



Wisconsin natural resources. Vol. 13, No. 2

April 1989

Madison, Wisconsin: Wisconsin Department of Natural Resources,
April 1989

<https://digital.library.wisc.edu/1711.dl/WDI475V4RNI5J9D>

<http://rightsstatements.org/vocab/InC/1.0>

The libraries provide public access to a wide range of material, including online exhibits, digitized collections, archival finding aids, our catalog, online articles, and a growing range of materials in many media.

When possible, we provide rights information in catalog records, finding aids, and other metadata that accompanies collections or items. However, it is always the user's obligation to evaluate copyright and rights issues in light of their own use.

SPECIAL SECTION: A matter of chance, A matter of choice

WISCONSIN

NATURAL RESOURCES

April 1989

\$3.00 Volume 13, Number 2



Against all odds
Hot spots in cool waters
Plunge into water gardening

Secrets of the fencerow

Anita Carpenter

Narrow strips of trees, shrubs, fieldstones, and tangled vegetation border many Wisconsin fields. These fencerows are home and refuge to numerous animals and plants. In the springtime softness of a warm April day, slip on rubber boots and walk along one of these fencerows. Discover its residents and visitors before new leaves obscure the secrets.

You may find a bulky stick nest hidden within the thorn-covered branches of a hawthorn where, last year, brown thrashers raised four young. Perhaps you will flush a ring-necked pheasant, be scolded by an impish chipmunk or serenaded by an eastern bluebird. You may see a late-departing northern shrike on its treetop perch surveying barren fields for its next meal. You may not see the cottontail rabbits that call the fencerow home, but gnawed stems of wild roses and ubiquitous droppings are telltale signs they were here. With a burst of purple, violets poke

Anita Carpenter shares nature observations from Oshkosh. She is a pharmacist, trained biologist and a nature columnist.

through the brown leaf cover. Bittersweet entwines young saplings and piles of fieldstone. In the coming months, it will produce orange fruits relished by residents and visitors to the fencerow. The musky scent of red fox floats on gentle breezes. Is there a vixen nearby nursing newborn pups?

Perhaps you will chance upon several small birds that are searching for seeds by vigorously hopping and scratching the ground with both feet. A proud, upright posture and puffy, broad black and white stripes on their heads quickly identify them as white-crowned sparrows, *Zonotrichia leucophrys*. They're often seen in small flocks. The six- to seven-inch sparrow has a steel-gray unstreaked breast and face, white throat and belly, and the typical sparrow-brown back and wings, highlighted by two white wingbars. The sexes look alike.

White-crowned sparrows visit fencerows during migration. We are



most likely to see them from late April into May. They do not nest in Wisconsin but are northbound for the brushy, stunted-tree habitat of the subarctic. The female builds a small, cup-shaped nest on the ground or in a small shrub. She'll likely raise only one clutch of three to five young during the short northern summer. The sparrows reappear in Wisconsin during October en route to their winter destination in warm southern states.

You won't find the secretive white-crowned sparrows along every fencerow, but don't be disappointed. Take another walk in the glorious springtime warmth. Witness the re-birth of spring as you discover the secrets of the fencerow. ■



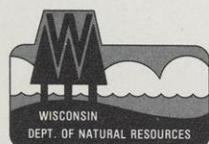
Illustrations by Jim McEvoy

WISCONSIN NATURAL RESOURCES

April 1989

Volume 13, Number 2

PUBL-IE-012
ISSN -0736-2277



Editor—
David L. Sperling
Associate Editor—
Maureen Mecozzi
Business Manager—
Laurel Fisher Steffes
Circulation & Production—
Joan C. Kesterson
Art Direction—
Christine Linder,
Moonlit Ink
Typesetting—
WISCOMP, Department of
Administration
Printing—
Straus Printing Company

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

© Copyright 1989, *Wisconsin Natural Resources* magazine, Wisconsin Department of Natural Resources, P.O. Box 7921, Madison, WI 53707.

Contributions are welcomed, but the Wisconsin Department of Natural Resources assumes no responsibility for loss or damage to unsolicited manuscripts or illustrative material. Viewpoints of authors do not necessarily represent the opinion or policies of the Natural Resources Board or the Department of Natural Resources.

Natural Resources Board

Thomas D. Lawin, Bloomer—Chair
Stanton P. Helland, Wisconsin Dells—Vice-Chair
Donald C. O'Melia, Rhineland—Secretary
Richard A. Hemp, Mosinee
Helen M. Jacobs, Shorewood
Will Lee, Wisconsin Rapids
Collins H. Ferris, Madison
Wisconsin Department of Natural Resources
Carroll D. Besadny—Secretary
Bruce Braun—Deputy Secretary
Linda Bochart—Executive Assistant

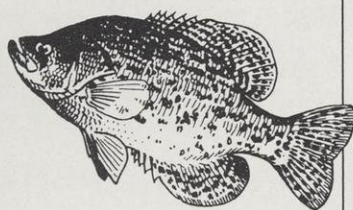


DNR Photo

4 BLOWN DOWN BUT NOT BEATEN

David D. Klug

How the Flambeau River State Forest is recovering from the windstorm of the century.



11 HOT SPOTS IN COOL WATERS

Fisheries experts tell what's hot and what's not for the spring opener.

FRONT COVER: Dutchman's Breeches (*Dicentra cucullaria*). Photo by Barbara Peterman.

BACK COVER: Brown-throated three-toed sloth (*Bradypus variegatus*) photographed in the La Tirimbina rain forest, Province of Heredia, Costa Rica. Photo by Nathan Kraucunas, Milwaukee Public Museum. See our story p. 24.



Nathan Kraucunas

24 TROUBLE BEYOND OUR BORDERS

Craig Thompson

The loss of tropical forests harms migrating birds and incalculable resources.



Tim Sweet



Beth Kaminsky

32 AGAINST ALL ODDS

James J. Kempinger

Sturgeon face a rocky road in their first month.

