deadly combination of risk factors for wildlife. First, it bisects a continuous expanse of several thousand acres of managed wetlands; ideal wildlife habitat. Second, the stretch in question is straight, flat and presents a tempting opportunity for drivers to "put the hammer down." Third, there is simply a lot of traffic, including large trucks. Highway 49 has been a key link between Highways 151

to the west of the marsh, and 41 to the east of the marsh, and between Waupun and other area communities. However recent improvements to Highway 151 west of the marsh may reduce truck traffic. Even so, simple probability suggests that an animal crossing the road stands a good chance of meeting an oncoming vehicle.

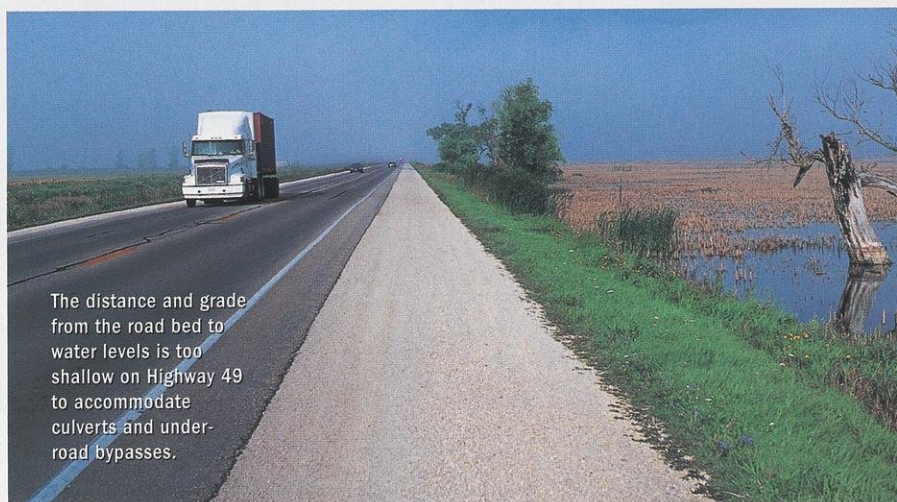
The task force has discussed many possibilities ranging from expensive options like relocating Highway 49 to the north of the refuge, to relatively inexpensive options like more warning signs and creating simple barriers to animal movement. Solutions like culverts and underpasses used in similar settings are not as simple to install in the Horicon situation. Highway 49 is only a foot or two above the roadside water level and it serves as a water level control dike between units of the refuge that are intentionally managed to provide variable water levels to meet the needs of wildlife. Water levels are managed at different times of the year and on multiple-year cycles to provide nesting habitat, feeding areas, loafing areas and staging areas for a diversity of wetland wildlife. A simple culvert would not work unless the roadbed is raised, because it would drain the water impounded on the north side of the highway.

The ad hoc task force will continue discussions and hopes to encourage steps to reduce road kill problems this summer including a proposed sign on Highway 49 drawing attention to the problem, but they need help! Finances are always an issue, but beyond that we need a fundamental change in driving behavior in this unique area. Despite a genuine and widespread empathy for wildlife, we all seem to be more strongly bonded with our cars and are "driven" by a sense of urgency to get to any given destination.

Driving on Highway 49 as it passes through the marsh is more than just another few minutes on the road, it represents an opportunity to experience one of the great wildlife viewing sites in the United States. To keep it that way, *please*, slow down and travel no faster than the posted speed limits. Enjoy the view, and watch for wildlife on the road, roadside, or approaching the road



To avoid accidents, drive much more slowly where wildlife frequently cross roads. This driver had a much more serious accident by leaving the road to avoid a deer.



The distance and grade from the road bed to water levels is too shallow on Highway 49 to accommodate culverts and under-road bypasses.

corridor. Drivers should reduce their speeds to allow enough reaction time to brake if they see an animal on the road. Be especially observant during the early morning, evening and nighttime hours when animals are most active. As the Humane Society of the United States' national campaign says, "Give Wildlife a Brake!"

If you decide to pull off onto the shoulder, pull all the way off the road. Use your turn signal when pulling off and on the road, and be very careful to watch for fast moving traffic. Stay in your vehicle! Birders can use simple two-way radios to communicate sightings between vehicles without getting out of their cars, trucks and buses. Promote the idea of using the vehicle as a blind, too. Stay on the same side of the road and do not cross the roadway! Alternative viewing sites off the highway are available at the east and west ends of Highway 49 where it enters and leaves the marsh.

Whether Highway 49 is your desti-

nation or a byway on your journey, take the time to slow down, enjoy this unique corridor and keep an eye out for the smaller creatures trying to have a safe trip traveling across the road. ▀

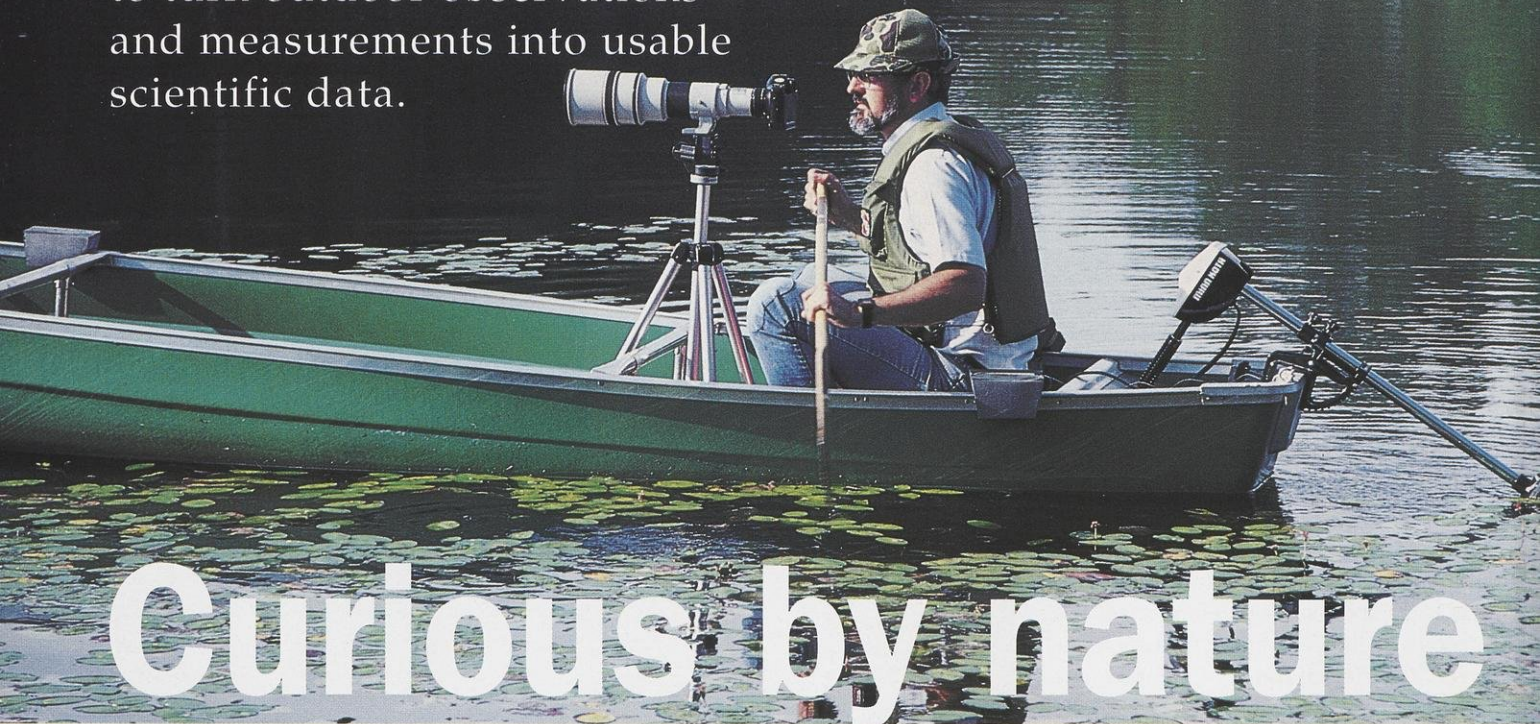
Scott Craven is a wildlife specialist and Jamie Nack, a wildlife outreach specialist with the Department of Wildlife Ecology at the University of Wisconsin-Madison.

Jon Krapfl and Molly Stoddard with the U.S. Fish & Wildlife Service and Carol Sykes from Appleton also provided information for this story.

YOU'VE GOT A FRIEND

To find out more about Horicon Marsh events or receive informational brochures, leave a message for The Friends of Horicon National Wildlife Refuge, at (920) 387-2658, ext. 17. Calls are checked regularly by a member of the Friends group and returned as soon as possible.

A gathering of professional and amateur scientists discusses how to knit together a network to turn outdoor observations and measurements into usable scientific data.



Curious by nature

David L. Sperling

It was a conclave of the perpetually curious. People like myself who had spent their youth looking under rocks, poking sticks in the mud, watching flutterbys, blowing blades of grass and lying face up in the lawn imagining puffy dragons in the clouds that floated by. Unlike others who “grew out” of that phase, these folks got more serious. They’ve often spent a lifetime learning more about the things that take root, crawl, hop, slither and fly away. These are the folks who study nature as a job or on their own, they are never bored, and as near as I can tell, they never idle by watching *American Idol*.

The Wisconsin Department of Natural Resources was but one of 13 groups that invited citizens and scientists who like to monitor nature’s comings and goings to come together for a workshop on a beautiful weekend last summer. People who do research and environmental monitoring for more than 60 groups attended. They represented citizen groups, municipalities, agencies and university programs. Their aim? To learn about each others’ interests, to discuss how to keep collected data useful and to build a network that can share monitoring results.

“Amateur groups” and “agencies” aren’t the only ones wrestling with this problem, noted Phil Emming of the Federation of Fly Fishers. “Getting data to talk to each other is equally a problem for professional groups.”

Government has been slow to explore how we might better rely on the information that citizen monitoring groups collect, said Paul Heinen, policy advisor to the DNR secretary. “It seems clear in looking at state legislative trends that there is going to be less government and there is going to be more citizen responsibility,” he said. “We

need to keep encouraging diverse ‘friends’ groups like the Friends of State Parks, volunteer lake monitors and people who take part in Sturgeon Watch to stay interested and involved.”

State Sen. Neal Kedzie echoed that theme in his keynote address. State government can’t do it all and we have important work to do together to better protect the environment. “It takes ordinary citizens to do extraordinary things,” Sen. Kedzie said. Citizen involvement on smaller bills and policies paves the way to larger pieces of legislation. That’s how we moved from looking at wetland mitigation cases and water shortages to building groundwater protection laws.

Danielle Donkersloot, the volunteer monitoring coordinator for the New Jersey Department of Environmental Protection (NJDEP) described how that state sets up its partnerships with citizen groups and makes use of the water quality data these groups collect.

There are a lot of myths about volunteer data, Donkersloot said. Some people think the volunteers are advocates

LEFT: "The conference provided a forum to encourage outdoor observations, share those records and discuss ways to make that information useful for making decisions." — Erin Crain, DNR conference coordinator.

BELOW: A teacher monitors common milkweed for signs of monarch butterfly larvae as part of a university-sponsored citizen science program.



with hidden agendas. They're not scientists," some say, and the "professionals" question the quality of the data volunteers collect.

"In fact, volunteers want to do it right," Donkersloot said. "They want to collect and share quality data so their time in the field is well invested."

When she counsels citizen groups, the first question she asks them is "Why are they out there?" Do they want their data to be used and by whom?

Some groups are mainly interested in just getting their members outdoors and exploring nature. Some want to collect information, photos and maps for their own projects. Some want to take a more serious approach to conduct scientific research including quality controls and quality assurance of their data. And some want their data to be used by regulatory agencies when evaluating water quality, air quality and the environmental performance of businesses and communities. NJDEP sets different requirements for visual, physical, biological and chemical monitoring depending on the level groups choose to pursue.

That last tier requires a more intense level of commitment, Donkersloot explained. If you want to consider using data for regulatory purposes, then the people who collect it need to be trained, certified and follow strict quality assurance/quality control plans.

Dana Curtiss of the Illinois DNR's EcoWatch Network shared lessons learned in 12 years of running that state's volunteer environmental monitoring program. Illinois invests \$640,000 a year training and working with 1,400 volunteers to monitor wadeable streams, forests and prairies at 650 locations throughout Illinois.

We meet with the volunteer groups and talk out their goals, Curtiss explained. The groups need to decide if they are primarily interested in outdoor education, stewardship or monitoring. If they are interested and committed to monitoring, then "we work with them to do this one thing to the best of our ability and support the collection of quality data," Curtiss said. She noted that the average volunteer stays with the program for at least four years.

KAREN OBERHAUSER, UNIVERSITY OF MINNESOTA MONARCH LARVAE MONITORING PROGRAM

Lisa Goodman, former volunteer coordinator for the River Alliance of Wisconsin offered ideas about how to keep volunteers interested.

The people an organization attracts as volunteers genuinely care about that natural resource for a reason, Goodman said. They stay with your program if you can show you are providing support that an issue deserves. Your organization needs to show that it will provide opportunities for volunteers to find others with similar interests. In a cause like ours, Wisconsin river protection, our volunteers don't just want to talk about their protection, they usually want to explore and experience the rivers together. It's fun to feed those common interests and to reinforce the values the volunteers feel when they are on the rivers.

A chance to share their passions

The conference moved from discussing volunteer groups in theory to sharing the neat stuff groups have learned in their explorations and investigations. A few of the 12 workshops are described here.

Wisconsin Bird Conservation Initiative (WBCI) — DNR Wildlife Biologist Andy Paulios described this impressive project that acts as a clearinghouse and coordinating center for statewide research and education on birdlife. More than 130 organizations statewide take part in WBCI efforts and Paulios pointed out that the longest-running surveys of natural resources in the nation have been conducted by dedicated volunteers, not government agencies. The Christmas Bird Count started by Frank Chapman on Christmas Day 1900 continues today. One of the 25 participants in that initial count was an individual from North Freedom in Sauk County.

Today, the program has expanded to include such combined research as the Federal Breeding Bird Survey whose data includes observations of more than 3,700 active bird migration routes that are monitored annually nationwide. More than two-thirds of the nation's birds are monitored along their migration routes. Such projects as the Wisconsin

Breeding Bird Atlas rely on hundreds of volunteer ornithologists to map the breeding territories and range of birdlife.

WBCI volunteers and partners work to keep common birds common, to promote bird-based recreation, to manage large landscapes, to enhance bird habitat, preserve important birding areas, work on international bird migration/preservation projects and to help people understand how they can be better neighbors to birds. That work ranges from field research to offering practical tips about controlling non-native bird predators and making manmade structures like houses and transmission towers less hazardous to birds. Contact WBCI: Andy.Paulios@dnr.state.wi.us

Wisconsin's Volunteer Carnivore Tracking Program — What started as a workshop for folks interested in wolves has turned into several packs of volunteers trained to track wolves in winter. By car, snowshoe, snowmobile and on skis, trackers slowly patrol snow-covered roads from November through

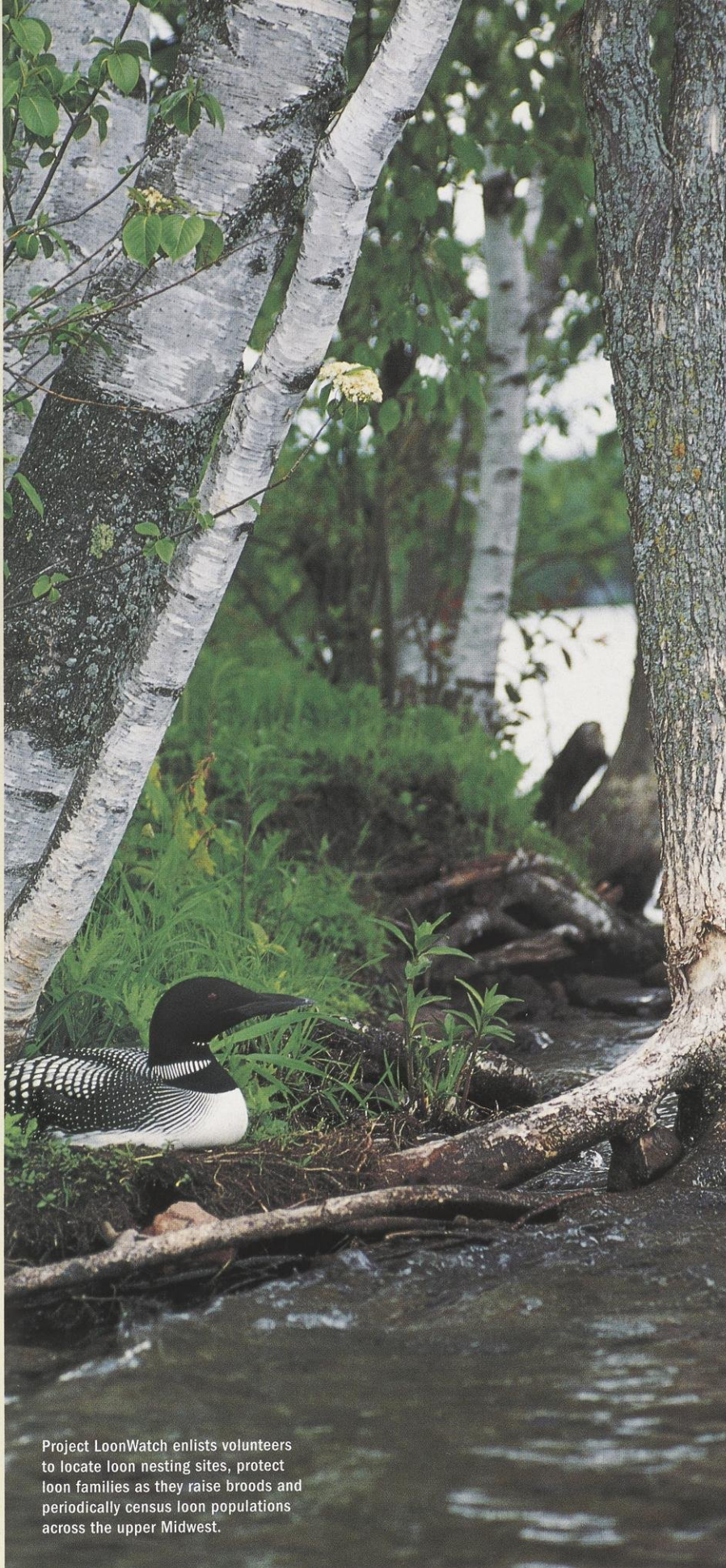
March to note where wolf packs are on the move. Reports from their observations are pieced together to determine the number, territories, distribution and breeding status of wolves and also keep an eye out to see if rare carnivores like Canada lynx, wolverines and cougar are gaining a foothold in Wisconsin. More than 450 trackers have attended training that is now conducted every other year in three workshops. Last year, 113 volunteers participated in conducting the winter surveys, which doubled the amount of tracking reports that DNR biologists could have compiled without that help. Help from volunteer trackers may become even more important for maintaining accurate population estimates and ranges. If wolves are delisted from endangered species protection less federal funding might be available for monitoring and radio tracking work. Contact: www.dnr.state.wi.us/org/land/er/mammals/volunteer.

LoonWatch — This program coordinated by the Sigurd Olson Environmental Institute of Northland College in



Conference participants had real enthusiasm for collecting and sharing quality information about their outdoor research. They want to build databases that make sense of what they are seeing collectively and provide solid reasons to take action that protects our natural heritage.

TERI GRAIN



Project LoonWatch enlists volunteers to locate loon nesting sites, protect loon families as they raise broods and periodically census loon populations across the upper Midwest.

Ashland conducts research, monitoring and education about the approximately 16,000 adult loons that are summer residents across northern Minnesota, Wisconsin and Michigan; about 3,100 adult loons nest and raise broods in Wisconsin waters. Shoreland development, campgrounds, summer homes and marinas have all taken their toll on nesting loons. Pollution affects their nesting success and motorized watercraft and human encroachment also affect their survival. Research programs since 1976 have studied the loons' range, protected nesting areas and conducted surveys to better understand their winter range needs as well. Volunteer educational programs include staffing a speakers bureau, writing lake monitoring reports, installing artificial nesting platforms and posting loon nesting areas. Every five years the LoonWatch program also coordinates a one-day count of loon adults and chicks to track population trends. Contact: www.northland.edu/soei/loonwatch.asp

Monarch Butterfly Larva Monitoring — This program coordinated at the University of Minnesota aims to promote a basic level of citizen science, insect appreciation, an understanding of insect biology and monarch butterfly conservation.