FEATURES

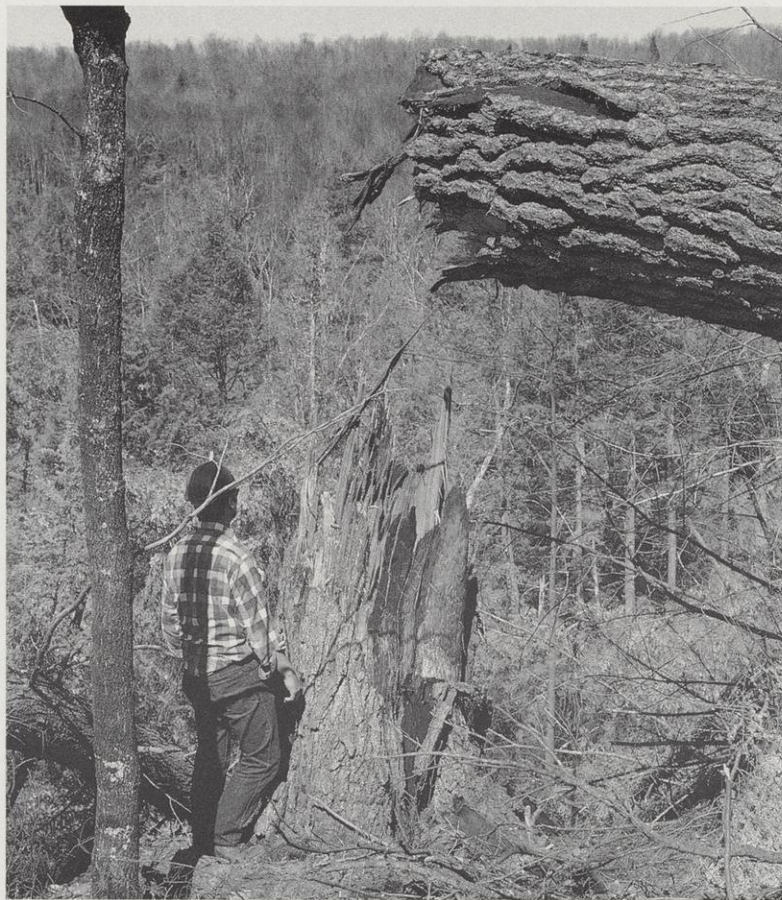
Wisconsin Traveler 6

Readers Write 31

Special Section center
A MATTER OF
CHANCE, A MATTER
OF CHOICE: Living
with environmental risk in
Wisconsin.

19
PLUNGE INTO
WATER GARDENING
Timothy Sweet
These small, colorful ponds can spruce up your backyard.

BLOWN DOWN



July 4, 1977. Massive trees were snapped in half.

but not beaten

Twelve years after mighty winds blew down tall timber, a DNR forester shares lessons from the tree-torn trenches.

David D. Klug

It was more than a holiday. In 1977, the Fourth of July redirected the future of the Flambeau River State Forest in Sawyer County. A "downburst" created by severe thunderstorms whipped winds of up to 150 miles per hour that bullied and battered a path stretching from

Grantsburg to Rhinelander. The Flambeau forest was squarely in the middle, helpless as the meteorological freight train hit.

When the winds subsided, 18,000 acres of commercial timberland in the center of the forest lay flattened; another 20,000 acres were damaged, wooden witnesses to a major catastrophe. Hardest hit was the Big Block — 1,600 acres of old-growth, virgin timber. Trees that survived the hey-

day of logging and stump agriculture in northern Wisconsin were now a jumble of giant jackstraws.

Since that day 12 years ago, the Flambeau forest has been the scene of a massive salvage, planting, seeding and recovery operation. What have we learned from reflecting on such wholesale devastation and reclamation?

First things first. Immediately after the storm, the main concern was

David D. Klug is DNR's assistant superintendent of the Flambeau River State Forest.

human safety. After all, this was the Independence Day holiday — the cabins and campgrounds were full and canoeists were enjoying the river. Miraculously, only one person was killed by the storm — a camper in the Connors Lake Campground. Once the roads were opened, roofs repaired and people accounted for, thoughts turned to the damaged forest.

Aerial inspection revealed the magnitude of the storm damage. Few trees survived where the windstorm was strongest. Amazingly, trees that grew in even slight depressions survived where others were leveled. Tree damage gradually lessened towards the fringes of the 10-mile-wide storm path.

The wind picked on the weak and the mighty. Aspen is especially susceptible to wind damage and in some mixed stands where the winds had been lighter, only aspen were knocked down. The old-growth giants, tall timber with towering overgrown tops and relatively undersized root systems, were more easily toppled. The Big Block was especially hard hit. It was a sickening sight to see acre upon acre of downed, massive trees where only a few sentinel white pines remained standing, witnesses to the devastation.

Let the salvage begin

Within days of the storm, loggers inquired about salvaging downed wood. We believed the old-growth timber would degrade rapidly and valuable veneer and select logs would be lost to stain, rot and insects if we didn't act quickly.

We concentrated on areas holding large volumes of prime timber. We needed help, and DNR foresters and technicians were brought together from around the state. In about a month, more than 2,700 acres of sales were set up for bidding by logging contractors. During the course of two years, more than 100 tracts of timber on 10,000 acres were sold. Fortunately, markets at the time for most forest products were strong. Salvage sales eventually tapered off and for-

estry practices returned to a less frenzied pace. In total, more than 20 million board feet of saw logs and 120,000 cords of pulpwood were salvaged, yielding more than \$1.3 million for state taxpayers. Almost 70 percent of the area was salvaged and 90 percent of the estimated timber value was recovered.

We moved with a sense of urgency, but actually, the hardwood saw logs kept their quality and value longer than many had predicted. Six years after the storm, some lower grades of saw logs were still being harvested.

Fortunately, few pine plantations were damaged. These were salvaged quickly before pine insect problems could develop.

By contrast, the aspen stands degraded very quickly. By May 1979, less than two years after the storm, blown down aspen was no longer usable at most mills.