Monarchs proved to be a great species to study because they are well-known, identifiable and approachable, noted Project Coordinator Karen Oberhauser. Many children have seen monarchs, and recognize the larva, chrysalis, and adult forms, she noted. Training courses provide protocols that volunteers can use to recognize monarch developmental stages and recognize milkweed and other host species the larvae use. Volunteers describe larval locations, egg densities, monarch densities, survival rates and weather conditions. Monitoring for this educational program only takes about two to three hours per week.

"We have a lot to learn about basic distribution and abundance of this species," Oberhauser noted. Moreover, citizen observations may offer insights on insect response to herbicide tolerance, other pesticide use and changing land uses.

STEPHEN J. LANG



More than 130 statewide birding organizations have banded together to monitor bird migration routes, census breeding populations, protect habitat and attract people who are interested in both seeing birds and conserving their populations worldwide.

Wisconsin NatureMapping — This program adopts a similar aim to act as a starting point and training ground for people who would like to start simply by recording and sharing their wildlife observations in a more systematic way. The program, sponsored by the Beaver Creek Citizen Science Center in Fall Creek and the Wisconsin Department of Natural Resources, trains observers how to use simple field notes and a computer program to pinpoint their observations online. Sightings pinpoint the day, location, habitat type and species seen. Observers also list a confidence factor of how certain they are that they've properly identified the species reported. Results are compiled in a database available to all users. As more people share their observations, the resulting maps give a sense of the abundance and distribution of species over time. The database could also be used by wildlife watchers to plan road trips when they could be reasonably

certain of seeing species in a given area at a point in time. To participate or just learn more, contact www.wisnatmap.org or call (715) 877-2212.

Other breakout sessions discussed a host of water quality monitoring programs including coordinated efforts to monitor and contain purple loosestrife, community programs to control the spread of invasive plants, and lake and stream monitoring programs.

Follow-through to help citizen monitoring set roots

Since the summer conference, the Department of Natural Resources has taken several steps to help nurture the citizen monitoring concept in Wisconsin. First, the agency provides a website and list of contacts where groups can network and exchange ideas.

Second, the agency will forward a draft to legislators that would establish an advisory board to the DNR on vol-

unteer monitoring efforts. As envisioned, that board would include representatives from active groups conducting monitoring projects, members of conservation groups, science teachers, university researchers, land-use planners, Native American tribes, industry and agriculture. Until such legislation is discussed and approved, an interim advisory board has been appointed by Secretary Hassett with representation from the Wisconsin Wildlife Society, The Nature Conservancy, University of Wisconsin-Stevens Point Watershed Science and Education Program, the state LEAF (Learning Experiences and Activities in Forestry) program, the Wisconsin Association of Lakes and the Water Action Volunteers program. The interim board has met to consider approaches for fostering more viable monitoring programs.

In a related effort, the DNR Water Division has developed a strategy to link DNR workplanning with citizen

monitoring efforts. One goal of that strategy is to involve citizens in monitoring at a level where their data can be used for management decisions by the Department of Natural Resources. It includes involving citizens in many aspects of water monitoring in streams, rivers, wetlands, inland and Great Lakes beaches, lakes and groundwater. Parameters that can be monitored and the protocols DNR staff can accept have been defined. The monitoring program is being tested this summer. A parallel citizen-based monitoring plan is also being developed as part of the Comprehensive Wildlife Conservation Plan to address terrestrial monitoring.

Key future goals include setting up common databases that are accessible to professional and dedicated amateur scientists; creating and maintaining accessible websites that can serve as clearinghouses for monitoring data, training and collection methods; identifying gaps in current monitoring programs that trained citizen monitoring programs can fill; and integrating these monitoring programs into conservation

plans and management plans.

Michelle Washebek was hired to coordinate DNR's citizen-based monitoring activities until such time as a permanent position is authorized and filled. Some seed money (\$100,000) was available to provide grants to citizen groups this spring. Individual grants ranging from \$2,500-\$10,000 helped 13 groups underwrite the costs of teaching volunteers to identify species, developing consistent methods of collecting data and recording observations so the information may better meet professional standards and be useable in collective databases. Funds also covered part of the costs to buy sampling equipment, help pay for lab analyses, pay partial travel expenses, and pinpoint observation locations by interpreting GPS data.

Future grants will similarly judge whether each project is conducted in a rigorous fashion so the data collected will have wider applications that might prove useful in making environmental and resource management decisions.

"The environment didn't come with



Wolf tracks at Namekagon Barrens. Wolves are rarely seen, but reports from more than 450 trained volunteers have been pieced together to provide a picture of wolf numbers, pack sizes, wolf societal structures and wolf ranges throughout Wisconsin as this extirpated species is restored to the landscape.

GORDON DIETZMAN



Middle school and high school students take pride in learning about butterfly ecology and appreciating how outdoor scientific observation can become a lifelong habit.

KAREN OBERHAUSER

a learner's manual, and we've always felt that if you really want to know what's going on in the landscape, you need to ask the folks who are living there," said Erin Crain, who coordinated the conference for DNR's Endangered Resources and Integrated Science Services programs.

"These partnerships can encourage more people to keep their eyes and ears attuned to the outdoors, to make solid, regular outdoor observations, to engage in scientific exploration and to record those results in ways that are useful for making decisions," Crain said. "We need to keep encouraging that kind of dedication and find ways to value and use those observations whether made by 'professionals' or equally dedicated and knowledgeable 'amateur scientists.' We need to keep finding and working with people who maintain a natural curiosity about the natural world around them."

David L. Sperling edits Wisconsin Natural Resources magazine.



Show more with less

It takes practice to say it simply visually.

Story and photos
by Dave Crehore

When it comes to providing material for photographs, nature is generous to a fault.

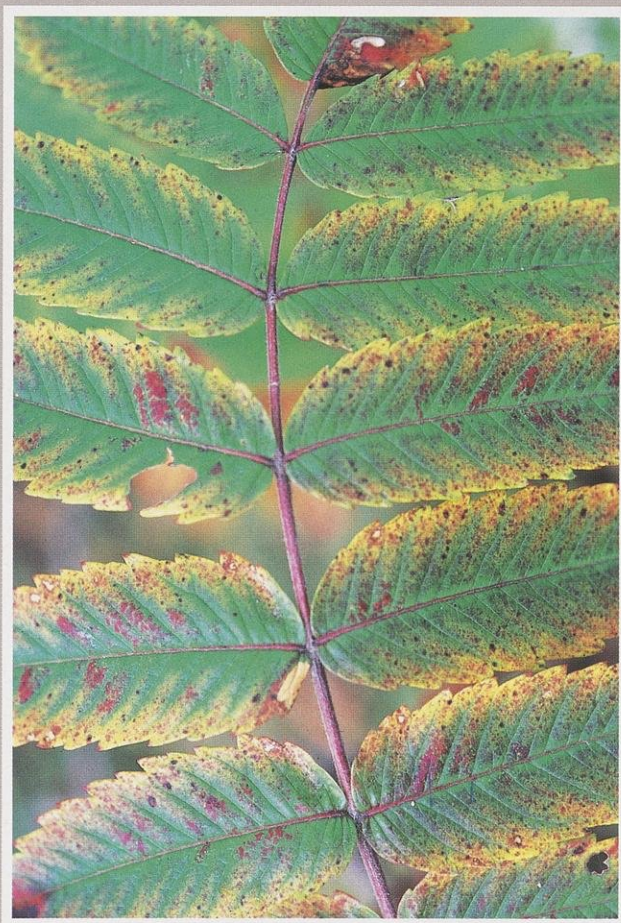
There is so much of everything — trees, leaves, blades of grass, drops of water, grains of sand, flakes of snow. It's difficult to cram all that detail into the viewfinder of a camera. And if you do, the results may not always be pleasing.

Suppose you're wandering down a logging road on an October day. The maple leaves are fluorescent orange and red, the aspens have turned to gold. Even the undergrowth is colorful. You can't resist, and snap away until you're out of film or memory. What a thrill!

But when the slides or prints come back, you could be disappointed. You may find that instead of the art you thought you were creating, you have little more than gaudy snapshots, colorful but trite.

What went wrong? The problem probably was that in your enthusiasm, you recorded everything you saw — and there was so much of it that the pictures became cluttered and pointless.

The way to avoid this disappointment is to impose *discipline* and *economy* in your photographs of nature and landscape. If you deliberately pare natural subjects down to a few important elements, you can express more with them, creating



LEFT: *Birches 1970* condenses a few colorful elements to capture a fall day.

ABOVE: *Sumac 1986* pares down fall to a simple repeated pattern to similarly capture a mood and a season.

memorable and distinctive images that put your stamp on what you saw. And if you mentally *design* each photograph before you take it, following some basic artistic principles, you'll use less film and produce more pictures that are deliberately good.

The picture of the birches and sugar maple leaves ("*Birches 1970*") is an example of discipline and economy. The glory of a fall day is there, but it is condensed into a few birches and a manageable spray of red leaves. In this case, I found that moving in to capture a simple scene was more expressive than stepping back to photograph the forest.

"*Sumac 1986*" is another example of economy and design. The picture was taken at close range with a wide aperture, to throw the background out of focus. The light from an

overcast sky muted the colors and there are only 13 leaves in the picture, rather than the usual thousands. As a result, viewers may be induced to look at each leaf. Maybe they will also notice the gentle curve of the stem, the subtle differences between the leaves, and the simple rhythm of the way they



TOP: *Point Beach 1977*

BELOW: *November PM 75*

grew. This display of leaves forms a repetitive pattern, which is one of the ways to deal with nature in photographs.

Another time-honored technique is to reduce the scene before you to large planes or surfaces — as few as possible — and make them balance each other to form a composition.

“Point Beach 1977” demonstrates this idea. A wide-angle lens at the smallest possible aperture was used to assure that the entire scene would be in sharp focus. The photo is divided into two large planes: the sky and the beach. In this case, the smaller plane of light color balances the larger plane of darker color, and the horizon line is deliberate-

ly placed two-thirds of the way up from the bottom of the frame, to draw attention to the foreground. A horizontal balance is created by the dark triangular bluff on the right opposed to the larger triangle of ice and surf on the left, one above the horizon, the other below. Finally, the driftwood in the foreground creates a sense of depth. But what is the subject of this photograph? The cold wind! The visible effects of the wind — surf, scudding clouds and the blowing sand — made it possible to take a picture of something invisible.

Yet another way to simplify nature photographs is to think of their subjects as *large masses of color or light*. The pho-

tograph titled *November PM 75*” is an example. It is based on the idea of inserting a wedge of brighter light or light color between masses of darker colors. This photograph is so simple as to be little more than a poster, but notice how important the fence and the oak tree become. Nothing is wasted in these two photographs; there is no clutter and the smallest details become valuable.

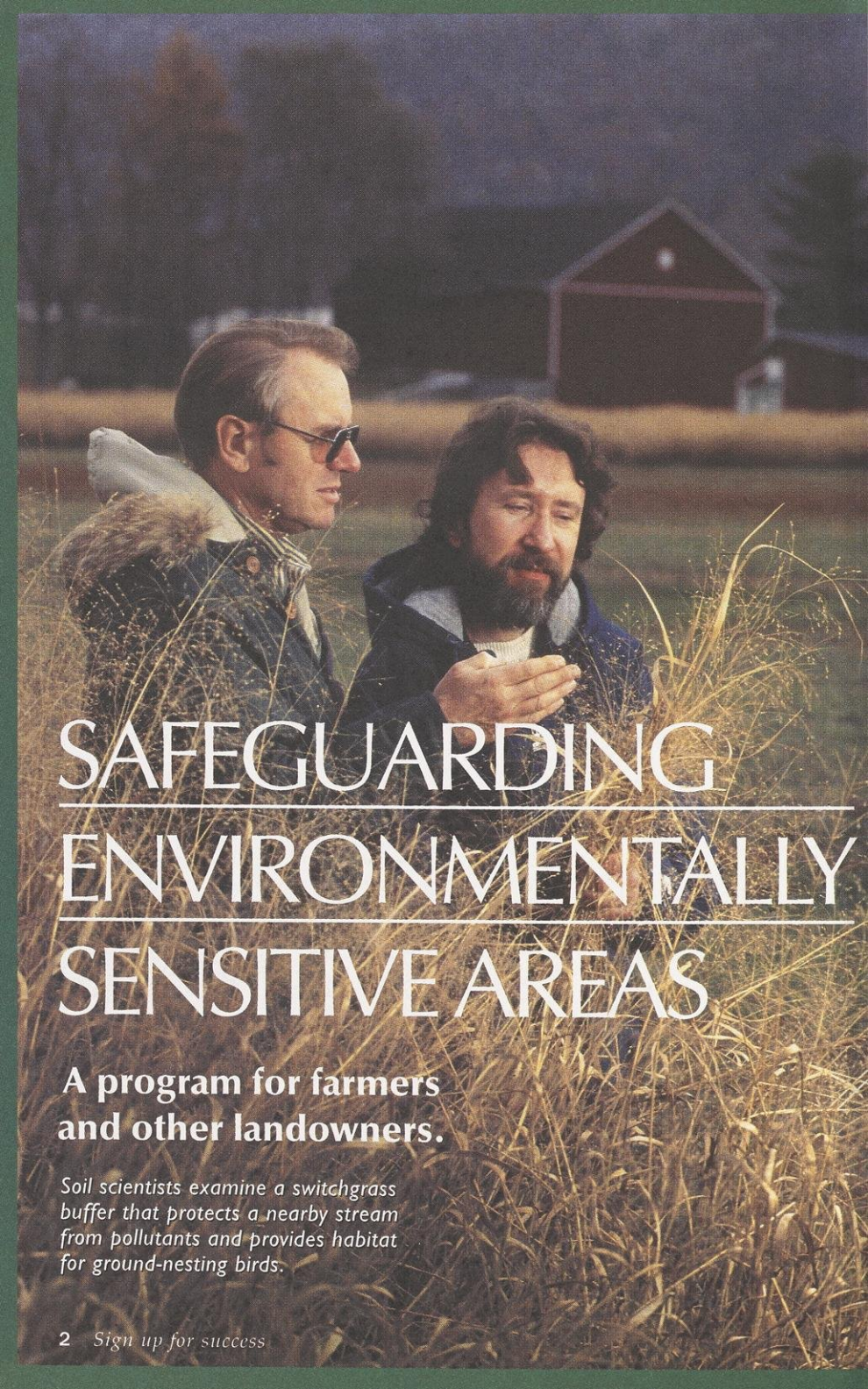
You can also deliberately create images that could be called *random patterns*. These are collections of lines, small masses, or both, of varying surface texture and color. The photo called “Aspen Leaves 96” (see page 17) is a “found” composition of natural objects

Continued on page 17

SIGN UP FOR SUCCESS

Buffers can protect the land,
water and checkbook.



A photograph of two men in a field of tall, dry grass. The man on the left is wearing sunglasses and a dark jacket, looking towards the right. The man on the right has a beard and is wearing a blue jacket, looking down at something in his hands. In the background, there is a large red barn and some trees under a dark sky.

SAFEGUARDING ENVIRONMENTALLY SENSITIVE AREAS

**A program for farmers
and other landowners.**

*Soil scientists examine a switchgrass
buffer that protects a nearby stream
from pollutants and provides habitat
for ground-nesting birds.*

The U.S. Department of Agriculture (USDA) and the state of Wisconsin continue collaborating on a \$230 million program to protect the state's water quality and wildlife habitat.

Launched in 2001, the Conservation Reserve Enhancement Program, or CREP (pronounced "krep"), offers financial incentives to stop farming land edges next to rivers and streams for a minimum of 15 years. Larger payments are available if the landowner offers a perpetual easement to stop farming these environmentally sensitive parcels altogether. Program participants receive annual rent, cost-share assistance and other financial assistance.

The program aims to reduce runoff pollution along Wisconsin's rivers and streams by installing buffers — narrow strips of land along a stream, usually 30 feet wide or more that are planted with dense vegetation — as an alternative to cropping or grazing close to the water. Haying and grazing are not permitted on these buffers during the contract period unless USDA permits it for emergency purposes.

In many cases, CREP makes sense for farmers because crops planted next to the stream usually yield less than in the center of the field. Farmers also don't need to invest in seed, fertilizer and chemicals to improve lower-yielding land. A Kenosha County study showed that field edges with low yields (less than 40 bushels/acre for soybeans and less than 115 bushels/acre for corn), would be more profitable if enrolled as buffers.

Since CREP began in Wisconsin, 3,106 CREP contracts covering 33,290 acres have been approved. Currently 47 Wisconsin counties can enroll in CREP.

After the program was launched, sign-up started strong and then leveled off. Now some are concerned that the window to take advantage of the program may be closing.

"The program is authorized through

2007 and probably will be reauthorized," says Jim Baumann, a DNR senior policy analyst for the Office of the Great Lakes. "But there is an urgency to make good use of available funding now because state and federal money isn't guaranteed for the future."

Wisconsin's program

The CREP goal in Wisconsin is to reduce water pollution by installing 85,000 acres of riparian buffers and filter strips, and restoring 15,000 acres of native grasses and wetlands. Eligible areas include sensitive grassland areas in southern Iowa County and parts of Lafayette, Dane and Green counties that have seen dramatic declines in songbird populations. Efforts in Marathon, Taylor, Clark, Wood and Portage counties are underway to help revive prairie chicken populations and restore habitat for the Karner Blue butterfly.

The program is estimated to reduce annual phosphorus and nitrogen loading by 600,000 and 300,000 pounds, respectively, and reduce sediment loading to streams by over 330,000 tons a year. CREP will restore an estimated 3,600 stream miles and help the state meet state and federal water quality standards.

Increased nutrient loads also are believed to contribute to the spread of *Cladophora* along the coast of Lake Michigan and other Great Lakes. These algae blooms lead to unsightly and foul-smelling beaches. The algae accumulate in large mats and look like overcooked spinach.

"When the CREP program was introduced we convinced the Chippewa County Board that we could do a lot of good with it; literature shows that buffers may be the most important non-point source pollution prevention step that we have," says Mike Dahlby, Chippewa County private lands conservation specialist. "Most of the farmers I know view buffers as a common sense way to balance good farm practices with

safe environmental practices."

Chippewa County, like many Wisconsin counties, has an agricultural based economy. The area is moving from dairy to raising cash grain crops.

"When you have cows, you need to grow a lot of hay for the cattle, but that area also is important habitat for nesting birds and insects. As the cows leave, so does the hayfield, and we've lost some wildlife habitat. Adding buffers is important to bring back habitat," Dahlby says.

Some landowners in the area were concerned that if they put in buffers, their real estate tax would increase. But land enrolled in the program receives an agricultural use value assessment, which is often much lower than other land taxes. Others were concerned that the land would be open to the public, which is not true. Still others were concerned that the areas would require intense maintenance.

"If you pay attention to preparing the site up-front it can be largely self-supportive after two years and the maintenance drops off," Dahlby says.

The program has had broad support from local resource managers. Chippewa County has signed up 2,100 acres with more on the waiting list. Of those signed up, about 1,200 are enrolled permanently (79 permanent easements) and others have signed on for 15-year agreements. About 20,000 acres drain through these buffers.

"Landowners keep telling me that they like having an option for permanent resource protection, yet they still control the land and receive money up-front," Dahlby says. "Cash flow is important and some of the lands that are eligible for buffers would otherwise not be useable, so this is guaranteed revenue on that land."

Why CREP is good for the environment

Buffers are good for the environment

because:

- they create healthier streams and are good for fish
- they provide wildlife habitat
- they decrease the amount of pollution from nonpoint sources
- they decrease the amount of sedimentation

"Buffers are critical to getting nonpoint source pollution and runoff problems solved," says Jim Jolly, Brown County Land Conservation Department program manager. "We know that buffers can reduce 70 percent or more of nitrogen, pesticides and sediment from entering a stream. Sediment and phosphorus stress the environment and cause problems in the lower Green Bay area."

Jolly supports the CREP goals and the county has enrolled 440 acres.

This CREP program is especially important to Great Lakes' tributaries. According to the U.S. Fish and Wildlife Service, more than 100 native fish species use Great Lakes coastal wetlands as spawning, nursery, feeding and wintering habitat. However, more than two-thirds of the natural Great Lakes wetlands have been filled or drained for agriculture, urban use, recreation and more.

Dick Rost, DNR fisheries management technician, says buffers are critical to providing spawning habitat and ensuring reproductive success of northern pike.

In the 1980s, the northern pike population in Green Bay proper was declining and DNR began a project to follow the fish to find out where they were spawning. Researchers found that they spawn in wetlands and ephemeral streams sometimes located 15 miles upstream. The spawning act is stimulated by vegetation. Eggs attach to the vegetation, taking about two weeks to hatch. Small fry then become active, yet stay attached to vegetation for four or more days while they absorb the yolk sac. When they are about 20 mm long, they begin their journey back to Green Bay.

"We found that these critical spawn-

ing areas were being dramatically impacted by sediments and nutrients primarily associated with agriculture in the area," Rost says. "Because of the lack of grassy habitat, the areas were not able to be used for spawning."

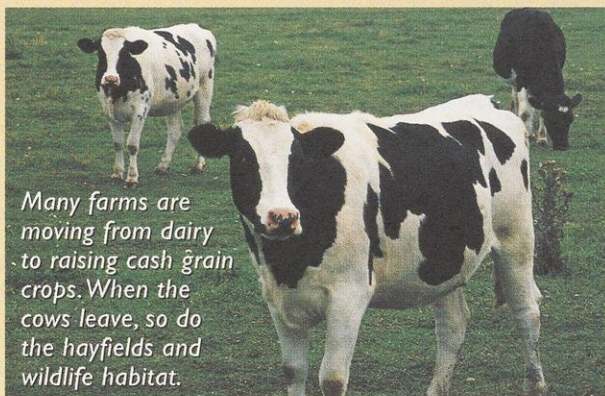
Who can sign up and for how long?

Eligible producers will be able to enroll in 15-year contracts or for perpetuity. The applicant must be able to offer eligible acreage. Land must be cropland that has been cropped four out of six years (between 1996 and 2001) and that is physically and legally capable of being cropped. Some hay land may qualify. Marginal pastureland can also be eligible to be enrolled provided it is suitable for use as a riparian buffer. Those who have an existing contract under the federal Farm Bill or an approved offer with a contract pending are not eligible for CREP until that contract expires.

The following conservation practices may be eligible for CREP enrollment (consult with your local USDA Service Center representative to find out what practices are eligible for your CREP area and specific acreage):

- establishment of permanent introduced grasses
- establishment of permanent native grasses
- grassed waterways
- filter strips
- riparian buffer
- wetland restoration
- rare and declining habitat
- marginal pastureland wildlife habitat

"We need to get our message out to active farmers," says Susan Butler, conservation specialist for the Farm Service Agency. "There is a misconception that these buffers have to be 150 feet wide,



Many farms are moving from dairy to raising cash grain crops. When the cows leave, so do the hayfields and wildlife habitat.

SUZETTE BUHR

but that's not the case. Buffer width depends on the slope, soil type and other site characteristics. We may need as little as 30 or 40 feet of buffer to make a big difference in water quality and good stewardship."

The financial incentives also are based on the soil types. They can vary from \$6/acre for rough ground to \$120/acre for prime farmlands.

Established buffers consist of a mix of trees, shrubs and plants that are native to the region and adapted to the site conditions.

DATCP has requested CREP expansion into Ashland, Bayfield, Douglas and Iron counties. This would add sensitive lands that drain to Lake Superior.

Nancy Larson, DNR water resources management specialist in Ashland, has been involved in the discussions to extend the program to the Lake Superior basin.

"In the past, the Farm Bill Program wasn't used much here because the agricultural land doesn't meet the crop history requirements of the program — agricultural land here is mostly hay. CREP has different criteria, though, and allows marginal pastureland to be eligible where it wasn't before."

Soils in the area also are largely clay. Increased runoff is carving away stream banks, and the ultimate goal is to stop this and reduce the amount of sediment entering the streams, Larson says.

Financial incentives

Wisconsin CREP participants are eligible for four types of USDA payments:

1. **Signing Incentive Payment** — a one-time payment of up to \$150 per acre for land enrolled in a riparian buffer practice, filter strip or grassed waterway. USDA makes this payment soon after the contract has been signed.
2. **Practice Incentive Payment** — payment equal to about 40 percent of the total cost for establishing the conservation practice. This payment is in addition to the 50 percent cost-share assistance that USDA provides.
3. **Annual rental payment** of about 135 to 160 percent of the dry land cash rental rate for the county in which the land is located. Annual rental payments are based on rate by soil types and slope and can range from about \$20 to \$185 per acre in Wisconsin.
4. **Cost-share assistance** for installing the conservation practices on retired land. Wisconsin will also offer one-time lump sum incentive payments of 1.5 times the federal base rental rates for 15-year agreements and 12 times the federal rental rates for perpetual conservation easements. In addition, the state pays 20 percent of the cost to install conservation practices.

The total cost of the program (based on enrolling 100,000 acres in Wisconsin) is expected to reach \$243 million over 15 years. Of that amount, \$198 million will come from USDA and \$45 million from the State of Wisconsin.

How does it work?

CREP is a partnership between resource managers and landowners. The Farm Service Agency (FSA) administers the program, and the USDA's Natural Resources Conservation Service provides technical assistance, creating a conservation plan for the property and suggesting vegetation types for buffers.

The landowner's first contact is usually made with USDA. The FSA

starts to determine the land's eligibility and crop history. They then turn over the technical determinations to NRCS and the local land conservation district, which determine the necessary buffer width and review waterbodies involved.

The county land conservation departments then handle applications for the state. DATCP administers the state's portion of the program.

FSA reviews the soil type and calculates payment early in the process. It is tied to the annual rental rate and the state uses that as its basis for payment, too.

"The state has streamlined some of the paperwork by using the federal paperwork instead of duplicating efforts," says Keith Foye, chief of the land management section of the Department of Agriculture, Trade and Consumer Protection.

Some perpetual easements become complicated if a title search finds that an owner has mineral rights or there is a manure spreading easement. Landowners are not allowed to spread manure on CREP lands. Foye says it takes several months between the time application materials are filed to when the easement can be completed. Installing the buffers usually takes at least one growing season.

Foye says other partners in the program, including Trout Unlimited and Pheasants Forever, work directly with landowners to encourage sign-up and install buffers.

For more information

Contact your county USDA Service Center, Farm Service Agency local office, Soil and Water Conservation District, or Wisconsin State Department of Agriculture. Additional information is also available at www.fsa.usda.gov/dafp/cepd/crep.htm and at datcp.state.wi.us/arm/agriculture/land-water/conservation/crep/index.html

Natasha Kassulke is associate editor of Wisconsin Natural Resources magazine.

A profile in conservation

IN HIS OWN WORDS

John O. Lane, 61, is one of thousands of farmers throughout the country working to improve natural resources conditions on his land. But Lane also has the distinction of being the first landowner in Wisconsin to sign up for the Conservation Reserve Enhancement Program. During a groundbreaking ceremony in 2001, he enrolled 15.1 acres of his 160-acre farm in the town of Bloomer (Chippewa County).

The land has been in his family since 1867 when his great-grandfather received the homestead as payment for his service in the Civil War. Throughout its history, the Pioneer Stock Farm has supported cattle, sheep, horses and chickens. Of the 160 acres, about 60 acres are wooded, 20 are swamp and another 80 acres devoted to cropland — corn, oats and hay.

In the late 1970s, Lane began renting the cropland, and it alternated between beans and corn. But when the cropland changed, Lane says he started noticing meadowlarks, bobolinks, blackbirds, killdeer and bluebirds leaving the area.

"The birds had lost their habitat and the insects they fed on," Lane recalls.

John credits his wife, Kathleen, for giving him a push to join the program for perpetuity.

"She walks this area and loves the trees and wildlife," Lane says. "So we put



ANN HANSEN

John O. Lane and Kathleen Lane are Wisconsin's first landowners to sign up for CREP.

land into CREP because we love trees, and this program allowed us to plant them. We couldn't afford to plant trees under the woodland tax program, but CREP set taxes at a lower rate and I could afford to plant trees."

Lane also was concerned that someone might try to develop the property in the future, especially around a pond on the property. CREP provided an up-front payment and reimbursement for the trees he planted. It also put his mind at ease that the land would not be developed.

Lane says he had "a thousand questions" about the program but found Farm Service Agency and county staff helpful.

"When you sign up for something forever, you want to make sure that it is the best idea for you," he says.

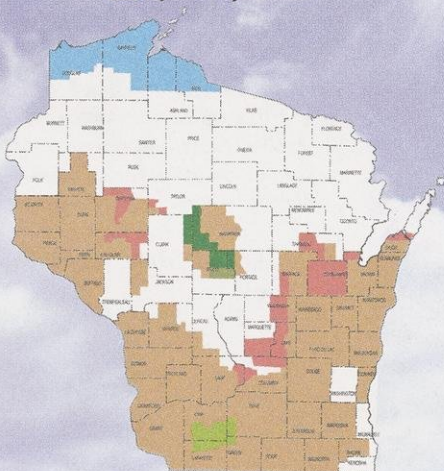
Since signing into CREP, the Lanes have planted trees and installed buffers. The results have been favorable with a return of pheasants and meadowlarks.

"We're really proud of being in this program," Lane says. "I've put a lot of hours into this but it has been worth it — it's a good deal for me, and it's a good deal for the environment. It's like my grandpa always said — 'the land was good to the Lanes and the Lanes are good to the land.'"

Natasha Kassulke is associate editor of Wisconsin Natural Resources magazine.

CREP PROPOSED AND EXISTING PROJECT AREAS

- Proposed Riparian Area
- Proposed Northern Grassland Project Area
- Proposed Lake Superior CREP Area
- Northern Grassland Project Areas
- Southern Grassland Project Areas
- Riparian Project Areas



MAP BY DATCP

CREDITS

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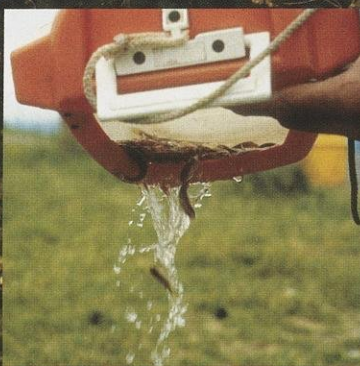
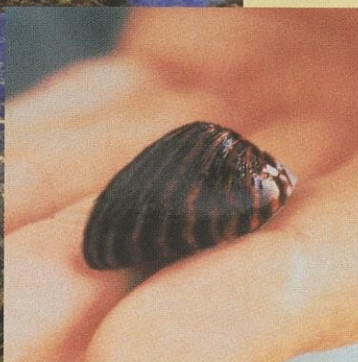
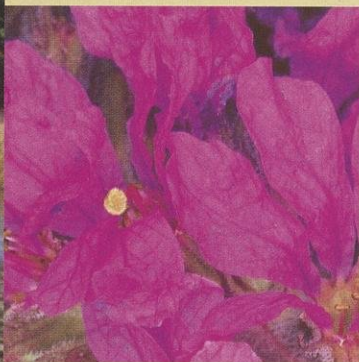
The Wisconsin Coastal Management Program, the Wisconsin Department of Natural Resources and oversees the Wisconsin Coastal Management Council, which was established in 1978 to protect and manage the resources of the Lake Michigan and Lake Superior Coastline. This and other generative

Subscribe *Wisconsin Natural Resources* at www.wisconsin.gov

Front and cover photo by RICHARD



Hitching a ride



Unwelcome
invasive
species make
themselves
at home in
Wisconsin's
waters.

Wisconsin's first **invasive** awareness month

Through awareness comes positive change.

Publish information on invasive species in your neighborhood newsletter using a press-ready article.

Paddle a pristine northern Wisconsin lake surrounded by forest and diverse wetlands to learn how purple loosestrife biological control is helping to keep the invader in check.

Hike through the richest prairie ecosystem in Wisconsin, Chikwaakee Prairie, while learning about its ecology, management and invasive species threats.

Hand out informative invasive "Wild Cards" at a fishing tournament or festival.

Flowering rush found at Archibald Lake in Oconto County.

WISCONSIN WILDCARDS

WISCONSIN WILDCARDS

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WISCONSIN WILDCARDS:
(FROM BACK TO FRONT)
DNR FILE PHOTO
GREAT LAKES SEA GRANT NETWORK
JOHN LYONS

GREG SEVENIER

species

Amy Staffen

These are just a few ways that citizens might get involved in aquatic invasive species education. Gov. Jim Doyle has proclaimed June Invasive Species Awareness Month in Wisconsin. All month, Wisconsin residents and visitors will learn about aquatic and terrestrial invasive species at workshops, field trips and lectures, and through newspapers, television and radio.

"We are privileged to enjoy Wisconsin's many high-quality forests, waterways, wetlands and agricultural areas," says Gov. Doyle. "They are essential to the quality of life we've come to expect here in our great state. It is important that we acknowledge the growing threat from invasive species to our natural resources and work to find solutions."

Invasive Species Awareness Month represents one of many exciting initiatives demonstrating statewide heightened interest in invasive species issues: legislators are considering increased funding for invasive species monitoring and control in the biennial budget. "Clean Boats, Clean Waters" volunteers are taking an active role in invasive species education, monitoring and management. State, regional and federal groups have joined forces in coordinated efforts to control invasives. The legislature created the Wisconsin Council on

Invasive Species to address how invasives harm Wisconsin's ecological and economic resources as well as human health. Members of the Council's Education Committee spearheaded Invasive Species Awareness Month.

The state's first Invasive Species Awareness Month lays a foundation for future June awareness months.

Partners across the state will lead awareness events and an Awareness Month Planning Committee represents non-profit conservation organizations and state agencies.

The goal is to provide opportunities for extended learning and involvement to better control invasives. The motto of Invasive Species Awareness Month is: "Through awareness comes positive change."

The first priority is to prevent new introductions into Wisconsin. The second priority is to prevent the spread of invasive species that are already in the state. Invasive Species Awareness Month provides an opportunity to help citizens become part of the solution by stopping the introduction, transport and spread of invasive species. They can learn how to:

- recognize invasive species
- report their presence
- avoid purchasing, planting or importing invasive species
- help prevent the spread of aquatic hitchhikers by properly cleaning their boat, boat trailer and boating equipment
- effectively share knowledge on invasive species with others

Would you like to lead an Invasive Species Awareness Month activity? Are you wondering what events are taking place in your area? Visit invasivespecies.wi.gov/awareness to find tips on leading events, educational resources, a media kit, a speakers' bureau, press-ready articles for distribution and publication, an image library, an experts contact list and list of Invasive Species Awareness Month events across the state.

Amy Staffen is the invasive species education coordinator for the Wisconsin Council on Invasive Species.

Tips to prevent the spread

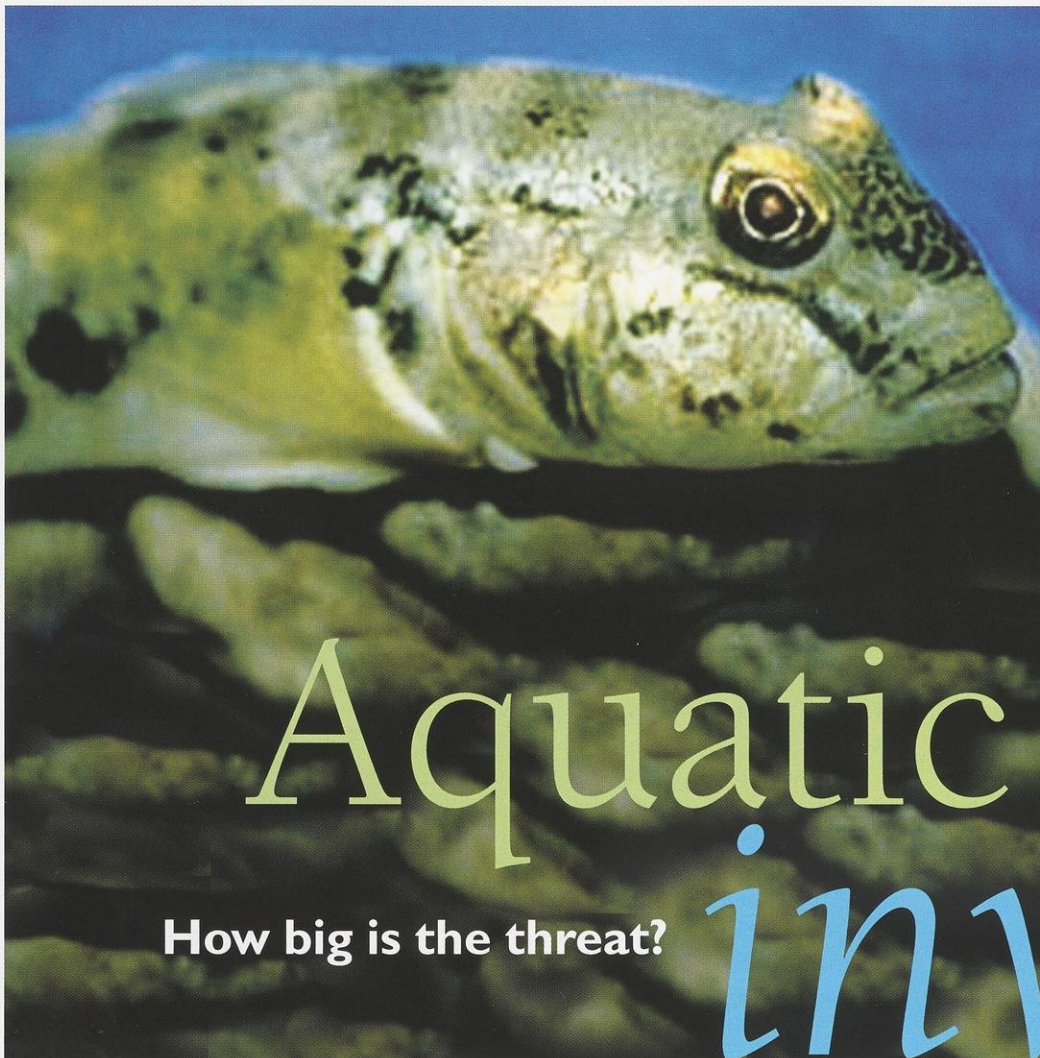
Help prevent aquatic hitchhikers from catching a ride on your boat, trailer or boating equipment:

1. Inspect and remove aquatic plants, animals and mud from your boat, trailer and equipment.
2. Drain all water from your motor, live well, bilge, transom wells, jet drives, SCUBA equipment, etc.
3. Dispose of unwanted bait in the trash. Never release live bait into a waterbody, or transfer aquatic animals from one waterbody to another.
4. Wash your boat and equipment with hot (>104 degrees F) and/or high pressure water, particularly if moored for more than one day or
5. Dry your boat and equipment thoroughly for five days before transporting to new waters.
6. "Watch Cards" and "Wildcards" are available from the Department of Natural Resources to help you identify aquatic invasives. If you think you have a new sighting to report, please preserve the specimen in alcohol or keep it moist in a sealed bag and refrigerated. Then call the DNR (608-267-9270) or the Wisconsin Sea Grant Program (920-683-4697) for identification. Visit the Wisconsin DNR website www.dnr.state.wi.us/org/water/wm/glwsp/exotics or call 608-266-9270.


CARDS



INVADERS



Close-up of round goby. (inset) Eurasian watermilfoil arrived in Wisconsin in the 1960s. During the 1980s, it began to move from southern Wisconsin to waterways in the northern half of the state.



Aquatic How big is the threat? *invaders*

Ron Martin

Aquatic invasive species (sometimes referred to as *alien* or *exotic* species) are receiving increasing attention because of the threats they pose to our waters. But how great is the urgency to act? Are we in any immediate danger of having our lakes and rivers overrun by alien species? To answer these questions we need to look at how these species are getting here and what actions are being taken to alleviate future threats.

Ballast water from ships is a primary pathway for introducing exotic species into the Great Lakes. Foreign freighters enter the Great Lakes through the St. Lawrence Seaway and legally discharge hundreds of thousands of gallons of ballast water each year. At least 180 foreign species have already entered the Great Lakes, the majority of them in the last 40 years. Despite Coast Guard reg-

ulations in place since 1993 that require ballast water to be exchanged on the high seas, new species keep arriving in the Great Lakes at the rate of one every eight months. There is widespread recognition in the scientific community that the current regulations are ineffective.