Salvaging timber that is blown down is a tricky, dangerous job. Trees were downed, bent and flexed unnaturally by the forceful wind. Once

severed from the stump, cut trees often sprang and rolled in unpredictable ways, making the chain saw operator's job even more hazardous. One serious logging accident claimed a victim.

The "blow" attracted logging contractors from all over Wisconsin and the Upper Peninsula. While most sales went smoothly, a few operators only cut the best timber and left lots of usable trees to rot. Cutting rights to many of these stands were resold and penalties assessed for uncut and unutilized wood.

Planning and planting the future

As salvage operations were underway, foresters contemplated how quickly the land might recover. Foresters are an optimistic bunch, but it was hard even for us to envision these bare patches of ground as thriving hardwood forests again.

History predicted that this recovery is exactly what would happen.

Salvaging aspen, 1982. Brutal winds twisted timbers in unnatural directions. Sawyers cautiously and skillfully cut tangled trees that sprung dangerously when severed from the stump. Across the Northwoods more than 840,000 acres of timberlands were damaged.



DNR Photo

The even-aged hardwood forests we manage today are the direct result of cut, slash and burn logging during the early 1900s. Section upon section of forests were laid flat by the axe, presumably to be followed by the plow. Where that didn't happen, land was left to recover on its own, sometimes taking 20 or 30 years to reestablish trees. On the Flambeau, we didn't want to wait that long and we wanted a bigger hand in determining what kinds of trees resettled the wastelands.

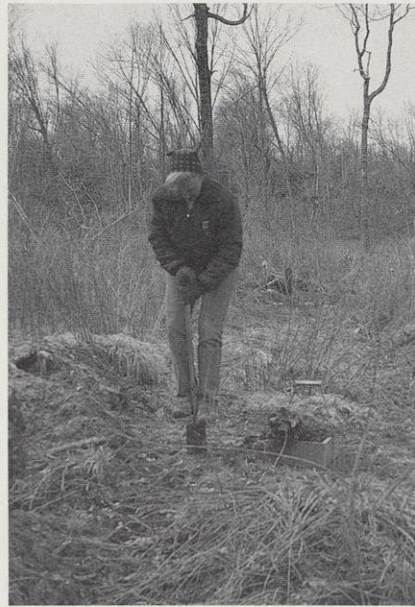
Plans sprung up while the salvage work continued. The rich, fertile silt loam soils nestled between the Flambeau River's north and south forks would grow quality hardwoods again!

During December 1979, we tried broadcasting native hardwood seeds in six locations by helicopter. It didn't work. The unprotected sites were just too exposed for the seeds to germinate and grow. We had to try other planting schemes quickly. Though the land lay bare, it was not barren. A thick jungle of raspberries and elderberries shot up after the loggers finished salvage work.

But this open brushy landscape was deceiving. Ground surveys revealed that tree seedlings established before the storm were doing quite nicely. Those hardwood stands that had been previously thinned and managed had exceptional regeneration and needed no help from us. Now, 12 years later, these seedlings and saplings are turning brushlands into forests once again.

It was a different story on the forest floor under the old growth stands like the Big Block. Few natural seedlings survive under dense, dark canopies. Where the windstorm obliterated that protective canopy, the ground was too hot and dry for seedlings to grow naturally. These areas were prime candidates for planting. However, many were located in designated wilderness zones, an important concept which, in this case, meant the areas would be left to recover naturally.

The largest area outside of these



DNR Photo

Spring planting in the "Big Block," 1983. Hole by back-breaking hole, foresters used planting spuds to punch through heavy soils to scoop out a home for young hardwood seedlings.

protected zones affected by the "blow" was about 500 acres of the Big Block east of Highway M in Sawyer County. During the past 12 years, we've scraped eight-foot swaths of this country for planting. Each scraped swath is buffered by 16-foot-wide strips that were left untouched to allow some natural regeneration and provide some shelter for the newly planted trees. In scraped areas, we planted about 500 hardwood trees per acre.

Red oak thrived under this strategy; sugar maple, white ash and hybrid aspen also did well. We hope these planted additions will help shape the character of the future stand, but it's too early to tell.

We also planted isolated stands of former old growth stands with conifers that are relatively uncommon in the Flambeau — about 350 acres were planted with red pine, white pine, white spruce, tamarack and European larch. Only a few sites still remain to be planted.

Chainsaw crews exposed 1,700 acres of new aspen shoots to full sunlight by cutting damaged, overtopping trees. Similarly, 1,200 acres of partially damaged young hardwood trees were thinned, saving undam-

aged trees and stimulating new seedlings and sprouts.

What lessons did we learn?

We learned that aspen is a real opportunist. This pioneer species regenerates quite well when blown over but requires full sunlight to thrive. Aspen has also reclaimed many hardwood sites by seeding into the bare patches of soil created by root-tipped trees, summer logging operations and our own deliberate activities to prepare sites. These actions have expanded aspen acreage at least 10 to 15 percent in windblown areas.

The key to how well hardwood stands will recover after a blowdown lies in establishing a large number of well-rooted seedlings on the forest floor before the sheltering canopy is destroyed. This basic forestry principle applies whether that canopy is removed by nature or by people. The windstorm was a poignant reminder that poor logging practices without regard for forest management can produce the same type of disaster as nature.

Historically, downbursts are recurring weather threats in northern Wisconsin. Windstorms as strong as the 1977 one are rare. However, in the 60-year history of the Flambeau River State Forest, four other destructive storms were recorded. Together, these storms damaged 12 million board feet of sawtimber. Certainly, more downbursts large enough to cause significant damage will occur in Wisconsin within our lifetime.

The scars of the 1977 windstorm have healed surprisingly fast. Twelve years may seem like a long time, but it's a mere blink of an eye to the living forest. Left to its own resources, the forest recovers and continues. These soils have a tremendous capacity to recover if we have the patience to let them do so. Patience and planning continue to be our biggest allies. ■



APRIL 1989

INSIDE

A two-wheeled Wisconsin adventure

History re-seeds itself

New highway inspires poetry!