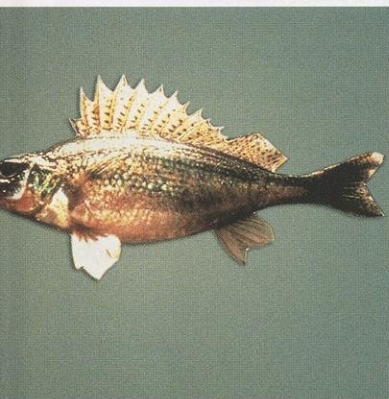
Tougher new laws and funding to combat future invasions have been stalled in Congress since 2003. Regional efforts by the Great Lakes Panel on Aquatic Nuisance Species and the Council of Great Lakes Governors to push for passage of the legislation have been unsuccessful.

Recent invaders to Lake Michigan, zebra mussels (*Dreissena polymorpha*) and round gobies (*Neogobius melanostomus*), have posed the greatest threat to the lake's ecosystem. Zebra mussels are very efficient filter feeders that have significantly reduced populations of

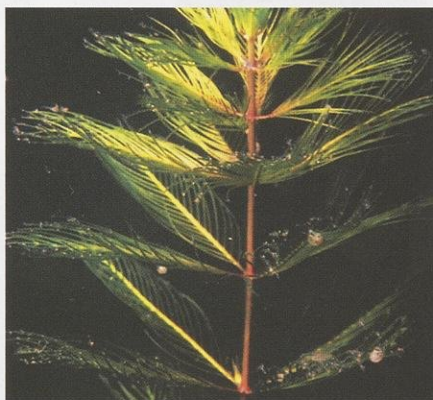
phytoplankton (microscopic algae) and zooplankton (tiny animals) that are the dietary staple of larval and juvenile fish.

Zebra mussels are threatening the food web that has evolved over thousands of years. For instance, small shrimp-like organisms called *Diporeia* are a key food source for native whitefish. *Diporeia* numbers have been substantially reduced in recent years and the zebra mussels have been blamed. This also is bad news for forage fish that feed on *Diporeia* and for top-level predators like the trout and salmon that feed on the forage fish.

Increasing water clarity that results from zebra mussels filtering the water may be a perceived benefit, but there is a downside. Sunlight can penetrate deeper, creating more places for attached algae to grow and reach nuisance levels. In recent years we have seen an increase in stringy algae,



DNR FILE PHOTO



DNR FILE PHOTO

Eurasian ruffe (above) competes with native fish for food and habitat. (top right) Eurasian watermilfoil reproduces vegetatively by fragmentation instead of by seeds. (right) Zebra mussels firmly attach to solid objects including native mussels, boat hulls and water intake pipes.



DNR FILE PHOTO

ers

Cladophora, that have washed up on Lake Michigan beaches creating unsightly and smelly conditions.

Round gobies are a strange-looking bottom-dwelling fish that came in via the ballast water of ships over a decade ago. They are very aggressive and eat the eggs of sport fish, such as smallmouth bass, trout and sturgeon. The gobies out-compete native species like the mottled sculpin for food and spawning sites. They are already the most abundant fish in the nearshore areas of Lake Michigan and are considered a nuisance by anglers. Given their aggressive nature and explosive growth, gobies can adversely affect the valuable sport fish populations in Lake Michigan.

There are a number of other invasive species that inhabit Lake Michigan including the sea lamprey (*Petromyzon marinus*), alewives (*Alosa pseudohare-*

gus), ruffe (*Gymnocephalus cernuus*), white perch (*Morone americana*), threespined stickleback (*Gasterosteus aculeatus*), the Quagga mussel (*Dreissena bugensis*), Eurasian watermilfoil (*Myriophyllum spicatum*) and the spiny (*Bythotrephes cederstroemi*) and fishhook (*Cercopagis pengoi*) waterfleas. The cumulative impact on Lake Michigan is not good. As more exotic species are introduced, there is greater stress placed on native species and an increased likelihood of an ecological breakdown.

So what are the prospects for future invasions and the likelihood that new invaders as devastating as the zebra mussel or round goby will be introduced? It is quite large given the loopholes in the current ballast water regulations. Over 80 percent of the ships arriving from foreign ports are exempt from ballast water regulations because

they report no ballast water on board. These supposedly empty ballast water tanks actually carry sludge and water that harbor foreign organisms that are often washed out at ports.

An immediate threat are the Asian carp (in particular the silver *Hypophthalmichthys molitrix* and bighead *Hypophthalmichthys nobilis*). They compete directly with native fish and decrease the natural biodiversity. In waters of the lower Missouri and middle Mississippi River where they have become firmly established, Asian carp constitute 90 percent of fish abundance. They are moving toward Wisconsin waters from the Illinois River and the Mississippi River. Asian carp are perpetual eating machines that escaped from southern fish farms in Arkansas during the last decade. They have been making their way northward at the rate of about 50 miles a year.

The only thing that is keeping Asian carp from moving into Lake Michigan is an electrical barrier system completed in 2002 on the Chicago Sanitary and Ship Canal. But even a new barrier, which will be operational by this fall and costs \$9.1 million, does not guarantee that the carp will not eventually enter Lake Michigan. For example, flooding on the Des Plaines River could carry water overland into the Sanitary and Ship Canal upstream of the electrical barrier. Furthermore, there are no assurances that the new barrier will not break down in the future. Obviously, contingency plans will need to be put in place.

The Asian carp are also moving up the Mississippi River. A joint feasibility study with Minnesota, Iowa, Illinois, Wisconsin, the U.S. Fish and Wildlife Service and the U.S. Army Corps of Engineers recommended installing two barriers on the Mississippi River at Lock & Dam 11 (near the Wisconsin border) and at Lock & Dam 14 or 15 (in Iowa) by 2006. The cost to build the two barriers will depend on the sites and types of technologies selected. Any technologies employed will definitely be challenging to build and potentially more costly than the barrier on the Chicago Sanitary and Ship Canal. The

Continued on page 15

Invader ALERT

Wisconsin targets aquatic invasives.

A fixed plate sampler is designed to give zebra mussel veligers a place to 'land' and colonize. This one looks like it worked.

Natasha Kassulke

They have many names: non-native, exotic, alien, invasive and nonindigenous. But no matter what you choose to call them, non-native species are plants and animals living in an ecosystem beyond their native range.

Aquatic invasive species are increasingly recognized as a serious problem in Wisconsin.

"Exotic species control is one of the major environmental issues of the day," says Ron Martin, DNR's aquatic invasive species coordinator, "in terms of habitat destruction and the negative impacts on native species. Since Wisconsin's native species haven't grown up with these new species, they often aren't adapted to compete with them or fight back."

The magnitude of this problem has been rapidly expanding. Zebra mussels (*Dreissena polymorpha*) have the ability to inhabit every hard surface in their path and Eurasian watermilfoil (*Myriophyllum spicatum*) form mats so dense that people can no longer boat, fish or swim. Recent and potential introductions of invasive species further threaten Wisconsin waters. There is a growing watch list of species that, while not yet here, are within striking distance of

our borders (www.wi.gov/invasives).

State program

In 2003, the National Aquatic Nuisance Task Force approved Wisconsin's comprehensive aquatic invasive species plan. The U.S. Fish and Wildlife Service has funded plan implementation.

"There are several broad goals in the plan," Martin says, "including preventing the introduction of new exotics in Wisconsin waters, finding ways to slow the spread of established exotics and abating the harmful impacts of aquatic invasives."

Nationally, there is strong competition for funding exotics research. Wisconsin competes with areas such as the Florida Everglades for scarce federal funding. As a result, the state has to ramp up its contribution.

The Aquatic Invasive Species (AIS) Grant Program, new in 2004, is a \$500,000 annual appropriation. It's funded from the motor boat gas tax revenues that the Department of Natural Resources administers as a 50 percent cost-share grant program to local government. Eligible projects include plan development, invasive species surveys,

watercraft inspections and development of educational materials. Control projects are limited to those in DNR-approved plans. The Department of Natural Resources has written a rule to administer the program.

"I get satisfaction in knowing that the state is focused on this area of high concern and importance in terms of recreation, tourism, scenic beauty and the health of our lakes and rivers," says Peter Murray, chair of the Wisconsin Council on Invasive Species.

The Council is a little over one year old, and its primary work has been to develop a system for classifying invasives and their impacts. The Council also is assessing the effects of the bait industry, pet industry and Internet sales on the spread of invasives. Four subcommittees look at regulations, research, inter-agency cooperation and education.

Inspection and information

Prevention and control strategies in Wisconsin rely heavily on information, education and outreach, as well as watercraft inspection, monitoring, research and policy and legislative initiatives.

"The good news is that there are prevention steps that we can take when boating, fishing and otherwise enjoying the water to help prevent the spread of invasives," says Mandy Beall, aquatic invasives education specialist for the University of Wisconsin Extension and Department of Natural Resources.

The "Clean Boats, Clean Waters" volunteer program is sponsored by the Department of Natural Resources, University of Wisconsin Extension and the Wisconsin Association of Lakes. Many educational tools are used to reach the public, and Beall stresses the importance of delivering a consistent message in multiple formats.

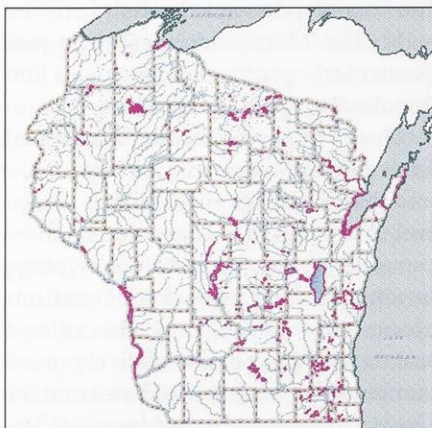
"We need to reach boaters at the landings, but also at home so they are thinking of this even before they leave on a trip to a lake or river," Beall says.

Natasha Kassulke is associate editor of Wisconsin Natural Resources magazine.

ZEBRA MUSSEL INFESTATION 2004



EURASIAN WATERMILFOIL INFESTATION 2004



MAPS BY KATE BARRETT

Boater surveys offer valuable feedback

Natasha Kassulke

A 2003 survey confirms that many of the right people are getting the right message — Clean Boats, Clean Waters.

When surveyed in 2003, boaters overwhelmingly agreed that it is important to take precautions to prevent invasives from moving from one waterbody to another. A majority of those surveyed used smaller boats (less than 20 feet).

The goal of the 2003 survey was to gauge how much progress has been made educating boaters about exotics since 1994 when the last survey was done. Results will be used as a benchmark in future surveys. Survey questionnaires were mailed to 800 randomly selected registered boaters in Wisconsin.

One striking change was in the number of boaters reporting that they take action to prevent the spread of invasive species while boating — 80 percent of those who moved their boats from one waterbody to another indicated they take action, up from 39 percent in 1994.

An important component of the state's educational program is post-



STOP AQUATIC HITCHHIKERS!™
Prevent the transport of nuisance species.
Clean all recreational equipment.
www.ProtectYourWaters.net

ing signs at boat landings. When asked where boaters have heard about aquatic invasives, 73 percent reported seeing signs at landings and marinas. Many other boaters said they received information from fishing and boating pamphlets, boat registration materials, bait shop signs, newspaper and magazine articles, and television news.

Most boaters said they would take action to clean their boats because they want to keep invasive species out of lakes and streams, and because they feel a sense of personal responsibility. Other factors listed included regulations and a desire to prevent damage to their boats or equipment.

While the report card is positive, the survey also showed areas that need improvement.

Twenty percent who said they don't take special precautions to prevent

the spread of exotics from one waterbody to another said they didn't know exactly what to do. And while most boaters had heard about zebra mussels (*Dreissena polymorpha*), Eurasian wa-

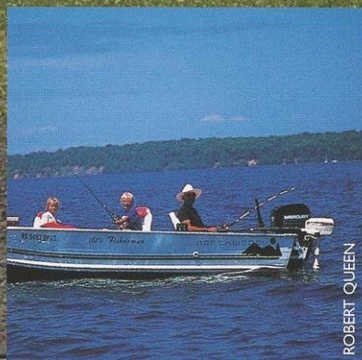
termilfoil (*Myriophyllum spicatum*) and purple loosestrife (*Lythrum salicaria*), less than half knew very much about rusty crayfish (*Orconectes rusticus*), ruffe (*Gymnocephalum cernuus*), round goby (*Neogobius melanostomus*), spiny waterflea (*Bythotrephes cederstroemi*) and bighead Asian carp (*Hypophthalmichthys nobilis*).

The survey concluded that most people know aquatic exotics are bad and that boaters need to take actions to prevent their spread. So, educational campaigns may not need to spend a great deal of effort trying to convince boaters to care about invasives. Instead, the survey points to a need to take the next step and focus on teaching boaters exactly what to do to prevent the spread and to learn about new species.

Natasha Kassulke is associate editor of Wisconsin Natural Resources magazine.

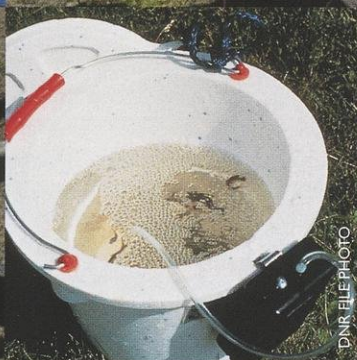
Pathways of destruction

How invasives spread between waterbodies.



ROBERT QUEEN

Invasive species threaten the health of Great Lakes' fisheries.



DNR FILE PHOTO

Dispose of unwanted bait in the trash. Never release live bait into a waterbody or on the ground.

Inspect and remove aquatic plants, animals and mud from your boat, trailer and equipment when leaving a waterbody.

Phil Moy

Aquatic invasive species (AIS) are capable of increasing their range without help from people, but human activities greatly increase the ability of these organisms to spread into new areas. Small seeds, microscopic larvae, ability to hide in vegetation and the cryptic nature of non-native organisms are just some of the means by which AIS take advantage of peoples' activities to increase their range.

Aquatic invasive species arrive and move about in our state waters via ballast water, bait releases, escapes from aquaculture, aquarium releases, water garden escape or release, boaters and anglers and others. Once introduced to our rivers and streams, they can easily spread by currents. Many aquatic plants spread through fragmentation and are able to establish new colonies from small pieces of a single plant. Zebra mussels (*Dreissena polymorpha*) produce microscopic larvae that float in the water and are easily entrained in live wells, bait wells and bait buckets. Adult zebra mussels attach to weeds as well as hard surfaces like boat hulls and lower units of motors. In this way they can spread when weeds are tangled onto boat motors and trailers and are transported to another lake or river.

We have recently heard of the Northern snakehead (*Channa argus*), a predatory Asian species, being found in the Rock River, in a Lake Michigan harbor in Chicago and in rivers in Maryland. These were most likely the result of aquarium releases, where the fish grew too big for the aquarium at home. Rather than returning the fish to the pet shop or selling it to another hobbyist, the owner released the fish into the wild. The Maryland infestation was particularly problematic as males and females were able to reproduce.

Once organisms become established in rivers, eradication may be impossible, and their spread is very difficult to control. Although canals provide an inexpensive means to move bulky cargo among broadly separated locations along a waterway, they also offer a means for AIS to move relatively unencumbered between the Midwest and the Great Lakes regions and beyond. The



Ballast water from ships is a primary pathway for introducing exotic species to the Great Lakes.

DNR FILE PHOTO

Chicago Sanitary and Ship Canal, for example, connects the Des Plaines River, part of the Mississippi River basin with the Great Lakes drainage basin.

An electric barrier on the Chicago San-Ship Canal will deter the movement of fish but will not be effective on planktonic organisms. Two canals in Ohio connect Lake Erie with the Ohio River drainage basin. The New York State Canal System involves the Erie, Hudson and Champlain canals, and links Lake Erie with the tidal Hudson River. Efforts to control the spread of AIS in these canals are only in the preliminary stages.

Gardeners must be vigilant when shopping for exotic plants online as well as at the local nursery. Plants and animals used in water gardens can spread inadvertently to nearby waters. Snails introduced intentionally or with aquatic plants can crawl to nearby waters or can live out of the water and can quickly establish large destructive populations. Purple loosestrife may have been introduced via ballast water from Europe or as an ornamental garden plant for its pretty bright purple flowers. Often seen in roadside ditches,

purple loosestrife is an aggressive wetland invader that produces hundreds of thousands of tiny seeds per plant. These seeds can spread in the wind, in water and can very easily stick to mud on shoes, boots or tires.

Efforts are underway to curb new introductions via ballast water. Regulations established in 1993 require ocean-going vessels to exchange ballast at sea, and new rules will soon require that they meet certain provisions for the number and size of organisms that remain in the ballast water after treatment. The Wisconsin Department of Natural Resources, in partnership with volunteers and Wisconsin Sea Grant, stations watercraft inspectors at boat ramps throughout the state. These individuals help teach boaters and anglers how to prevent the spread of invasive species as they move from one waterbody to the next. Removing aquatic plants; draining water from bilge, bait and motor; cleaning off mud and other debris; and disposing of unused bait in the trash, not in the water, can help prevent the spread of AIS.

Under a new national initiative, Habitattitude (www.habitattitude.net),

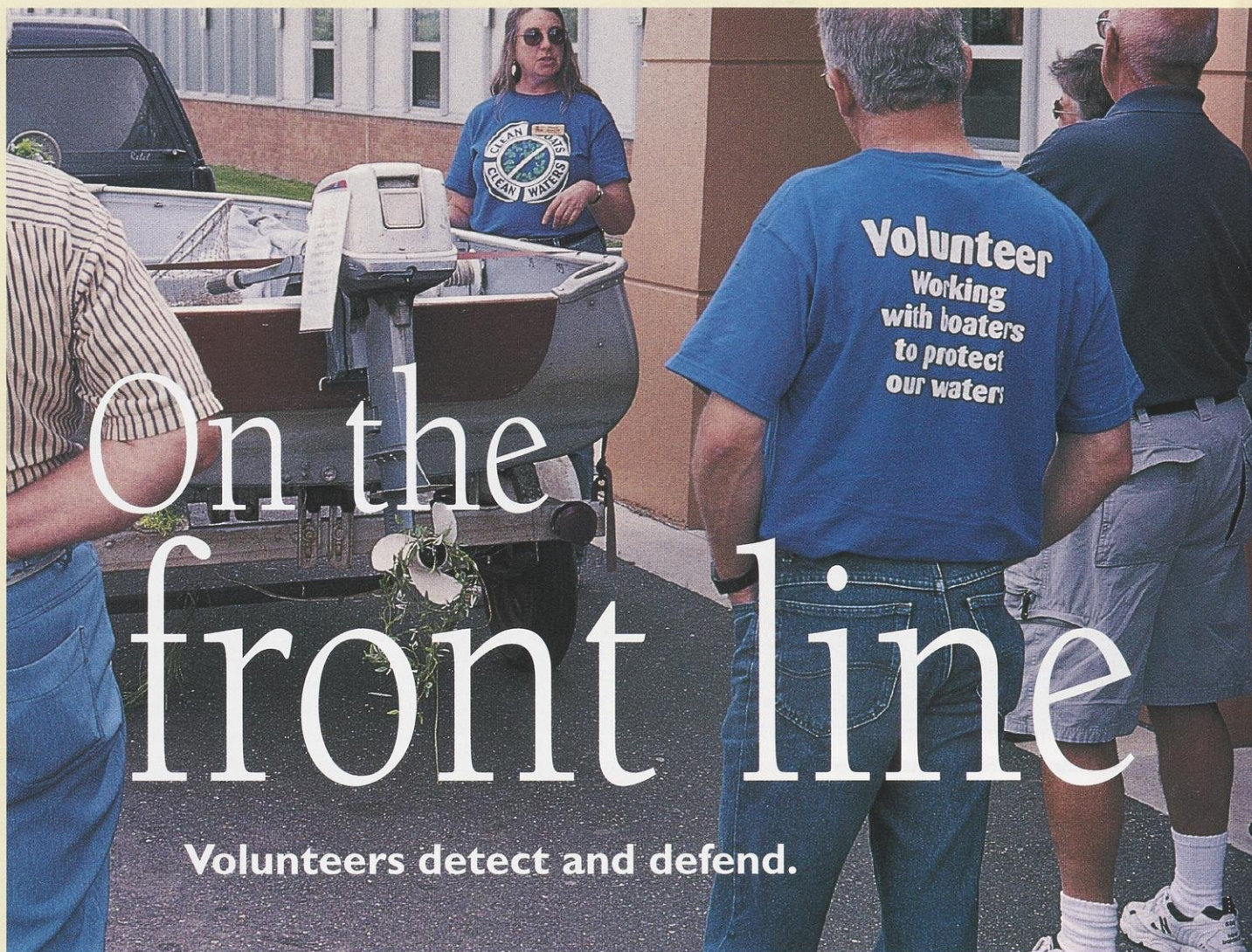
aquarium hobbyists and water gardeners are encouraged to responsibly dispose of unwanted plant and animal species. If you have acquired an undesirable aquatic plant or fish species for your aquarium or water garden, it is important not to release these plants or animals into the environment. While most of these organisms will die, some may be able to survive. A small number of those that do survive have the potential to create negative impacts on our natural environment and our wallets, as well as generate misperceptions about our hobbies. If you are faced with the situation of having an undesirable species, what can you do? By choosing among several alternatives, you can properly dispose of these unwanted aquatic plants or fish.

- Contact a retailer for proper handling advice or for possible returns
- Give to or trade with another aquarist, pond owner, or water gardener
- Donate them to a local aquarium society, school, or aquatic business
- Seal aquatic plants in plastic bags and dispose in trash
- Contact a veterinarian or pet retailer for guidance about humane disposal of animals

Aquaculture operations, baitfish dealers and natural resource agencies are also receiving training on how to avoid spreading invasive species through their business and sampling activities. Using a process designed to ensure food safety for NASA, the Great Lakes Sea Grant programs are training resource professionals and business owners how their activities in the field can promote the spread of AIS and how to develop a plan to prevent their spread of AIS.

We all have a stake in keeping our waters free of invasive species. Likewise we each play a role in preventing their spread. Take a few moments to learn how to prevent AIS from spreading through your actions when you're on the water, and teach and encourage others to take steps to keep our waters free of unwanted plants and animals.

Phil Moy is a fisheries and nonindigenous species specialist for the University of Wisconsin Sea Grant.



Natasha Kassulke

'Clean Boats, Clean Waters' volunteer training in Cumberland.

Preventing the spread of invasives requires the attention of everyone involved in water recreation. Volunteers are one of the best lines of defense.

"Clean Boats, Clean Waters" watercraft inspection volunteers have been trained how to properly clean boats and instruct boaters how invasives can be inadvertently moved between waterbodies. The Wisconsin Department of Natural Resources, UW-Extension, and local county land and water conservation departments host training workshops for volunteers who then return to their communities to conduct boater education programs.

"In 2004, watercraft inspectors spent 1,103 hours at boat landings, checked 2,468 boats and contacted 5,079 peo-

ple," says Laura Felda-Marquardt, the University of Wisconsin Extension invasive species program volunteer coordinator. "Crescent Lake and Shell Lake are both great examples of what individual lake groups can do, while Vilas County is a great example of a countywide approach to combating invasives."

The Crescent Lake Association Board of Directors in Oneida County formed a volunteer watercraft inspectors program in 2004. Volunteers worked for 20 weeks during the summer at the boat landings talking with boaters and inspecting boats. Crescent Lake inspectors contacted 454 boaters, inspected 244 boats and logged in 153 volunteer inspection hours. The only cost besides their time was the \$25 fee for the workshop and

materials. Twelve boats were found to have attached aquatic vegetation, two of which were identified as Eurasian water-milfoil.

Two years ago, the City of Shell Lake in Washburn County began a project to keep invasives from spreading to their lakes. Their first step was to close all but the major public boat landing on Shell Lake to concentrate volunteer hours on inspecting boat trailers at one location. A sign at the main landing alerted boaters of the need to protect the lake from exotics. Collection bins were placed at the landing for disposing of aquatic plants pulled from boats and trailers.

The city also hired a coordinator to recruit and train volunteers, and local media and citizen groups spread the word about the volunteer program. Vol-



CLEAN BOATS, CLEAN WATERS PROGRAM

Eurasian watermilfoil is readily dispersed by boats, motors, trailers, live wells, or bait buckets, and can stay alive for weeks if kept moist.

unteers at the landing were given a list of Eurasian watermilfoil (*Myriophyllum spicatum*) infested lakes in Wisconsin and Minnesota, a whisk broom for brushing off trailers and a diagram of key areas to inspect on boats and trailers. Funding came from a cost-shared lake planning grant and aquatic invasives grant administered through the Department of Natural Resources. Another grant is being used to study the feasibility of a boat wash station at the lake. Reactions have been positive and volunteers inspected 1,358 boats in 2004. Eurasian watermilfoil was found on boats or trailers on three occasions.

For more information visit the DNR watercraft inspection website, dnr.wi.gov/org/water/fshp/lakes/watercraftinspection/watercrafthome.asp

County coordinator

Vilas County is becoming a model for countywide management and volunteerism in its battle to fight aquatic invasives. A state grant funds Ted Ritter's position as county invasives species project coordinator. He came to the position with experience dealing with exotics as the town supervisor for the Little St. Germain Lake District.

"There is widespread agreement that the problem of exotics and the potential for damage to the county's natural resources and, thus, its economy, is too big for any one entity to solve," Ritter says.

The Vilas County Aquatic Invasive Species (AIS) Planning Partnership, formed early this year, consists of 75 members. Additional membership is

anticipated as nonresident lakefront property owners return from their winter retreats.

Over the next few years, the partnership will develop and implement a strategic countywide plan for combating exotics — an opportunity for efficient and effective AIS information to be collected or developed and disseminated to the 14 towns and approximately 70 lake organizations throughout the county.

"Some communities are attempting to deal with exotics at a great expense. The battle continues and there is an unknown outcome," Ritter says.

The partnership offers opportunities for public participation in the following five areas:

- public awareness and education
- prevention and early detection programs
- infestation management programs (for new or existing infestations) including a rapid response system
- research (information gathering)
- ordinance development

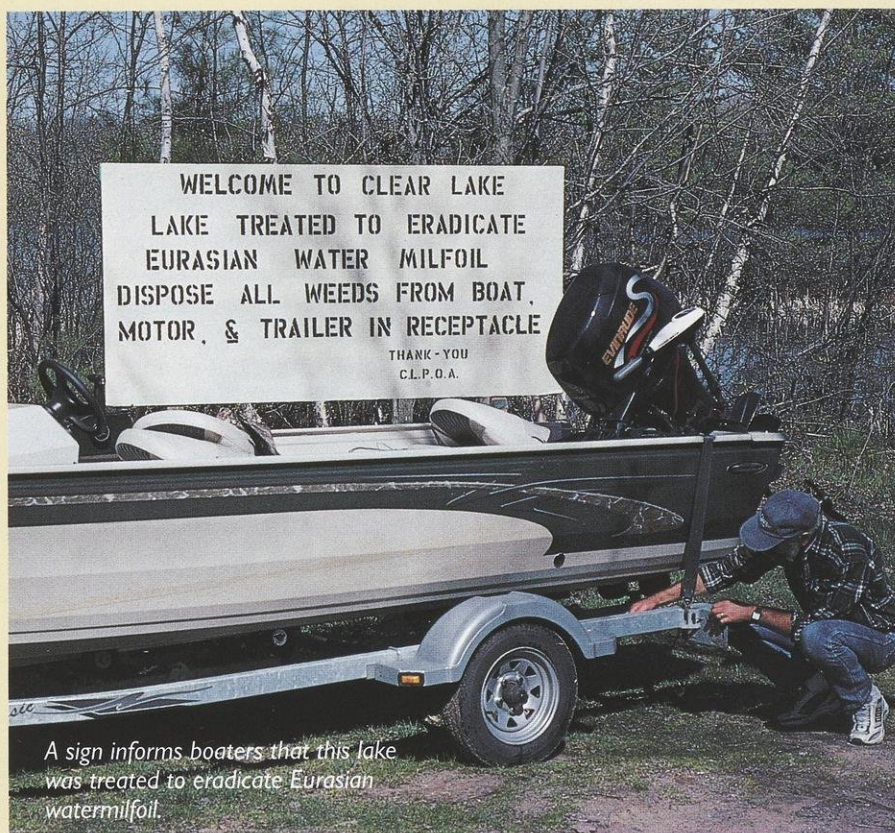
One noteworthy project will be developing a management plan to deal with dense stands of Eurasian watermilfoil infestation on Big Sand Lake (at the head of the Deerskin River) and downstream water including the Eagle River Chain of Lakes, which is also infested.

"Local lake organizations are the foundation blocks of the county's efforts and as such," Ritter says, "every town board in the county is being encouraged to establish a town lakes committee as an officially recognized unit of local government." Creating these committees will enable lake organizations within a township to pool human and financial resources and function under the umbrella of their town boards.

"People need to accept the fact that lake stewardship has taken on new meaning and the days when lakes could take care of themselves is past," Ritter says.

Purple loosestrife project

The Purple Loosestrife Biological Control Program is a citizen-based project that emphasizes using two safe beetle species that feed on loosestrife foliage in combination with traditional



A sign informs boaters that this lake was treated to eradicate Eurasian watermilfoil.

FRANK KOSHERE

methods for controlling this invasive plant.

"Controlling this exotic will require a long-term effort involving many citizens," says Brock Woods, DNR and UW-Extension purple loosestrife biocontrol coordinator.

The Purple Loosestrife Biocontrol Project has enlisted help from students, scouts, lake associations and individuals in raising the beetles for release since 1997. Over nine million of these beetles (with almost 95 percent coming from citizen cooperators) have been released at about 1,000 sites across Wisconsin.

"Despite the large number of sites, we estimate that these still represent only two to three percent of all the wetland area within the state that is infested with purple loosestrife, so we still have a long way to go to control the plant," Woods says.

Traditional removal methods, such as hand pulling, burning and chemicals, are labor intensive and, though very useful for containing small populations, have had limited success for larger infestations.

"For every 100 beetles at the start, you can ultimately release up to 10,000,"

Woods says. "These insects are beginning to reverse the spread of purple loosestrife around the state, but we still need many more volunteer cooperators out there to make it work."

The Department of Natural Resources offers a free beetle starter population that may be picked up in Madison or shipped for a \$30 donation. The program supplies most needed gear for free, if you agree to rear beetles at least two years. Additional materials like potting soil and cage supports cost \$50 or less.

The program is primarily funded through the motor boat tax, though for each of the last two years the amount of support (money and in-kind contributions) from cooperators has added an amount equal to 50 percent of the funding base.

"Initial success has come much sooner than expected wherever beetles have been released," Woods says.

Annual field trips scheduled in spring and early summer introduce citizens to the purple loosestrife problem and, if possible, collect biocontrol beetles (for control purposes). A list of these trips is available by e-mailing the program or by accessing the lists of out-

door offerings on the DNR website. The program loans out a short video that details the loosestrife problem, and the role and safeness of biocontrol.

The program also loans out walk-in cages to groups that have very large infested wetlands and want to produce 100,000 or more new beetles at these sites. The project's typical field time runs from April through July. For more information, contact Purple Loosestrife Project at DNR Research Center, 1350 Femrite Dr., Monona, WI 53716, or by e-mail at brock.woods@dnr.state.wi.us or call (608) 221-6349.

Superior Days

Special protection measures are needed for Lake Superior, says Mike Kroenke, University of Wisconsin Extension Lake Superior basin educator. "Superior is the largest and most pristine of the Great Lakes and represents 10 percent of the fresh water in the world. It is colder than Lake Michigan so it has been harder for aquatic invasives to become established but some are already here."

There is a growing concern for how these exotics will impact some unique geological and ecological areas such as Big Bay State Park.

To underscore their importance to the area, exotic species were identified as one of the top five issues at this year's Lake Superior Days, a series of meetings at the State Capitol comprised of more than 200 people from nine northern Wisconsin counties. Lake Superior Days have been held for 20 years to provide citizens the opportunity to meet with state officials to discuss their concerns and potential legislation.

This year, delegates spoke in favor of the DNR's biennial budget request that would provide funding for law enforcement at landings, increased aid to local communities and additional training of citizen volunteers to inspect boats at the landings.

"Exotics have done a lot of damage to the ecosystem, but also have done economic damage to our communities and that is getting legislative attention," Kroenke says.

Natasha Kassulke is associate editor of Wisconsin Natural Resources.

Researching the threat

Big Bay Park is one of many special areas researchers hope to protect from invasives. (inset) Two safe beetle species feed on purple loosestrife foliage and help control the spread of this showy invasive. (right) Invasive species are causing a decline in wetlands' plant diversity.

Natasha Kassulke

Jeff Bode, DNR's lakes and wetlands section chief, knows that some people are frustrated that resource managers don't have better tools in place to stem the spread of exotics.

"Sometimes problems evolve faster than the solutions," Bode says. "Dealing with exotic species is much like the medical field in that we might not have a cure yet, but with continued research there is hope."

Tom Hrabik, a fisheries ecologist and native of north central Wisconsin, agrees. Since he was a child, he has been interested in how the presence of rainbow smelt (*Osmerus mordax*) has affected walleye and other native fish in northern Wisconsin. He saw firsthand the negative effects that exotics can have on a fishery. But his research into exotics has expanded since he studied lakes in Northern Wisconsin. Today, he is an assistant biology professor at the University of Minnesota-Duluth and continues to study rainbow smelt in Lake Superior. However, he is also involved in stud-

ies of round gobies (*Neogobius melanostomus*) and ruffe (*Gymnocephalus cernuus*) in the St. Louis River.

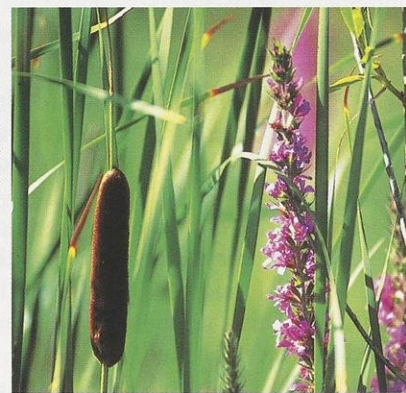
"There is a growing need to examine the effects of exotic species and many students are now choosing to focus on exotics as part of their graduate research," Hrabik says.

In fact, the University of Wisconsin is leading much of the research in Wisconsin on how to control the spread of aquatic exotics and predict the likelihood of an invasion.

John Magnuson, director emeritus of the UW-Madison Center for Limnology, has based a career on long-term lake ecosystem research including the influence of invasives and climate change on biodiversity.

"Climate change will increase the range of exotic organisms in Wisconsin, especially as it relates to fishes," Magnuson predicts. He points to research published by the Intergovernmental Panel on Climate Change and the Union of Concerned Scientists that supports his statement.

Issues, results and future challenges.



ROBERT QUEEN

DNR FILE PHOTO

DNR FILE PHOTO

"By the end of the century we would expect animals that live in Northern Illinois to be able to thrive in northern Wisconsin due to warmer temperatures," he says. Warmer winters may allow invasives to become established and even dominate some aquatic communities.

While climate change is a long-term issue, several other researchers are building on Magnuson's work with exotics to find more immediate answers for how to stop the spread of invasives that are already here.

Rusty crayfish and rainbow smelt

Jake Vander Zanden, an aquatic ecologist and University of Wisconsin professor of limnology, is interested in predicting which lakes are vulnerable to an invasion, thus being able to concentrate prevention efforts on those lakes.

"With approximately 15,000 lakes in Wisconsin, how do we focus our efforts most effectively?" he asks.

Vander Zanden asks three questions when determining a lake's vulnerability

to invasion: can they get there, can they live there and can they impact the system? He found that the answers to these questions depend on the invader. His studies examine rusty crayfish (*Orconectes rusticus*) and rainbow smelt invasions in Wisconsin lakes.

"The rusty crayfish cause a decline in abundance of the native crayfish and clear-cut the weed beds," says Tim Kratz, director at Trout Lake research station in Vilas County. "Rainbow smelt have been linked to the local extirpation of yellow perch and ciscowet."

Kratz closely follows the research of Vander Zanden and others on Crystal and Sparkling lakes.

"There was cause for concern here," Kratz says. "First, we were trying to avoid transporting smelt and crayfish into the lake, but once they were here, we were asking what we could do about them?"

Ideas included stocking a predator. Walleye were introduced to prey on the rainbow smelt and bass to prey on the crayfish. Fishing regulations were adjusted to protect the predators.

At Sparkling Lake, Vander Zanden and others also trapped and manually removed rusty crayfish — about 70,000 crayfish over four years. The community held crayfish boils to "dispose" of the crayfish and some were donated as animal food.

Brian Roth, a UW-Madison graduate student, explains that the trapping was very labor intensive but effective in this case.

"We've found that in smaller lakes, removal by trapping is effective for rusty crayfish and that walleye are very effective smelt removers," Roth says, "but some lakes are just too big to take that approach."

There is evidence, though, that the project is working here. Aquatic plants are returning, providing critical habitat for fish and stabilizing sediments on the lake bottom.

"There are a lot of vulnerable systems in Wisconsin and we've done our best to see whether or not we can remove an invader once it is established and found that is very difficult," says Jeff Maxted, a UW Limnology Center research specialist. He says prevention is

still the best line of defense. "As the world becomes smaller through international trade, animals and plants are moving more easily."

Spiny water flea

Pieter Johnson, another Limnology Center researcher, knew that the spiny water flea (*Bythotrephes cederstroemi*) has existed in the Great Lakes since the early 1990s. But it wasn't until 2003 that he discovered that it had moved into an inland Wisconsin lake. During a 64-lake survey, Johnson found the invader in the Gile Flowage, an impoundment in Iron County.

"Spiny water fleas are nasty; they eat the smaller forms of zooplankton that fish depend on and they are tough for fish to eat because their barbed terminal spines are sharp enough to puncture the lining of the fish stomach," Johnson says. "They can knock out a food supply and are potentially fatal to fish."

Johnson says it isn't known how long spiny water fleas have been in the Gile Flowage. The spiny water flea is a large (about 3/4 inch long) freshwater zooplankton native to northern Europe and the Caspian Sea. It likely arrived in North America in ballast water.

In an effort to prevent spiny water fleas from spreading to other Wisconsin lakes, Johnson is working with the Department of Natural Resources to educate boaters that these fleas can be transported in live wells and bilge water and that the eggs can become attached to fishing tackle, anchor lines and mud on boats and anchors.

Informational fliers advising lake users of the potential spread of spiny water fleas have been posted at each of Gile Flowage's boat landings and in local bait and boating stores.

Wetlands

Joy Zedler, a professor in the University of Wisconsin Botany Department and the Aldo Leopold Professor of Restoration Ecology for the University of Wisconsin Arboretum, moved to Wisconsin from California in 1998 and quickly got to work on what she found to be the biggest threat to Wisconsin wetlands.



DNR FILE PHOTO

Sea lamprey attaches to fish with a sucking disk and sharp teeth.

"I realized that the biggest problem in Wisconsin wetlands is invasive species," Zedler says.

As a restoration ecologist, her interest is in replacing invasives with natives. Several of her students have led projects that rely on field surveys, historical aerial photos, experimentation, restoration and replanting, and more. Collectively, these studies aim to understand how and why plant diversity is declining in wetlands, and how to develop approaches to restore natives and weed out the exotics.

Zedler's students are working within the UW-Madison Arboretum, throughout Wisconsin and across the Upper Midwest region. One project is helping to explain why reed canary grass (*Phalaris arundinacea*) and hybrid cattails, two of the most common invasive plants in Wisconsin wetlands, are increasingly dominant in wetlands that surround development. As development increases, surrounding wetlands tend to experience increased stormwater runoff and with that, more sediment and nutrients.

Another one of Zedler's students studies sedge meadows in Wisconsin that are dominated by tussock sedge. She is learning how increasing surface area and creating microhabitats affects plant distribution within sedge meadows. She has set up an experiment to test the usefulness of creating artificial bumps in sedge meadows to increase species diversity and coax back native species.

Sea lamprey success story

For Bill Horns, DNR's Great Lakes fisheries specialist, research and experimentation have played an important role in controlling sea lampreys (*Petromyzon marinus*), one of the most infamous

invaders to the Great Lakes.

Sea lampreys, native to the Atlantic Ocean, resemble eels and feed on large fish. They came to the Great Lakes in the early 20th Century through shipping canals and today are found in all the Great Lakes.