VOLUME 1 NO. 1

WISCONSIN'S FORGOTTEN CITIES



Dawn Manor, the sole survivor of a Wisconsin River ghost town.

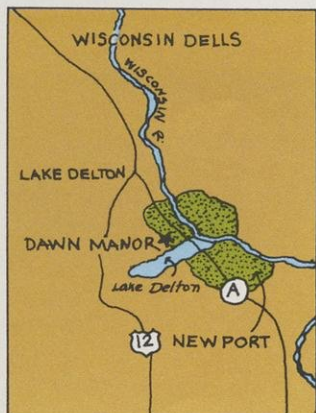
H.H. Bennett Studio, Wisconsin Dells

Site unseen

Think of traveling, and you'll likely have an image of going somewhere to see something — the scenery, a museum, a recreation spot. But the greatest pleasure of touring often comes from what cannot be seen, or rather, knowing what was once there that is no more.

County Highway A, a road off State Highway 12 in Sauk County that winds along the western bank of the Wisconsin River about four miles south of Wisconsin Dells, will take you through one of these invisible tourist attractions. There's a story of greed, power, reputations ruined and made, and a whole community literally sold up the river along the shoulders of that highway.

Ready for the tour?



Our story begins in 1850 with an enterprising Ohioan named Joseph Bailey. His eye on the future, young Joe headed west to the new state of Wisconsin and claimed 160 acres along the east bank of the Wisconsin River in the far northwestern corner of Columbia County, just across the river from Dell Creek.

Mr. Bailey had hopes of being hailed as the founding father of a thriving cen-

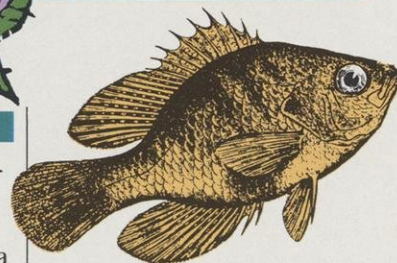
ter of commerce and transportation. The site he had chosen was in a direct line between Milwaukee and La Crosse, so Joe had every reason to believe that as the new railroad crossing the state reached northwestern Columbia County, it would span the Wisconsin River at his front door.

Joe had vision, but he lacked cash. To make his dream a reality, in 1851 he sought the friendship and finances of Jonathan Bowman, a lawyer who left behind the relative civility of New York state for wild Wisconsin. The duo bought the land and built a warehouse on the east side of the river. Meanwhile, four other investors recognized the value of the site and bought property on the west bank.

A year later, the Legislature authorized construction of a bridge to link the two sites for commerce and travel. The proprietors of the prospective villages lost no time in contacting one Byron Kilbourn, president of the new La Crosse & Milwaukee Railroad and mayor of Milwaukee, to ensure that the rail line would use the bridge. Kilbourn assured them that it would. The gentlemen also received authorization to build a dam for water power uses on the river in 1853.

The time was right. Bai-

Continued on page 2

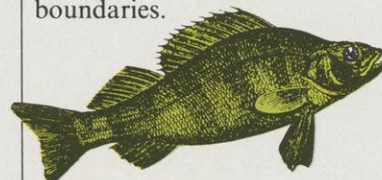


Cheap thrills!

If the best things in life are free, then Wisconsin is the place to be on Sunday, June 4th.

It's Free Fishing Day — your invitation to wet a line and land a lunker (or at the very least, a bluegill) in any of Wisconsin's lakes, rivers, streams or border waters without purchasing a fishing license.

Fishing is a sport everyone can enjoy, no matter what age or physical condition. All it takes is water, some inexpensive gear and a little luck. And speaking of luck, Free Fishing Day coincides with Wisconsin's State Parks Open House — which means you don't have to pay an entrance fee or have a park sticker to ply the waters within park boundaries.



You say you can't even tie your shoes, let alone knot a line? And the kids are threatening mutiny on the next vacation if you won't take them fishing?

Continued on page 4



A Lower Dells rock formation known as Sugar Bowl was a sweet sight to the denizens of Newport. H.H. Bennett Studio, Wisconsin Dells

Continued from page 1

ley and Bowman platted the land on both sides of the river and dubbed the new village "Newport." Lots in the boomtown sold for the exorbitant price of \$1,000 or more; the population increased rapidly, nearing 2,000 by the summer of 1855. Newportians could boast of three hotels, 13 stores, a hexagonal house and The Mary Lyon Female Seminary, a girl's school modeled after Mt. Holyoke College in Massachusetts.

Neither dam nor rail bridge had yet been built, however. As an inducement to secure the railroad crossing at Newport, Bailey and Bowman transferred some of the property they owned near Newport to Byron Kilbourn. The charter to the dam was signed over to the Wisconsin River Hydraulic Company, of which Mr. Kilbourn owned a major share.

When word got out that additional land was being platted for Newport, the real estate market boomed. Lots changed hands at alarming rates; property owners were able to double

their profits overnight.

Byron Kilbourn found this amateur wheeling and dealing most amusing. In spite of his promises, he had no intention of laying track through the town or of buying land at inflated prices to build the dam. Kilbourn had secretly purchased land several miles north of Newport on the east bank, where he intended to have the railroad and dam cross the river. He went so far as to have men survey the area at night.

The citizens of Newport panicked when they heard the story of Kilbourn's midnight survey. Anyone who owned land in Newport wanted to sell it, and sell it fast; buyers, unfortunately, were scarce. Property values plummeted, and in the spring of 1857, when the railroad was completed through the new village of Kilbourn City to the north, lots that had once sold in Newport for \$1,000 were going for \$100 or less.

Within months, many of Newport's buildings were moved to Kilbourn City. The population of the village dwindled. In April


1868, the Newport post office was closed, and lots in the deserted village were dropped from the tax rolls. Newport was no more.

And the fortunes of Kilbourn City? The village named for the mayor of Milwaukee (who later was ruined in a scandal over bribes paid for favorable railroad grants) grew steadily and became an important shipping and supply point for the logging industry. Kilbourn City also had discovered the value of its crowning jewel — the lovely dalles (French for precipices) forming the sides of the Wisconsin River gorge.