Lampreys are enormously destructive. They attach to fish with a sucking disk and sharp teeth, and then feed on body fluids, often scarring and killing host fish. During its life as a parasite, each sea lamprey can kill 40 or more pounds of fish. Sea lampreys have had a serious negative impact on the Great Lakes fishery. Before sea lampreys entered the Great Lakes, about 15 million pounds of lake trout were harvested in lakes Huron and Superior annually. By the early 1960s, the catch was only 300,000 pounds.

The Great Lakes Fishery Commission was formed in 1955, primarily to control sea lampreys and support research in that area. The commission, with Fisheries and Oceans Canada and the U.S. Fish and Wildlife Service acting as agents, has coordinated and funded sea lamprey control on the Great Lakes for more than 40 years. Individual states and the U.S. Army Corps of Engineers have provided support for some control projects. For example, Wisconsin contributed to the construction of the sea lamprey barrier now on the Iron River. Research institutions throughout the Great Lakes basin conduct critical sea lamprey research.

Today, sea lamprey controls include barriers, mechanical trapping, and the release of sterile male sea lampreys, which compete with normal males for mates but produce no offspring. As sea lampreys became sufficiently controlled, lakes were stocked with chinook salmon and coho salmon, which control alewives, while also providing a recreational fishery.

"Overall," Horns says, "the sea lamprey control program has been tremendously successful." Ongoing control efforts have resulted in a 90 percent reduction of sea lamprey populations in most areas.

Natasha Kassulke is associate editor of Wisconsin Natural Resources magazine.

Aquatic invaders

Continued from page 5

design will need to allow the free flow of native fish up and downstream for spawning while blocking movement of the Asian carp upstream.

Any barrier system is designed to repel the fish, not kill them. If they do get into Lake Michigan or the Upper Mississippi River, it will only be a matter of time before they make it into other Wisconsin waters. The fear is that these fish,

which can grow up to 100 pounds, will seriously alter the ecology of our waters. And once they are here, there will be no way to eradicate them.

There are still other pathways through which unwanted organisms can enter state waters. These include aquaculture, the aquarium and pet trades, the sale and distribution of bait, horticultural practices, commercial barge traffic, fish stocking, plant nurseries and recreational boating. Not all exotics introduced via these pathways are harmful; some actually can be beneficial. The Department of Natural Resources, in partnership with the Wisconsin Council on Invasive Species, is assessing the potential threat of invasive species and the various pathways of introduction. They will also be examining the effectiveness of current regulations and identifying gaps in current laws. The Department of Natural Resources will be developing handbooks on procedures/protocols to help guide actions related to these methods of transport.

There is no way to completely close the door on all the pathways of introduction. But it is certainly possible to greatly reduce the likelihood that new species will be introduced and that existing nuisance species will be transported between waterbodies. This can only occur if



DNR FILE PHOTO

Round gobies are bottom-dwelling fish introduced to the Great Lakes via the ballast water of large cargo ships.

public and private entities unify in their fight against aquatic invasive species. A good model is the regional Great Lakes states' approach to sharing information and education.

With passage of the state's last biennial budget some assistance is available to help control new infestations. Through an annual appropriation of \$500,000, cost-share grants to local communities can be used to control pioneer infestations of aquatic invasive species before they become fully established.

So what is the prognosis with regard to aquatic invasive species? Clearly invasive species pose one of the most severe environmental challenges we face today. But the fact remains that the majority of regional waters in the Great Lakes basin and most of Wisconsin's inland waters remain free of invasive species. All levels of government — federal, state and local — as well as local citizens need to collectively join forces to solve this problem. It is everyone's problem. The keys to success are adequate resources to effectively combat the problem and demonstrating the political will to act.

Ron Martin is DNR's aquatic exotic species program coordinator.



CLEAN BOATS, CLEAN WATERS PROGRAM

Education stresses removing weed fragments at boat landings. (left) A sign at Shell Lake reminds boaters to inspect and clean boats. (right) The zebra mussel poses a multibillion-dollar threat to North American industrial, agricultural and municipal water supplies.



DNR FILE PHOTO

Resources for being a part of the solution

Wisconsin Council on Invasive Species:
invasivespecies.wi.gov

Midwest Invasive Plant Network:
www.mipn.org

Wisconsin Department of Natural Resources invasive species:
dnr.wi.gov/invasives

University of Wisconsin Sea Grant:
www.seagrant.wisc.edu and www.ProtectYourWaters.net

Invasive Plants Association of Wisconsin:
www.ipaw.org

USGS Nonindigenous Aquatic Species site:
nas.er.usgs.gov/

National Center for Research on Aquatic Invasive Species:
www.glerl.noaa.gov/res/Programs/ais

Great Lakes Aquatic Nonindigenous Species List:
www.glerl.noaa.gov/res/Programs/invasive

University of Florida Center for Aquatic and Invasive Plants:
aquat1.ifas.ufl.edu/welcome.html

Protect Your Waters:
www.protectyourwaters.com

Habitattitude:
www.habitattitude.net (for aquarium hobbyists and water gardeners)

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Cover photos: (clockwise from top left): Researching treatments to stem Eurasian watermilfoil growth. Purple loosestrife. Zebra mussel. Bait buckets can be a pathway for invasive introductions.

BRIAN PRECHTEL/USDA
SCOTT NIELSEN
DNR FILE PHOTO
UNIVERSITY OF MINNESOTA SEA GRANT PROGRAM

Continued from page 16

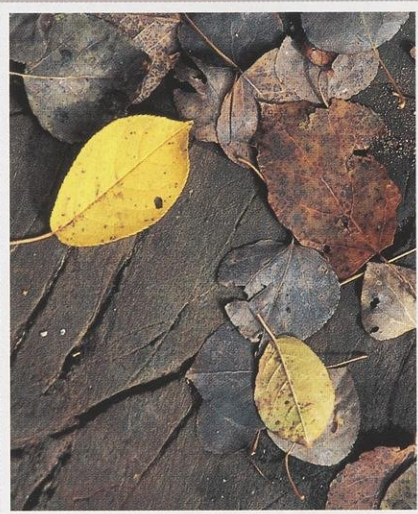
photographed as they were arranged by nature. In the case of the aspen leaves, all I had to do was frame the scene so that the brightest leaf was placed off-center, and take advantage of the radiating cracks in the stone.

Nature provides endless opportunities to photograph simple compositions that border on the abstract. The difficult part is deciding what to leave out of the picture. You can try walking around, peering through the viewfinder and repeating Thoreau's words: "Simplify, simplify."

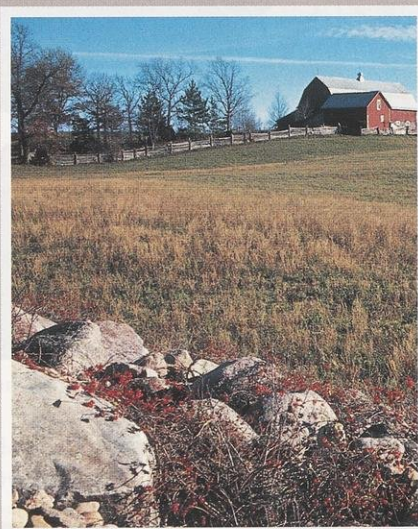
Of course, it's also possible to shoot landscape and nature photographs from a distance. The photograph called "Portage County 1970" is a classic, calendar-art farm landscape, shot with a moderate wide-angle lens to include the foreground stone fence. Notice how the image really consists of angling lines radiating from left to right, and that the foreground objects create a sense of three dimensions.

Finally, water. It's easy to use water in a photograph when it's calm and huge clouds or a sunset are reflected in a rustic pool. Instant French Impressionism! But when the sun is low in the sky, or the water is literally drenching you, waterscapes can require a little imagination. In "Big Chip Canoe 1995," exposing for the brilliant reflections on the water caused the canoe and the background forest to be rendered black, or *silhouetted*. Deliberately painting areas of a photo black with this technique can help simplify complex images. To silhouette, you underexpose dark areas of the scene by two f-stops. Intentional silhouetting may not be possible with point-and-shoot or digital cameras that do not permit manual exposure control.

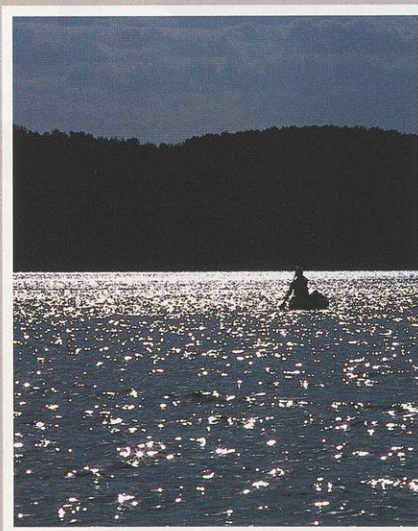
One day when I was shooting at Cave Point, a big surf was pounding into the Door County shore, shooting spouts of water above the slippery promontory I was using to get a look to the south, into the sun. Since there was no way to stay dry, I put a clear filter on the lens to protect it, slipped the camera body into a plastic bag, and turned on the motor drive. Many frames later I got the image I wanted: a photograph of a windy day on Lake Michigan that



Aspen Leaves 96



Portage County 1970



Big Chip Canoe 1995

should make the viewer feel as cold and wet as I was. The soft focus was the result of water on the filter, and the five-sided highlights around the sun are internal reflections of the lens' diaphragm at f16.

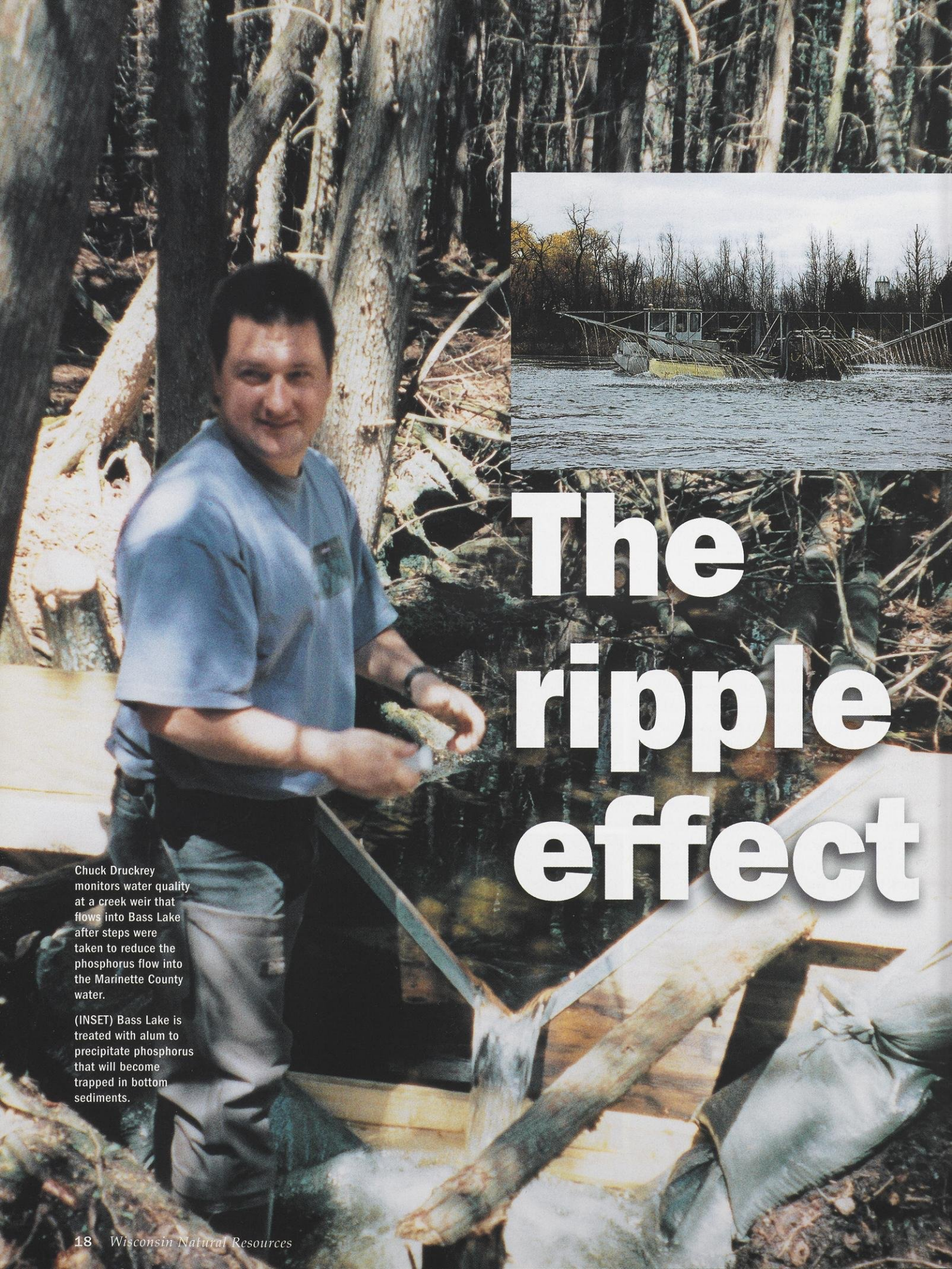
Discipline, design, economy and simplicity will make your nature pictures less crowded and more satisfying. Simplification tends to create pictures that look something like abstract paintings, and you may come to enjoy making abstractions out of familiar natural objects and scenes. As you take photos, use a tripod, remember to slow down and learn to see what the camera sees.

The important thing is not to follow this or any other approach slavishly. Instead, experiment with it and use it to structure your picture-taking for a while. The long-term result could be a photographic style of your own, and many happy hours outdoors with your camera. ▀

Photographer, writer and retired DNR Public Affairs Officer Dave Crehore writes from Green Bay. A longer version of this story with more photos is available on our website at www.wnrmag.com.

NOTES ON THE PICTURES

These pictures were taken in the course of 27 years. Gossen or Sekonic incident light meters were used as a supplement to the built-in meters in the Nikkormat, F2, F3 and F4; the Nikon F had no onboard meter. The films were Kodachrome II, Kodachrome 25, Fujichrome 50 and 100, Ektachrome 64 and Kodachrome 64. Most of the images on Kodachrome and Ektachrome were deliberately underexposed to bring out the color; ASA 25 film was shot at 32, and ASA 64 films were shot at 80. All the pictures were taken with 35 mm SLR cameras; lenses ranged from 28 mm to 105 mm. No macro, zoom or long telephoto lenses were used. Various Bogen and Gitzo tripods were used for most of these images; the tripods allowed me to work in low light and still use very small apertures.



The ripple effect

Chuck Druckrey monitors water quality at a creek weir that flows into Bass Lake after steps were taken to reduce the phosphorus flow into the Marinette County water.

(INSET) Bass Lake is treated with alum to precipitate phosphorus that will become trapped in bottom sediments.

BELOW: Middleton school students seed the Tiedeman Pond shores with native grasses and plants after a controlled burn to restore the natural shore.



PENNI KLEIN

With lake grants, municipalities, groups and individuals can assume ever-expanding roles in local shoreland protection. Can they help your community?

Carroll Schaal and Marilyn Leffler

From Myron Schuster's point of view, 1997 was a watershed year in Burnett County's management of its water resources. As the County Administrator at the time, Schuster grew concerned as proposals to develop shoreland parcels around the county's more than 500 lakes and along its many miles of riversides and streambanks flooded his desk. "The county board kept seeing more and more requests for changes and it was difficult to deal with," said Schuster. "It was hit or miss." Finding a way to objectively review all the proposals was a real challenge.

To make better decisions about shoreland development, Schuster believed the county needed two things: lake classification and a land use plan. Starting with a \$200,000 Lake Protection Grant from the Department of Natural Resources, the county worked with John Preissing, the UW-Extension Community, Natural Resources and Economic Development agent, to complete the integrated plan in 18 months.

One issue in particular kept coming up as public input was gathered during the planning process. "People wanted

to know 'How do we maintain the pristine waters and clean air that we have?'" said Schuster. "Shoreland laws and enforcement were not enough."

To address this concern the county designed an incentive program, funded by a second lake protection grant, to re-establish buffers of natural vegetation along lakeshores. Participants receive cost-sharing and professional advice on installing a buffer. They get an initial \$250 payment and an annual \$50 tax credit, an exclusive program T-shirt, and a sign they can proudly post on their property identifying the parcel as a "Preserved Natural Shoreline." Between 2000 and 2003, some 35 miles of shoreline buffers had been preserved, 80,644 square feet of shoreland buffers were restored, and 484 parcels now have covenants to maintain the buffers in perpetuity. "Over 38 miles of shoreline have been protected and the program fills up every year," said Schuster. "This never would have happened without help from DNR grants."

This success story and the cases that follow illustrate how lake protection grants can provide the spark to fuel community action and encourage the

dedication, cooperation and teamwork necessary to improve waters from Ashland to Kenosha and from the Mississippi River to Lake Michigan.

Back from the brink

Bass Lake, a small lake in far northeastern Wisconsin, had a diverse sport fishery that included trout as recently as 1970. But two decades of runoff from cropland, barnyards and unconfined manure stacks drained high levels of nutrients into the lake, which promoted plant growth and sucked up dissolved oxygen. Between 1977 and 1995, the average concentrations of phosphorus (a nutrient that fuels algae growth) were nearly 50 times the level considered "good." By 1990 the water quality had worsened and fish kills had decimated the sport fish population.

From 1985 through 2000 the lake received some intensive help from the Marinette County Land & Water Conservation Department (LWCD), assisted by DNR's Runoff Management Section. The aim was to eliminate the direct animal waste runoff flowing into Bass Lake. The two farm operations in the



DNR AERIAL PHOTO

watershed fully cooperated and installed recommended practices including clean water diversions, barnyard runoff controls, filter strips, roof runoff management, and new means to store manure.

Despite this effort, managers knew it would be years before the lake would show signs of improvement: The phosphorus accumulated in the lake sediments would “recycle” within the lake, continuing to foul the water quality for decades.

In the fall of 1999, the lake was treated with alum, a chemical that binds with phosphorus in the lake sediments, sealing off the internal recycling. A \$43,000 lake protection grant from the DNR covered 75 percent of the costs. The alum application dramatically reduced phosphorus levels in Bass Lake. Massive algal blooms stopped and water quality improved almost immediately. Water clarity has more than doubled in less than five years and there have been no fish kills noted since treatment began. Fish surveys conducted less than three years after treatment showed healthy populations of forage fish, panfish and predators such as largemouth bass and northern pike.

“Remediation is *very* expensive, but

sometimes there is no alternative to repair damage from years of improper land practices,” said Greg Sevener, DNR staffer who works on area watershed issues. “Any government program is only as good as the level of local interaction and cooperation. We just kept talking and working with the Marinette County LWCD and local landowners stayed involved.”

Chuck Druckrey of the Marinette County LWCD says, “Bass Lake proves the old saying that an ounce of prevention is worth a pound of cure. To restore Bass Lake took 15 years, millions of dollars and unprecedented cooperation among landowners, state regulators and local lake managers. We simply can’t afford to restore every lake in Wisconsin, so we had better protect them while we can.”

A super deal pays off for Long Lake

Long Lake in Chippewa County is one of the most undeveloped waters in western Wisconsin. A sizeable parcel of more than 580 acres at the southern end of the lake was put up for sale in 2000. The property includes old-growth red oak forest with trees more

than a century old. Eventually a real estate developer bought the land and intended to build nearly 150 houses, including 60 residential lakeshore lots.

Long Lake residents were justifiably concerned, because the parcel contained about two miles of shoreline and a very popular island. The news of land sale especially worried Steve Kristo, an Eau Claire orthodontist, who struck a deal with the developer to purchase 215 acres even before it was sold.

The developer still owned nearly 350 acres, which included over a mile of shoreline on Long Lake and parts of six other shallow-water wild lakes. A development plat was subsequently drawn up for county approval indicating plans to develop 99 lots, with over 30 of the homes built on the Long Lake shoreline.

Kristo wondered how to make a play to preserve the rest of these parcels from being overdeveloped. DNR staff suggested he contact the West Wisconsin Land Trust (WWLT) for assistance.

Costs to restore the 69-acre Silver Lake in Manitowoc County exceeded \$750,000. Grants from the state lakes program, four other agencies and donated time and funds from 12 local groups were needed to reroute runoff, build berms, treat the lake to reduce algae, restock fish and replant shoreline habitat.

WWLT staff met with Kristo and DNR biologists to discuss the situation, introducing the tools the land trust could bring to the table.

Meanwhile, down at Max's, a local hangout on Long Lake, Rich Kracum was talking with the bar owner about his personal quest to purchase the rest of the property. The owner encouraged Kracum to meet Kristo, so the two could consider ways to combine their efforts to save the land. It proved to be an excellent suggestion. The neighbors became an effective and dynamic team. "There's no way I would have been able to get this thing done without Steve," said Kracum. "He had put a ton of work into this deal."

The two conservation buyers formed a limited liability company and Kracum began negotiating with the developer. They cut a deal: The developer would retain the right to sell seven lots instead of 99 and split profits with the limited liability corporation. All seven lots and the remaining property would be subject to a conservation easement. The corporation would receive a 30-percent income tax deduction for up to six years on the easement, which was worth millions.

The conservation easement ensured development would include innovative approaches such as a lakeshore vegetative buffer and stormwater controls. The lakeshore and water quality would be protected, and the multi-layered canopy of the ancient forest and its wildlife habitat would continue to flourish.

"Our principal motivation was preserving the scenic beauty of the lake," said Kracum. "Another objective was public ownership of some of this land to prevent overdeveloping of that special corner of the lake."

A combination of funds from the state's Lake Protection Grants and Stewardship programs, sponsored by the West Wisconsin Land Trust, were used to purchase conservation easements on over 300 acres, including more than two miles of undeveloped shoreline. The DNR directly purchased over 200 acres with Stewardship and federal funds for an addition to the Ice Age Trail.

Without the aggressive efforts of Kristo and Kracum, Long Lake would

have become another crowded waterfront community. That kind of development harms the natural environment: Bald eagles, osprey, and other birds of prey stop nesting in shoreline trees; wildlife that once roamed forests retreat to less disturbed places; and stormwater rushes unchecked off new roofs and driveways, eroding bluffs and contaminating lake water. With excessive development, existing neighbors who desire a natural shoreline see their property values decline as backyards sprawl onto shores and porch lights hide the stars. Kristo and Kracum played a crucial role in conserving the natural character of a special place.

A team effort on Silver Lake

Formerly a carp-infested, algae-clogged water, Silver Lake near Manitowoc has

been put on the road to recovery through teamwork. The 69-acre lake is undergoing a \$750,000 restoration to improve water clarity, restore the lake's ecological balance and revive panfish and gamefish populations. The restoration is being managed in partnership with the Manitowoc County Soil and Water Conservation Department, Holy Family Convent, the Manitowoc County Lakes Association, and the Silver Lake District. A little more than half of the funding has been provided through DNR Lake Protection Grants. The balance of the cash came from Wisconsin Department of Transportation, Wisconsin Waterways Commission, the U.S. Fish & Wildlife Service, and the U.S. Environmental Protection Agency. The county, the Silver Lake District, the

Continued on page 28

PLANNING FOR PLAY

Lakes and rivers offer unique opportunities to boat, fish, swim, relax and reflect in peaceful, beautiful surroundings. With thoughtful planning and cooperation, Wisconsin's waters can continue to provide enjoyable experiences for all who seek their pleasures.

Lake grants, which include Lake Planning and the companion Lake Protection and Classification Grants, offer funding to underwrite the costs of surveying lake conditions, planning projects, and holding events like public forums to build support and participation for lake improvements, and to make physical and recreational improvements on public waters.

Lake Planning Grants help communities and organizations develop plans that become the source for many project activities. Up to \$10,000 may be awarded per project for which the state will cover up to 75 percent of planning costs. Grants are awarded twice a year: a February 1 deadline for grants awarded April 1, and an August 1 deadline for grants awarded October 1. Contact your local DNR region's lake coordinator or Carroll Schaal at (608) 261-6423.

Lake Protection and Classification Grants underwrite project costs to buy land or conservation easements, restore wetlands and shorelands, develop ordinances and carry out lake management plans like conducting alum treatments. These grants provide a 75 percent cost-share up to \$200,000. Applications are accepted once a year with a May 1 deadline for grants awarded by September 1.

The grants are available to nonprofit groups like conservation groups, land trusts and lake associations as well as to municipalities and lake districts.

Who pays for the grants? Those who use the waters. Both grant programs are funded by a portion of the excise tax on gasoline sales attributed to motor boat usage. The tax formula assumes each watercraft registered or used in Wisconsin burns about 50 gallons of fuel per season. This amounts to roughly \$10 million per year, of which lake protection receives slightly more than \$3 million annually.



Only waterfowl are attracted when *Cladophora* wash ashore and decompose. Geese and shorebirds feed on critters trapped in the algae. The birds' feces add bacteria to the putrefying weeds on the beach.

Algae

that are bad news for the nose

Conditions remain right for periodic outbreaks of stinky algae along the Lake Michigan coast.

Shaili Pfeiffer

Last summer the air along many coastal communities up and down Lake Michigan reeked with a septic-like odor, but the smells and accompanying windrows of green, slimy plants were not caused by sewage overflows. The culprits were algae, *Cladophora*, which have been washing up on Lake Michigan beaches in copious amounts for the last four to five summers, just as they did some 25 years ago. *Cladophora* outbreaks could well wash up on Lake Michigan beaches again this year.

Cladophora grow attached to rocks on the lake bottom. A survey of the nearshore last summer found *Cladophora* completely covered every available rock surface with a forest of algae up to six inches long. *Cladophora* beds were growing more than 30 feet down! When storms whip up the winds and blow inland, the algae break off from the bottom and wash ashore or pile up in the shallow waves near the beach. The decaying algae give off putrid odors that certainly make a visit to the beach an unpleasant, stinky experience.

Winds may make the beach awash in green after a storm and a few days later another storm with strong winds

from the west can carry the algae right back out into the lake. Later in the summer, particularly in August, the algae tend to slough

off the rocks and wash ashore more consistently. With warmer temperatures and a steady source of algae, the odors are often worst in late summer.

"The algae may be only part of the problem," says DNR researcher Paul Garrison. Some of the really bad smells may come from decomposing critters, like mussels that are carried ashore tangled in the mass of vegetation. These decomposing little animals can smell even worse than the algae, just as we've all observed when cleaning out a refrigerator — the smells of rotting meats and other proteins are usually stronger than the odors from decomposing fruits and vegetables, Garrison explained.

Other algae are more dangerous

Cladophora are a family of green algae

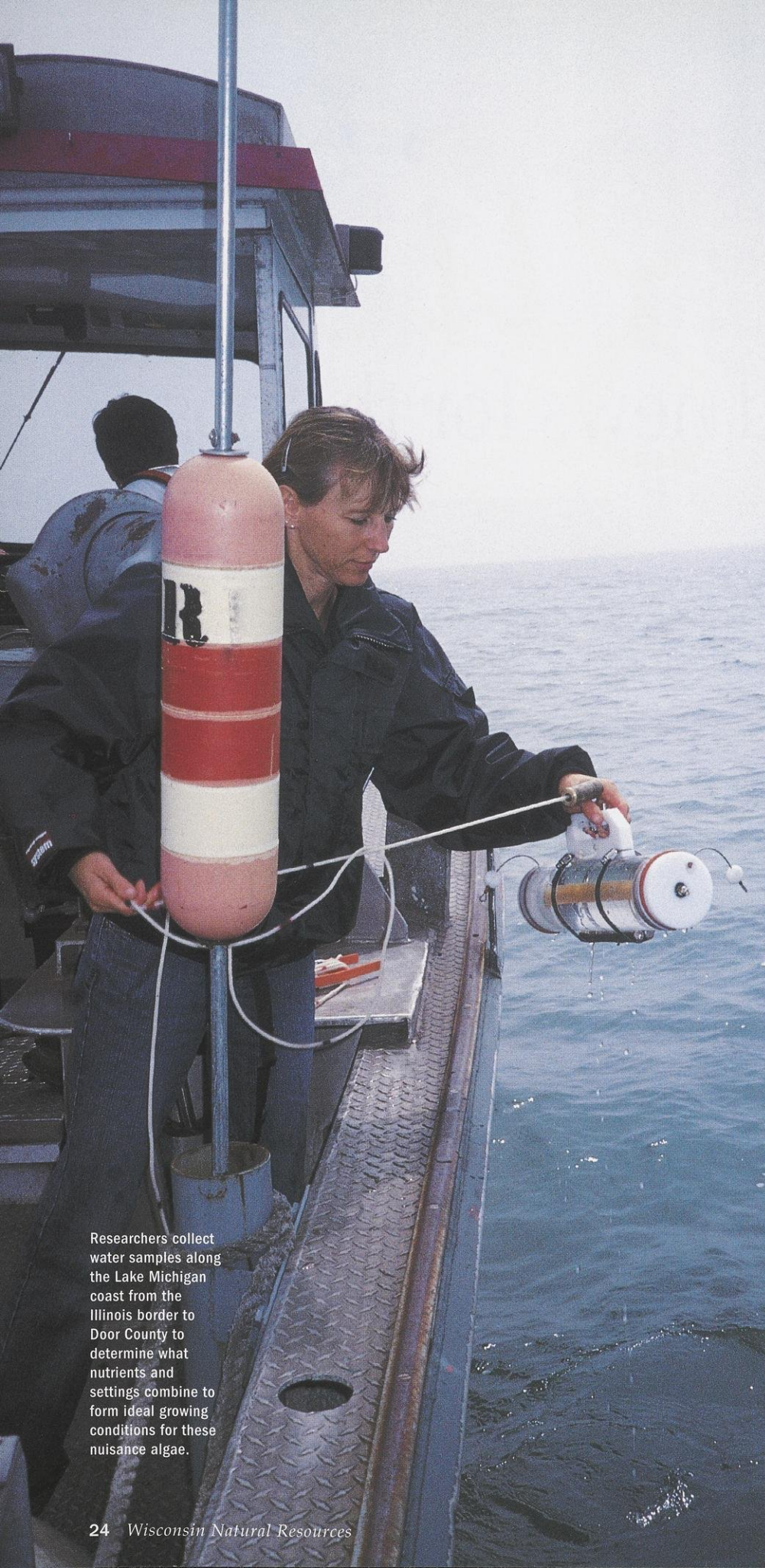


Cladophora take root and spread quickly on rocky bottoms where nutrients and sunshine reach the lakebed.

SHAILI PFEIFFER

and are different from the blue-green algae that can produce toxins. The blue-green algae have sickened or killed humans and animals that come into contact with them. Green algae don't produce toxins. "But it is

still important to think about practicing good hygiene, such as washing off, if you come in contact with *Cladophora* because they are a good host for bacteria," says Julie Kinzelman, microbiologist with the Racine Health Department. Kinzelman also explains how *Cladophora* may play a role in harboring *E.coli* that lead to beach closures. "Because other organisms wash up with the algae onto shore, gulls are attracted to the algae mats. This in turn results in more gull feces on the beaches that can lead to beach closure. We've studied how to manage our beaches to reduce the potential for algae accumulation that contribute to high bacteria concentrations. We've learned it's important to avoid grinding algae into the sand where they can serve as a food source for bacteria in the sand. Good beach



Researchers collect water samples along the Lake Michigan coast from the Illinois border to Door County to determine what nutrients and settings combine to form ideal growing conditions for these nuisance algae.

management techniques can improve swimming water quality. Beach goers can help too by refraining from feeding waterfowl at the beach."

Nuisance all over the Great Lakes

Cladophora are a significant nuisance in portions of all of the Great Lakes where there is suitable rocky substrate with the exception of Lake Superior. Lake Superior water temperatures are too cold for the algae to grow in abundance. On Lake Michigan, the algae problems are confined to the western shore that is very rocky. In contrast, the eastern shore along the state of Michigan has a sand bottom and the algae aren't a nuisance there.

Cladophora outbreaks were last a problem in Lake Michigan back in the 1960s and early '70s. Those outbreaks were linked to industrial and municipal discharges of wastes that contained a lot of phosphorus. The worst *Cladophora* outbreaks happened near areas where these pipelines drained into the lake. One positive outcome of those old outbreaks was they created public awareness, pressure and spurred action to help pass the Clean Water Act. As a result significant federal grant money was invested in improving sewage treatment plants nationwide to stem problems from industrial and municipal wastewater pipelines. Also there was a successful push to reduce phosphorus in laundry detergent.

Lake Michigan phosphorus concentration dropped significantly and the *Cladophora* went away, but the Great Lakes levels were also very low in the 1960s (lowest on record was 1964). At the same time phosphorus concentrations dropped, the lake levels rose, light didn't reach the lake bottom in as many areas and the *Cladophora* were no longer the nuisance they had been. This is a classic example of how many variables can affect the Great Lakes and make it difficult to understand how the different factors are interconnected and affect the ecosystem.

Why are the algae a problem again now? The short answer is we don't know definitively — Lake Michigan is a



The researchers also lower an underwater video camera at each sampling spot to examine the lake bottom for *Cladophora* buildup, zebra mussel accumulation and other factors that might help explain how and where the algae form.

big system that is constantly changing. The answer probably lies somewhere in an interconnection among conditions that vary such as the amount of available light, available nutrients, low lake levels, water temperature, and wind directions. Zebra mussels, recent invaders to Lake Michigan since 1991, may have a big role by increasing water clarity and recirculating nutrients.

Phosphorus recycling — Open water phosphorus concentrations have decreased substantially in Lake Michigan since the 1960s and '70s and currently meet phosphorus standards. The researchers haven't observed any sharp increases that would account for a large *Cladophora* rise. However, nearshore phosphorus concentrations haven't been regularly monitored, so we don't know for sure how they've changed. On the other hand, zebra mussels are amazingly efficient filter feeders and the bottom of the nearshore of Lake Michigan is covered with these powerhouses. They may be capturing phos-

phorus that typically would have moved into the open lake and may be excreting it in the nearshore area where *Cladophora* grow. Some phosphorus still runs off the land from urban stormwater and agricultural fields. We do know that fertilizer sales across the U.S are also increasing. All of those nutrients only add to the growth of algae in Lake Michigan.

Wisconsin lake topography or hydrology — The Wisconsin side of Lake Michigan has many areas that are rocky and have cobbles rather than fine sand. *Cladophora* need a hard surface to attach to, so if there is lots of light and food, there are plenty of surfaces for these algae to proliferate on the Wisconsin shores along the lake.

Light penetration — *Cladophora* need a certain amount of light to grow well. Since they need to attach to the lake bottom, algae growth is limited by how deep sunlight can penetrate. This is another environmental condition that

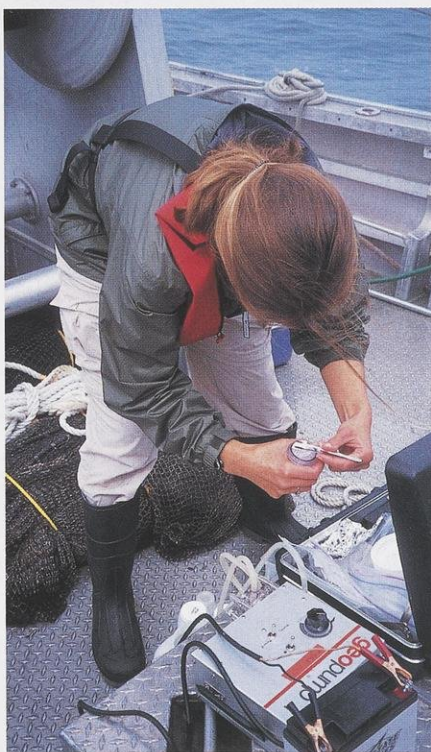
the zebra mussels have modified. Given their amazing filtering capacity, the mussels have made Lake Michigan water clearer. Last summer up and down the lake we could see the bottom of the lake at 30 feet deep.

Lower water levels now — Water levels in the Great Lakes fluctuate depending on precipitation and evaporation. In the last few years Great Lakes water levels have been at their lowest levels since the 1960s. Consequently there may be more light penetration in the nearshore shelf area of Lake Michigan than in many years. With the wet weather last spring, water levels started to rise. If this rise continues it may get too deep in the nearshore area for *Cladophora* to grow in abundance and these outbreaks may decrease.

Rising temperatures — Could global warming be a factor too? Maybe. Water temperatures in the nearshore area of Lake Michigan have risen about 2° C in the last 25 years and



Hika Bay along southern Manitowoc County is one of the hotspots where *Cladophora* blow ashore. The algae can grow in one part of the lake, slough off the bottom then drift ashore long distances from where the ropey masses formed.



Author Shaili Pfeiffer changes filter paper on a water sampler. Such filters collect portions of the phosphorus suspended in floating particles and are also used to measure chlorophyll concentrations as part of the *Cladophora* research.

DNR PHOTO

these algae grow better with increasing water temperatures.

Wind shifts — Wind patterns on Lake Michigan show that the prevailing winds more often are coming from the east rather than the west. East winds will blow the algae onto shore rather than washing them out into the open lake.

Learning more about the lake

Several teams of investigators are searching for causes of the *Cladophora* outbreaks. The partners include the Wisconsin Department of Natural Resources, the UW-Milwaukee WATER Institute, Centerville Cares — a citizen group from the Manitowoc area — and community health officials.

The DNR research team, supported by funding from Wisconsin's Coastal Management program and the National Oceanic and Atmospheric Administration undertook several studies last summer.

The shoreline along Lake Michigan from the Illinois border north to the tip of Door County was extensively sampled during June and again in September last year. Sample sites were selected at 16-mile intervals north along the coast. At each site, the researchers collected samples and made observations

from the nearshore area in six feet of water and farther offshore in 30 feet of water. In the deeper water, water samples were taken both at the surface and on the bottom. Researchers measured water clarity, nutrient concentration of the water, and did physical inspections of algae growth and zebra mussel populations.

Test results show that phosphorus levels near shore remain low compared to inland lakes and streams, but are well within the range that algae need to grow. Nearshore phosphorus concentrations also dropped significantly north of Manitowoc County, yet algal growth was as much of a problem on some Door County beaches as it was farther south.

Health departments and volunteers who are already monitoring coastal beaches for signs of bacteria are now also recording how much algae they find washed up on their beaches. This information is especially useful because the beach monitors collect samples and test water quality at their beaches at least weekly and often more frequently. From these beachfront observations we found that Bradford and McKinley beaches in Milwaukee and the beach at Newport State Park in Door County had the greatest number of days last summer where nuisance quantities of



JOHN MASTERSON

algae washed on shore.

Work plans to monitor for *Cladophora* outbreaks this summer will include repeating sampling in about half of the sampling sites from last year and adding new locations. Among the new sites, researchers will search for *Cladophora* along the Green Bay side of the Door Peninsula. The first sampling time has been changed to late April to observe *Cladophora* growth and lake nutrient concentrations at the beginning of the growing season. This sampling will be repeated in August when the algae start to slough off the bottom. DNR researchers are working in close collaboration with researchers at the UW-Milwaukee WATER Institute and of course, the partnership with health departments to monitor beaches for both bacterial and algae buildup will continue.

Dealing with *Cladophora* outbreaks

"Even if we can't stop or predict when and where *Cladophora* may drift ashore, we're learning how the algae grow and move in Lake Michigan," Garrison says. "We can allay public fears about the algae and make the best of cleaning them up, where feasible," he says.

"*Cladophora* don't necessarily wash up on the beach next to areas where the

algae grow. Sometimes the ropey algae slough off the bottom, drift and blow ashore quite a distance from the areas where they form. Unfortunately some community beaches appear to be hotspots for nuisance algae accumulation due to Lake Michigan nearshore currents. It's a complicated picture and certainly frustrating for anyone dealing with the problem to not have a quick solution on hand," says Garrison.

Communities all along Lake Michigan are struggling to keep up with algae accumulation. Some communities rake up algae from the water onto land and collect amassed algae with beach groomers to keep windrows from building up on their beaches. Where there is heavy accumulation, some communities have used backhoes and front-end loaders to collect the algae. Chemical treatments aren't effective in such big lake areas.

The one factor currently under human control that contributes to a long term solution is to keep taking actions to reduce phosphorus runoff. "We don't know how the current way that phosphorus circulates is affecting nuisance algae. But we do know that reducing phosphorus to Lake Michigan is a good thing," says Chuck Ledin, director of the DNR's Office of Great Lakes. "Unfortunately reducing phosphorus

today may be more challenging than upgrading sewage treatment plants because we need to change people's habits. Everyone needs to be aware that their actions can contribute to the *Cladophora* problem. We need to find ways to prevent any uses of phosphorus, big or small, that can result in a discharge to the lake. In the short term this will keep the problem from getting worse. In the long term we'll reduce what phosphorus is available in the lake. This is an endeavor we should start and continue."