The beauty of the site drew summer visitors from far and near, and Kilbourn City soon found that tourism, not logging, held the key to prosperity. In 1931, city administrators hoping to increase the tourist trade decided "Kilbourn City" did not do justice to the spectacular scenery of the area. They changed the town's name to Wisconsin Dells . . . and the rest is history.

As you drive along County Highway A, glance over toward the river and look for Sugar Bowl, Ink Stand and Lone Rock, three outstanding rock formations near the site of Newport. On "A" one mile east of Lake Delton you'll find Dawn Manor, a palatial stone mansion built in 1855 by Captain Abraham Vanderpoel. It's the sole survivor of the boomtown.

Ultimately, river rivals Newport and Kilbourn City met the same fate. They were both wiped off the map and swept into the rich history of Wisconsin.

 Wisconsin Dells Visitors & Convention Bureau, (608) 254-8088; outside Wisconsin, 1-800-22-DELLS.

BIKE




GRABAAWR!

If you can say it, you can do it — the Great Annual Bicycle Adventure Along the Wisconsin River! The 500-mile statewide bike tour begins July 1st at the river's headwaters in Lac Vieux Desert near Land o'Lakes and ends July 8th where the Wisconsin meets the Mississippi at Prairie du Chien.

Scenery and camaraderie have made GRABAAWR a must for two-wheeled travelers from Wisconsin, the U.S. and countries all over the world. Last year, 500 people pedaled from the Northwoods down through the driftless area of southwestern Wisconsin, stopping for the night to enjoy the hospitality of Land o' Lakes, Lac du Flambeau, Rhinelander, Wausau, Port Edwards, Portage and Spring Green.

If 500 miles seems a little, uh ... excessive, don't fret: You can sign up to ride for one or just a few days of the trip. A "sag service" is provided to handle road emergencies and haul gear from stop to stop so cyclists can ride unencumbered by extra weight. The cost for the entire tour: \$105, which includes transportation by bus from Prairie du Chien (where you'll leave your car) to Land o'Lakes for the start of the tour.

 GRABAAWR, Suite 310, 16 N. Carroll St., Madison WI 53703, or call Bill Hauda at (608) 256-2686.



Growing up in Wisconsin

Residents of the northern latitudes have always held a special place in their hearts for spring.

Back in Wisconsin's territorial days, settlers experienced the joy of spring by tending gardens and fields. Grains and vegetables provided sustenance for the



body; flowers were inspiration for the soul.

Travelers seeking a spring tonic should add Mineral Point to their itineraries. The southwestern Wisconsin town is home to

Pendarvis, a group of restored limestone and log cottages built in the 1830s and '40s by Cornish miners who settled in the area to dig "mineral" (galena, or lead ore). The cottages, nestled into a green, wooded hillside, are surrounded by lovely stone-rimmed wildflower gardens blooming with spring ephemerals — bloodroot, bluebells, ladyslippers and dutchman's breeches valued for their brief but spectacular appearance.

Guided tours of Pendarvis' refreshing gardens will be held at 10 a.m., 1 p.m. and 3 p.m. on May 13, 14, 20 and 21; tours of the building interiors are offered daily from 9 a.m. to 5 p.m. May 1 through October 31. \$4 adults, \$1.50 children, \$10 family. (608) 987-2122.

Spring wasn't all hearts and flowers. It also brought



State Historical Society

The conflict that threatened to tear the country asunder and its effect on the people of Wisconsin is recalled with drills, inspections and a look at life on the Union side at the Civil War Encampment, May 20-21 at Old World Wisconsin, on Highway 67 in Eagle. \$6 adults, \$2.50 children, \$17 family. (414) 594-2116.

The gardens of Pendarvis in bloom.

State Historical Society



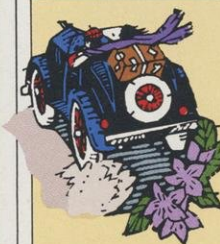
hard, physically demanding work. Those who labor in gardens for pleasure can empathize with Sylvanus Wade, the original proprietor of the Wade House, a 135-year-old Greek Revival inn.

Innkeeper Wade stocked the pantry and root cellar with home-grown produce to feed hungry travelers at the inn located on the plank road between Fond du Lac and Sheboygan. Growing enough goodies to satisfy the substantial appetites of a century ago kept Sylvanus and his family busy — very busy.

Modern-day visitors to the inn can witness the tilling of gardens and fields by

horse-drawn plows and watch as corn, pumpkins and other garden vegetables are hand-planted at Old Wade House on May 27-29. Travelers who work up a powerful thirst from all the spectatin' can refresh themselves in the tap room of the inn. (Be sure to toast Sylvanus Wade's aching back.) The Wesley W. Jung Carriage Museum and a blacksmith shop share the site.

Old Wade House in Greenbush, west of Plymouth on Highway 23, is open from 9 a.m. to 5 p.m. daily May 1-October 31. \$4 adults, \$1.50 children, \$10 family. (414) 526-3271.



Need more information?

Travel questions: 1-800-372-2737

Travel publications: 1-800-432-TRIP

Road conditions: 1-800-ROADWIS

Outdoor recreation: (608) 266-2277

Historical Society sites: (608) 262-9606



A capital idea

Used to be, the main view for drivers approaching Madison from the south and east was white knuckles and taillights spanning four lanes.

Today, visitors and Madisonians alike can enjoy the sight of red-winged blackbirds perched on cattails, mallards proudly escorting ducklings toward open water, and the occasional muskrat on its daily routine as motorists enter the city on the new South Beltline.

The four-mile, six-lane freeway sweeps from Interstate 90 to John Nolen Drive west of South Towne Mall, accommodating shopping and commuter traffic demands with ease.

**ROAD
CONSTRUCTION
NEXT 5 MILES**

The old beltline's mile-long backups are fast becoming a distant memory.

The new highway didn't come easily. Years of intense public debate pre-

ceded its construction. At issue was the protection of the Upper Mud Lake Marsh, a valuable wetland in the middle of the proposed route.



The solution: Elevate the highway over the main channel of the marsh and use sand dredged from the shallow lake for the approach ramps and junctions. Dredging improved fish habitat in the lake and eliminated the need to bring in fill from another location. Marshes filled in during earlier, less environmentally-sensitive times were re-created to replace wetlands taken for the road.

It will take one more summer of construction to complete the entire beltline project, but for motorists who have waited so long for relief, those few months will fly by like hours. One Madison newspaper columnist, frustrated with years of waiting for the road, rhapsodized about the new highway as "poetry in transportation, laughter in concrete, joy in all three lanes in each direction, with nary a stoplight to spoil the fun."

Travelers heading to Madison no doubt will agree.

 Department of Transportation, (608) 266-3581.

**END
CONSTRUCTION**

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

©Copyright 1989, Wisconsin Traveler, Wisconsin Natural Resources magazine, Wisconsin Department of Natural Resources. Requests to reprint or republish portions of Traveler must be approved by the editor. Address correspondence to: Maureen Mecozzi, Traveler Editor, Wisconsin Natural Resources, P.O. Box 7921, Madison, WI 53707.



Age is no barrier to the fun of fishing.

DNR Photo

Continued from page 1

Relax! Free Fishing Day was created especially for you. Hands-on instruction sessions, equipment demonstrations and kid's fishing clinics will be held around the state by Department of Natural Resources fish managers, state parks staff and local conservation groups to teach the basics of fishing to anyone who wants an introduction to the pleasures of this lifelong sport. Once you try it, you'll be hooked!


Sunday, June 4th: Free Fishing Day and free entry into all of Wisconsin's state parks during the Parks Open House. It doesn't get any better — or cheaper — than this.

Here's a sampling of sites where Free Fishing Day beginner's clinics will be held; more locations will

be added as the day nears:

Browntown-Cadiz Springs Recreation Area/Monroe
Bong Recreation Area/
Kansasville
Devil's Lake State Park/
Baraboo
Governor Dodge State Park/
Dodgeville
Governor Nelson State Park/
Madison
Hartman Creek State Park/
Waupaca
Lake Kegonsa State Park/
Stoughton
Peninsula State Park/Fish
Creek
Wyalusing State Park/Bagley
Yellowstone Lake State Park/
Blanchardville

If you'd like to see how fish are raised for stocking, stop in at the Lake Mills Fish Hatchery open house for a special Free Fishing Day tour.

 Theresa Stabo at the DNR, (608) 266-2272.

Call for road and weather conditions

With a bit of advance planning, neither detours, nor closures, nor hazardous road conditions will keep you from your appointed rounds in Wisconsin. In the Milwaukee area, call (414) 785-7140. In Madison, the number is (608) 246-7580. In other areas of the state, and in neighboring states, call 1-800-ROADWIS.

It's true: You can't do anything about the weather . . . except call ahead to check on it. The National Weather Service has the details. For Green Bay and vicinity, call (414) 494-2363; La Crosse, (608) 784-1930; Madison, (608) 249-6645; and Milwaukee, (414) 744-8000.

Hot spots in cool waters

Where will the fish be biting in 1989?
Here's our best guess.



These are the times that try anglers' tortured souls. The only safe ice is floating in your cola. You've cleaned and oiled your tip-ups, wound them with fresh line and carefully stored them. Likewise, your auger is razor-sharp and hanging in the garage. Your boat is still in storage. You sunk your Christmas money into a new depth finder, but you're tired of taking soundings in the kids' aquarium and the tub. You even slip a bar

of soap in the water to see if it registers as a "fish" while the suds are sucked down the drain. You've cleaned the broken bobbers, rusty splitshot and half-eaten bologna sandwiches out of your tackle box. Dog-eared fishing catalogs are propped under a wobbly table leg in the den. They're running a repeat of Babe Winkelman's fall outing to some southern reservoir and you're going to kick in the set if he casually releases

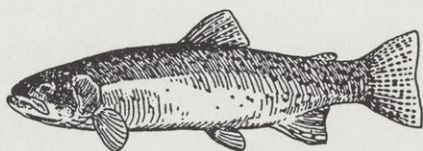
another five-pound bucketmouth. Your spouse is yelling because the dog scratched his way into your fly-tying supplies and is tossing up a nasty mix of bucktail, red and yellow feathers on the living room rug.

You got the blues, Bunky? There, there now, sit down and we'll tell you a little secret. We've got the itch to wet a line, too. We've got it so bad that magazine staff contacted managers from Bristol to Bayfield and back

again to find out where the fish may be biting this year.

Yes, Virginia, there is a spring. It will soon be May and the fishing holes will gurgle with excitement. Before you know it, you'll be floating on the water swappin' lies and swat-tin' flies. Here's where the fisheries crews think you should head.

We'll start our tour in western Wisconsin and amble clockwise around the state.



Trout fishing near La Crosse

The La Crosse region has some of the finest trout fishing in the state. The Department of Natural Resources manages a lot of public fishing areas in La Crosse, Vernon, Monroe and Crawford counties, and we can point out specific spots to anglers who stop in at our La Crosse office at 3550 Mormon Coulee Road.

Some anglers enjoyed the early trout season which opened in Crawford County and elsewhere in southern Wisconsin on January 1. Throughout the western region of Wisconsin, trout fishing is hottest in May and early June. It's kind of a mad house on opening day in La Crosse, Vernon and Monroe counties because so many anglers are anxious to fish, but the fishing pressure is generally low after the opener. If you're fishing on a sunny, clear day, fish really early in the morning or later in the evening. On overcast days, you can catch them all day.

There's no way around it, down here you have to wear hipboots or waders to enjoy trout fishing. We've done a lot of work on these streams and you have to keep crossing the stream to enjoy the fishing.