We have a naturally-occurring alga that has recently resurfaced. It's clearly a stinky nuisance on Lake Michigan beaches and there is no reason to expect it to go away any time soon. Reducing fertilizer use, maintaining septic systems, keeping animal waste out of waterways and storm drains, preventing soil erosion on farms and construction sites, planting buffers along waterways, and keeping leaves and grass clippings out of the streets are just a few of the ways that we can all reduce phosphorus runoff over the long run to help keep the problem from getting worse, Ledin said. ■

Shaili Pfeiffer is a water resources specialist coordinating the Cladophora response for the Department of Natural Resources.



A nettlesome question

Continued from page 2

Stinging nettle receives its common name from the action of many minute stinging hairs that cover its leaves and stem. Each hair resembles a hypodermic needle composed of a sharp-pointed tip, a capillary tube through the bristle and a fluid-filled sac at its base. When the hair is touched, the tip bends and effectively penetrates the skin. The action puts sufficient pressure on the sac to force fluid up through the tube into the skin. The chemistry of the fluid is not fully understood, but the irritating chemicals are believed to be histamine and acetylcholine. The body's response to injection by these foreign substances is intense burning and itching. Very sensitive individuals may develop red, raised welts. The irritation is transient, its duration depending on each person's sensitivity, but may be bothersome and put a damper on the day's outing.

From the plant's perspective, the stinging hairs are a good defense mechanism against browsing herbivores and curious naturalists. From our perspective, the plant is irritating. Our initial reaction is to get rid of it. After all, what good is it? Before you dash for your gloves and loppers, understand that several native butterfly species are dependent on stinging nettle as their larval host plant, that is, the plant upon which their caterpillars feed. Without the host plant, the butterflies would not survive.

Milbert's tortoiseshell, *Nymphalis milberti*, a two-inch brown butterfly with an orange-yellow band highlighting the outer third of its wings, is totally dependent on stinging nettle as a host. Unlike most other butterfly species which lay single eggs on many plants, a female Milbert's tortoiseshell lays her eggs in large clusters on the underside of nettle leaves. After hatching, the young larvae feed on nettles within silky communal webs. As the young grow and molt, they wander to neighboring nettle plants to feed

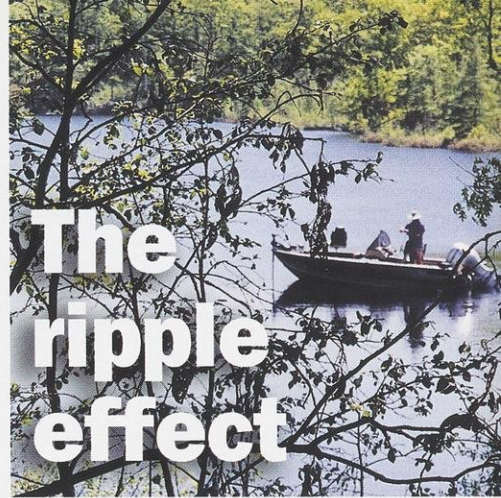
alone and rest in folded leaf shelters. When it's time to pupate and transform into adult butterflies, the fully-grown larvae crawl off the nettles, never to return.

Red admiral butterflies, *Vanessa atalanta*, can't survive Wisconsin winters and must, as migrants, recolonize the state each year from the south. Some years red admirals are plentiful, other years they are scarce. In their wanderings, red admirals search for stinging nettle and wood nettle. Females lay their eggs singly on nettles and the larvae feed on the tender leaves.

Larvae of several orange and dark brown angewinged butterflies feed on nettles as well as other plants. Question mark larvae, *Polygonia interrogationis*, feed on elm, hackberry and nettles. The eastern comma, *P. comma*, lays her eggs singly or in a short stack directly on nettles, elms or hops. The rare satyr comma, *P. satyrus*, of northern Wisconsin uses nettle as its only host plant. The pale-green eggs are laid on the lower surface of nettle leaves. Like other angewings, the young caterpillars rest inside folded leaf shelters. It appears the larvae are unaffected by the stinging hairs, though scientists don't understand how they are protected from the nettle's chemical defenses.

Learn to recognize stinging nettle, walk around it and think twice before cutting it down. Some people even plant stinging nettle in butterfly gardens along with common milkweed, everlasting and violets. All the butterflies that feed on nettles are wanderers so you're more likely to have these colorful visitors find your garden than many other butterfly species. As an added bonus, study your growing nettle patch to discover other creatures that live and dine on this delicacy. ■

Anita Carpenter sidesteps the nettles on walks near her Oshkosh home.



Continued from page 21

Manitowoc Fish and Game Club, and more than 10 other groups and individuals provided "match" through donated time and money.

The project started in 2001 when the group led by the Manitowoc County Soil and Water Conservation Department built an earthen berm to separate Silver Creek from Silver Lake, rerouting polluted runoff. The lake was treated with rotenone in fall 2003 to kill rough fish such as carp and bullheads, and treated with alum in spring 2004 to trap phosphorus in lake sediments. Starting in late spring 2004, the DNR began restocking the lake with largemouth bass, northern pike, walleye, yellow perch, bluegill, pumpkinseed sunfish and forage minnows. The Manitowoc County Soil and Water Conservation Department is restoring Silver Lake Park for public use, as well as planting natural vegetation along the park's extensive shoreline.

DNR testing shows the water quality has improved and populations of stocked fish survived through the fall. The aquatic plants haven't come back yet as hoped. Even so, "the Silver Lake project is an excellent example of how good work happens when many people and agencies work together," said Mary Gansberg, project biologist for the Department of Natural Resources.

Protecting little urban ponds

Tiedeman and Stricker ponds are tiny kettle ponds located in urban Middleton, just west of Madison, Wisconsin. Both ponds, renowned as birding hotspots for decades, are now ringed by nearby homes. Urban runoff drains into the ponds, and then into Lake Mendota.

State grants helped keep a large parcel undeveloped on Long Lake in Chippewa County.

Invasive species, especially reed canary grass, grew around the ponds' shores. Flooding left mud flats and killed most of the mature trees adjacent to the ponds.

With the support of Lake Protection Grants, the City of Middleton partnered with many groups, among them the Friends of the Kettle Ponds and local schools, to restore the shorelines with native plants. The effort also includes an effective and fun educational program aimed at raising awareness and fostering future stewards of these waters. The program features interpretive signs, workshops, volunteer planning days, and a series of local bird and plant hikes. One local bird watcher shared his observation of sighting ten species of shorebirds in a single week in August!

Today, the little ponds are integrated into Middleton's stormwater management system, and runoff is filtered by buffering vegetation that ultimately helps protect Lake Mendota. "Middleton does a great job of mobilizing its volunteers," said Lisa Reas-Knapp, environmental consultant on the project. "We had little old ladies come out of their homes with their gardening tools to help do the plantings and they were so grateful the city was doing something to improve the condition of these ponds. The more hands involved in the projects, the more likely they will be maintained and managed in the future."

From countywide projects to tiny neighborhood ponds, lake grants can provide the seed money that moves communities past their frustrations to start developing local, grassroots solutions for their lakes and rivers. For those who are watching from the lakeshore, the riverbank or streamside as the waters they love become murky, overused or less appealing, these grant options provide a starting point to get involved and get going. ■

Carroll Schaal leads the lake partnership teams and Marilyn Leffler is an outreach specialist in DNR's Lakes and Wetlands Section. Richard Gauger contributed information for the Long Lake project descriptions.

READERS *write*

COMMENT ON A STORY?

Send your letters to Readers Write, WNR magazine, P.O. Box 7921, Madison, WI 53707 or e-mail letters to david.sperling@dnr.state.wi.us

IN PRAISE OF ISHERWOOD

I have always enjoyed the beautifully written articles of Mr. Isherwood, but I think the essay, "The pleasure of dead trees" (December, 2004) is one of the finest pieces he has ever written. Please encourage him to do this more often. All of your articles are thought provoking and well written. Keep up the good work.

*Charles Mueller
Madison*

Hear, hear, for Justin Isherwood's eulogy on a tree. One's soul is rich who sees beauty in a dead tree or a gnarled jack pine.

*George Ellis
Eagle River*

Please tell Justin Isherwood that his article inspired me to keep an old snag tree up and not cut it down. Our forest is in the DNR forest management program and I'm working with Mike Sieger, the local DNR forester [in Waukesha] to regenerate a hardwood forest. Good luck in your endeavors.

*Leesley B. Hardy
Tucson, Ariz.*

THANKS FROM BUD JORDAHL

Thanks for giving Gathering Waters Conservancy ("The perfect partner," December 2004) such splendid publicity. This will really help spread our message to an important segment of Wisconsin conservationists. I have long admired the splendid job you do with the magazine. We have come a long way since I first started reading (and writing for) the magazine some 55 years ago. The December issue was filled with great articles. Give Lisa Gaumnitz my congratulations for a splendid piece on water ("The core of recovery"). And I have known Maggie Heino ("Where sleeping bears lie") for many years. My wife and I went to the bears dens many years ago. Again, congratulations and thanks!

*Harold C. (Bud) Jordahl
Madison*

TRAPPING CONTACT

I was reading one of your articles that talked with Scott Peterson ("Caught in time," October 2000). It said that he was in charge of the Wisconsin trapping education program. I live in Missouri and I am a trapper. I would like to contact Scott Peterson to learn more about using the whole animal that I trap.

*Janis Dillard
Lockwood, Missouri*

Janis, we would suggest you visit the Wisconsin Trappers Association website at www.wistrap.org. The organization's Education Director has provided an address, a phone number and an e-mail address. We'll bet that he or a colleague would be happy to help you. We're sure that just as in Missouri, the trappers up here are very interested in sustaining their activity and are very willing to share what they have learned through years of practical experience.

BIG CHIP FOR GENERATIONS

Love the story about the Chippewa Flowage ("A meander through the Big Chip," October 1997). My family has been coming here since the early 1900s. My grandfather helped plant the large pines at Pat's Landing. Now, we bring our kids here to enjoy the same things that were enjoyed 100 years ago. My hope is that this awesome place can continue to be enjoyed for many years to come!

*Mary Bykowski
Germantown*

MAGAZINE SHOULD WORK WITH SCHOOLS

I am a retired high school biology teacher and taught 25 years on the Kenai Peninsula in Alaska. During that time I worked with [the U.S.] Fish and Wildlife [Service] and Alaska Fish and Game on many interesting projects in conjunction with my classes, including moose research at the moose pens, lake surveys with seining, mapping and chemistry, lynx tagging, frog inventory for future use and stream shocking. This was a wonderful experience for my students and pointed many of them in a life science career.

I believe that your magazine should have a regular department to report on a school class project that was conducted in conjunction with the DNR. It would require advance planning and coordination to

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have enough projects [on a regular basis.]

Right now, I have the first of those projects forming. My neighbor, while logging a few weeks ago, dropped a tree on a bear den. No one got hurt — bears or logger — but all were very scared. A sow and three cubs came out and left. We think she is back as we can't see through the den as we could that day. I suggested to the Antigo High School wildlife management teacher that his class tag and follow these animals for a year or two. He was very excited but not clear how to proceed.

You recently had an article ("Where sleeping bears lie," December 2004) in which Maggie Heino was coordinating tagging of bears in the Northwoods. I've tried to contact her. Can you help us get going?

John Stengl
Birnamwood

We can certainly put you in touch with Maggie Heino to discuss whether the Birnamwood site would be appropriate for her research. As for devoting a column to school research projects, you hit the nail on the head that such columns depend on a ready supply of quality pieces and photos. Although our magazine supplements some classroom topics well, teachers and school libraries haven't widely subscribed. Some students find our website or the agency's EEK! Website (Environmental Education for Kids! www.dnr.state.wi.us/eeek) useful for research projects. The magazine has published all its stories online since 1996 at www.wnr-mag.com without all the fantastic photos in the printed version. We agree that wider exposure to outdoor and environmental issues we carry would complement middle school and high school biology and conservation courses, as well as interest school conservation clubs.

DEVIL'S DOORWAY DAREDEVIL

When I received the issue with the Devil's Doorway on the back

cover ("Wisconsin, Naturally," February 2005), I was prompted to write concerning other rock formations at Devil's Lake. When I was about 16 or 17 years old (1938-39), my brother and another friend visited Devil's Lake and rented a state-owned cottage for \$10 a week. We saved our money from caddying at a local golf club. We hitchhiked up from Oconomowoc. We climbed the bluffs and climbed the formations. I went to the top of Cleopatra's Needle. I was told later that nobody had ever done that before! (Someone said a clown from the circus had done it with ropes.) My question is, is there a record of anyone else ever having done this? A friend from Oconomowoc did a handstand on the top and edge of the Turk's Head, both witnessed by my brother Emery Tuttle, now in Texas. In later years, 50s and 60s, I took my family — three daughters — and camped in a tent on many occasions. What a great time we had!

Jim Tuttle (age 82)
Oconomowoc

According to Richard Evans, Devil's Lake park superintendent, rock climbing at Devil's Lake is a popular activity and is permitted, but not encouraged. The park does not keep records of climbers. His advice to climbers — be experienced, climb with a partner, have a cell phone, use safety equipment and stay within your limits.

APPRECIATES WETLAND PROTECTION

As a retired Navy, full-time student in environmental science at Texas A&M-Corpus Christi, I am very glad to see success in saving our wetlands. Only recently have I grown to truly appreciate the many advantages of a natural or constructed wetland for everyone's good. This conservation shows a good stewardship of the land. Thanks for your efforts.

Jim Mutchie
Corpus Christi, Texas

FOUNDERED VS. FLOUNDERED

In a recent article ("Ghosts of our coasts," February 2005 insert) the author spoke of a ship that "foundered" and then went down. Shouldn't it have been "floundered" and then went down? Great article though!

Dennis King
Oshkosh

Dennis, we think this verb confuses lots of people, but we believe we've made the right choice. It has a specific nautical meaning "to sink below the water." Here's what the American Heritage Dictionary Second College edition says about this usage: "The verb founder and flounder are often confused. Founder comes from a Latin word meaning 'bottom' (as in foundation) and originally referred to a ship's sinking; it is now used as well to mean 'to fall utterly, collapse.' Flounder means 'to move clumsily, thrash about' and hence 'to proceed in confusion.' If John is foundering in Chemistry, he had better drop the course; if he is floundering, he may yet pull through."

NOVICE TROUT ANGLER

This will be my second year fly-fishing. My fiancé has gotten me hooked. I'm also new at tying flies but what a great hobby. We have been fishing the Prairie River and in Wisconsin's parks. We'll be taking our first trip in a few weeks or so and I can't wait. What an adventure. Thanks for listening.

Teresa Foster
Wakefield, Mich.

UPDATES

INTERACTIVE SHIPWRECKS

Readers who enjoyed the February 2005 insert and poster ("Welcome Aboard: Discovering Wisconsin's Maritime Trails") will like a new CD-ROM produced by the Wisconsin Historical Society. "Wisconsin's Great Lakes Shipwrecks: Dive into Wisconsin's Past" is an interactive multimedia educational tool that's fun to boot. The CD-ROM is easily navigated, and contains a wonderful mix of photos, video and colorful graphics. Don't forget to turn up your speakers so you don't miss the sound effects and narration.

From the main menu, users can explore shipwrecks, learn about the tools used by underwater explorers, learn the WHS underwater archaeology mission, or skip right to the "fun stuff." Shipwreck exploration provides colorful descriptions of each ship and the circumstances that caused its demise. The "explorer's tools" section describes SCUBA gear, underwater tools for recording and documenting finds, and conservation methods for preserving artifacts so they don't decay when brought to the surface.

The fun comes when you find yourself on the deck of the interactive schooner and take a virtual tour from the top of the mast to the cargo hold below the deck. If you didn't know what jibs and stays were, you will when you're done. There's even a diving game where users try to beat the clock and rack up points by taking underwater pictures of artifacts before running out of air in their tank.

It is available for \$19.95 at Wisconsin Historical Museum Shop located on the Capitol Square, 30 N. Carroll St., Madison, WI 53703 as well as other museum shops and bookstores around the state. To order by phone, call toll free: 888-999-1669. In Madison, call 608-264-6555. Online: www.wisconsin-history.org/shop

If you're intrigued by tugboats, check out the story of the *Steven M. Selvick*, a hard-working tug that lies at the bottom of Munising Bay in Lake Superior. *Superior Legacy* is a booklet and CD available for \$15. Send check or money order to Dave De Groot, 7221 Outagamie County Rd., Kaukauna, WI 54130.

Fair enough

There's nothing like a fair to signal the true arrival of summer. Some say it's really here only after the wild strawberries ripen; for others it's when the lightning bugs shine bright. But for your TRAVELER, summer doesn't begin until the cream puffs blossom, the prize bull takes his blue ribbon, and the guy hawking the multipurpose vegetable grater/torque wrench makes his first sale.

Although Wisconsin's traditional State Fair garners most of the publicity, there are three **district fairs** and more than 75 **county fairs** that deserve your attention.

Smaller fairs offer exhibit halls filled with art, crafts, photography, and displays of vegetables and other homemade goods; barns where you can see the best farm animals from area herds; entertainment from music to demolition derbies and tractor pulls; food and fun — all without the massive crowds.

At a county fair you'll have a better chance to meet and chat with competition participants; you can, for instance, pick up tips on saddle cinching or hoof picking straight from the horse owner's mouth, or talk to the home gardener whose beets bested all. A county fair is a place for farmers, stock

breeders, vendors, and other producers of agricultural goods to showcase their products and skills, and an opportunity for consumers to learn more about how their food is produced.

Hardcore thrill-seekers may chafe at a county fair's lack of a triple-infinity 20-storey corkscrew roller coaster on the midway. TRAVELER'S advice: Save the high-pitched squeals for Six Flags. County fair midways are more likely to have Tilt-A-Whirls and bumper cars, but that's OK. Where else can you meet Zahara the Monkey Girl in the Fun House?

When the corn is knee-high (you know — around the first week in July) the annual fair season begins and continues through the end of September. To plan your fair-

going adventures, visit datcp.state.wi.us/mktg/business/marketing/fairs/, the website of the Department of Agriculture, Trade and Consumer Protection. You'll find a list of 2005 county fairs and a schedule of fair activities.

Interested in serving as a fair judge? If you are acquainted with the finer points of swine, are able to can a mean green bean or put up a wicked bread 'n' butter pickle, have knowledge of antiques, photography, woodworking or any of 39 areas of expertise, pick up an application by clicking the "Application for Registration" link on the website mentioned above. Applications must be submitted by July 1.

No need to wait until dark: You can help light up the sky with color all through the day during the **Fireworks Kite Festival** from 11 a.m. to 7:30 p.m. on Saturday, July 3 at Veterans Park on Milwaukee's lake-front. A large area of the park will be set aside for kite flyers, so untangle your string and soar with kite-minded companions from around the state. Folks from the Kite



WALWORTH COUNTY FAIR

Join the judging for the Fairest of the Fair...



WALWORTH COUNTY FAIR

...the udder winners, and...

Society of Wisconsin and Gift of Wings will be on hand to help you get airborne. Yves LaForest from Montreal, Quebec will be there, flying his Giant Kites — a sight you won't want to miss. Visit www.giftofwings.com or call 414/305-3145 for more details. By the way, the real fireworks begin at 9:25 p.m.

...the pageantry of a good show at county fairs.



Wisconsin, naturally

MILWAUKEE RIVER AND SWAMP STATE NATURAL AREA

Notable: A combination of southern and northern lowland forests along a meandering stretch of the Milwaukee River. Conifer swamp of tamarack, white cedar and black spruce gives way to wet, deciduous woods dominated by elm, basswood, and ash. The hardwood forests near the river are seasonally flooded, accessible only by canoe or kayak. The area harbors a diversity of birdlife, including the cerulean warbler and the northern waterthrush.

How to get there: Within the Northern Unit of the Kettle Moraine State Forest. From the intersection of Highways 67 and G in Dundee, go 2.9 miles south on G, then east 0.4 miles on the Forest Headquarters access road to a parking area. Get a trail map at the headquarters building. The heart of the area is best seen via water, accessed at the Mauthe Lake landing. Visit www.dnr.wi.gov/org/land/sna/sna93 for a map and more information. Wisconsin Atlas page 46, grid C4.



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