These are equal-opportunity streams — fun for worm dunkers, artificial spinner anglers and fly fishers. The worm dunkers have the best luck



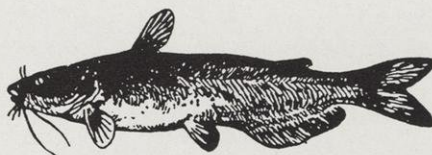
James G. Talley

This big channel catfish was prowling the Black River near Black River Falls when fisheries crews took an early summer census.

using a single hooked crawler weighted with a small split shot. Let the current slowly bounce the worm under the bank cover and hang on. Small spinner baits are equally effective — size #0 and #1 french spinners and small 1/8 oz. bladed spinners will produce fish if you work them slowly during the early season.

If you are fishing with live bait and hook an undersized fish, clip the leader at the fish's mouth and release it. Imbedded hooks dissolve in a very short time. We've found that up to 75 percent of even deeply-hooked fish will survive if handled this way. By contrast, forcibly removing hooks always kills the fish.

— Dave Vetrano, assistant area fisheries manager, La Crosse



Mississippi River near La Crosse

The River is a great place for spring angling and, since the season is open year-round here for most species, you can get a head start if you

just can't wait for the May opener. Fishing quality is dependent on flow and weather, which can change rapidly. So don't give up if you have a bad day. Tomorrow, they could be biting every bait on the water.

Most anglers on the river are after panfish, bass, northerns, walleye, sauger and, once the water warms up, catfish. Fish for panfish, largemouth bass and northerns on the backwaters. A late April trip will give you a shot at post-spawn northerns and pre-spawn bass. Hit the channels and side channels with swifter water for walleye, sauger, smallmouth bass and catfish.

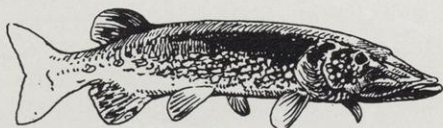
The spring walleye fishing at dams and wing dams draws anglers from throughout the Midwest who hope to snake a 10-pound lunker walleye out of these waters.

If you'd rather lay back and enjoy a quiet day, give the bluegills and crappies a try on a slower backwater cove.

The cats are on the prowl as the waters warm up in early May. They are darn hungry after a winter fast. Most likely, you'll catch channel catfish, but there's always a chance you could latch into a trophy flathead cat that will topple the scales at better than 50 pounds!

Whether you're a tournament angler or taking your family out for a spin, give the Mississippi River a try. You never know. A real surprise could be tugging on the line. And remember, if you have a very good day, release some of your fish so you can hook into them bigger and better than ever next spring.

— Willis Fernholz, supervisor, and Kenneth Von Ruden, fisheries technician with the Mississippi River work unit, La Crosse



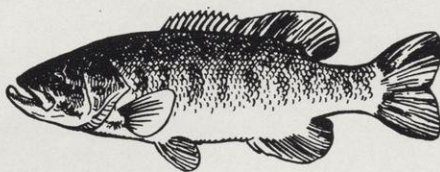
Along the Black River

Brook trout and brown trout provide hot action on the icy headwaters of the Buffalo River from Jackson County downstream to Strum in Trempealeau County, on the Trempealeau River and its tributaries near Hixton, and on Beaver Creek upstream from Galesville. The Buffalo and Trempealeau rivers are peppered with public fishing grounds.

We've done a lot of work improving the Trempealeau lakes area near the Village of Trempealeau. Fishing access is easy on resurfaced roads leading to 164 acres that provide parking, three boat ramps, toilet facilities and shore fishing. This region produces excellent catches of panfish, northern pike and largemouth bass.

Want to combine a canoeing, camping and fishing trip? I highly recommend the Black River near Black River Falls. About 125 miles of the river wind through the area. The best canoeing is along the 56 miles downstream from Black River Falls to the Mississippi. The river produces channel cats, flatheads, musky, walleye, northerns and smallmouth bass. The shores are scattered with scenic rock outcroppings and fine sand beaches.

— James G. Talley, area fisheries manager, Black River Falls



Exploring the St. Croix border rivers

Want an exciting opener? Start your fishing season on the delightful, lightly-fished waters of the Chipewewa, Red Cedar and St. Croix rivers. Whether you're searching for wilderness shorelines, wide rivers or deeper lakes, this region has it.

The lower St. Croix River and Lake St. Croix form the Minnesota-Wisconsin border from St. Croix Falls to the confluence of the Mississippi River at Prescott. A wild, rocky 52-mile corridor is protected as a National Scenic Riverway. These waters are home to walleye, sauger, smallmouth bass, northern and panfish as well as trophy flathead catfish and lake sturgeon. Fish habitat offers tremendous variety, from deep channels to river mouths, slow backwaters, steep shores, submerged reefs, sand bars and marsh flats. Motor trolling is allowed on the boundary waters, so consider cruising the 10-foot contours for bass and walleye.

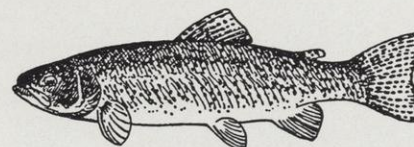
Boat launches are available in Prescott and Hudson in Wisconsin, Bay-

port and Stillwater in Minnesota as well as in smaller border towns. Use at least 14-foot boats on the river and deep-V hulled boats on Lake St. Croix.

On warm, spring days, try shallow bays, backwaters and river mouths of other regional waters—the Kinnickinnic, Willow and Apple rivers. Fish are congregating here in search of minnows and shad.

Wisconsin fishing licenses entitle you to fish both sides of the river, but you must abide by Minnesota fishing rules on the western side of the river.

— Martin P. Engel, fisheries manager, Baldwin



A prize in Price County

Patterson Lake, a small, 70-acre lake nestled in northeastern Price County and surrounded by the beauty of Chequamegon National Forest, is becoming a first-rate choice for trout anglers. Rainbow, brook and brown trout have been stocked in this revitalized water since 1983. The trout are growing quickly, adding four to five inches each year. Anglers are enjoying tussling with 18-inch

A dandy stringer of trout from Beaver Creek upstream from Galesville in Trempealeau County, part of the northern trout zone. Trout anglers should note page 11 of this year's regulations for new bag limits on southern Wisconsin waters.

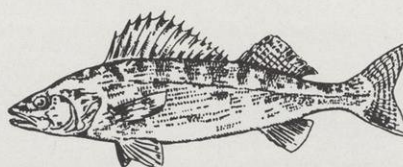
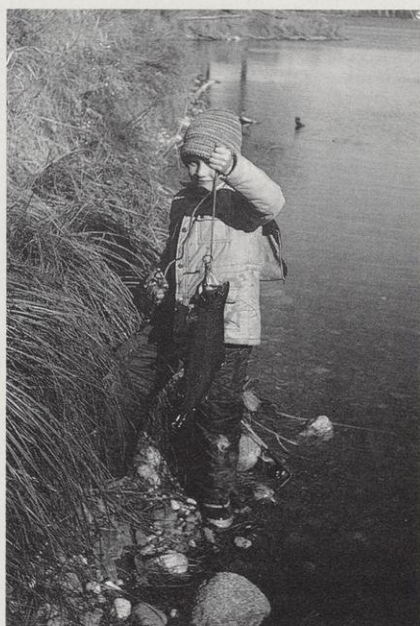


James G. Talley

rainbow and brook trout and beefy 22-inch brown trout. Popular open water baits include small spoons, spinners and nightcrawlers. To control populations of suckers and rough fish, minnows cannot be used for bait here.

The lake is also beautiful as nearly half the shoreline is managed by the national forest staff. Despite the rustic shoreline, a modern boat launch has been developed for easy access.

— Skip Sommerfeldt, fisheries biologist, Chequamegon National Forest



Bountiful waters near Woodruff

You can't say enough about angling opportunities in Forest, Oneida and Vilas counties. Walleye can be fished in 420 area lakes; muskellunge in 384. Most waters also produce northerns, bass and panfish.

During the early part of the fishing season, just after walleyes spawn, they will bite best in shallow lakes and reservoirs that warm up more quickly than big waters. By mid-May, the clear, deeper lakes should start producing walleyes. Musky season opens May 27, about the same time that anglers can expect the bass and panfish to start biting. Anglers concentrating on trophy walleyes and muskies should try fishing our large, deep lakes that have abundant cisco populations. Walleye and muskies grow big and brawny on a cisco diet. Try fishing late at night or row trolling to entice these big fish.

How many little tikes will get hooked by the chance to catch an 18-inch rainbow trout on Patterson Lake?

Generally, walleye and musky waters are concentrated in Oneida and Vilas counties; trout waters in Forest County.

Trout anglers can wet a line for brown, brook, rainbow and lake trout within the region on 29 lakes, numerous spring ponds and 386 streams. Stream trout fishing probably won't be up to par this year as last year's drought has lowered stream flows. In fact, the fish could use some help this year and we encourage stream trout anglers to limit their take and practice catch-and-release angling this year. You can still have a dandy day afield while hastening trout recovery.

Likewise, more and more musky anglers enjoy releasing fish as much as catching them. During the 1988 Vilas County Musky Marathon 1,849 muskies were caught and 76 percent of them were released to increase the chance of catching lunkers in future years.

— Lloyd "Duke" Andrews, area fisheries manager, Woodruff



Fishing the forests of Oconto and Florence counties

Try a spring fishing trip to the Lakewood area of the Nicolet National Forest in northern Oconto County, about 70 miles northeast of Green Bay. Many area lakes provide good walleye, bass, northern and panfish angling. The area has many public and private camping locations and private resorts offering a complete range from rustic walk-in camp sites to deluxe accommodations.

Looking for more of a wilderness experience? Stay on the road to Florence, about 40 miles further north. This forested area has relatively few roads and little traffic. Here's the spot for anglers who need more solitude to enjoy their trip.

— Tom Thuemler, area fish manager, Marinette

Size limits — What kinds of fishing would you rather have?

Each angler sets a standard of fishing quality. In England, anglers hold serious fishing contests to fish for minnows. Few Wisconsin anglers would enjoy that kind of fishing. Badger State anglers talk excitedly about fishing for bluegill, bass, trout and walleye. They talk about catching big fish and lots of them; of catching their limit.

Have you ever heard your buddy bragging about a limit catch of walleye only to discover that three of the fish were as small as good-sized perch? Perhaps if he'd thrown the small ones back he'd have another chance to catch them later when they were twice as big. After all, a 15-inch walleye weighs twice as much as a 12-incher.

That's the concept behind setting size limits on fish. The Department of Natural Resources proposes size limits on some fish in some waters to give people as many opportunities as possible to fish for quality catches.

Until the late 1950s, anglers couldn't keep small fish. Size limits were removed when research showed that egg production in gamefish was more than adequate to maintain fish populations. That was fine for the time. In the fifties, hook-and-line fishing techniques weren't effective enough to harvest too many gamefish.

The situation is quite different today. Anglers are outfitted with better equipment — hydrographic maps, fish finders, temperature sensors, trolling motors and a host of other specialized paraphernalia. Most anglers wouldn't even consider fishing without a boat equipped with an outboard

motor to quickly get to the best fishing spots. The changing nature of fishing concerns both anglers and professional fish managers who want to provide quality fishing experiences.

Placing size limits on gamefish appears to be the best method of improving fishing quality on waters fished so heavily that natural fish stocks are depleted.

At first glance, anglers often feel deprived when size limits are instated, but after a few years, these limits can really improve the angling experience. Fishers will catch many more fish. Many will be smaller than the size limit and will have to be thrown back, but the keepers will be so much heavier that the total poundage of fish anglers take home will be the same or greater than their catch before the size limits were established. That's not a pipe dream: it's already happening on some lakes where size limits were set on an experimental basis.

Size limits on bass and walleye can also benefit panfish anglers who fish the same waters where limits are set. As bass and walleye get bigger, they eat small panfish where populations are plentiful. The remaining panfish grow larger. Again, anglers catch more fish and take home fewer, but the ones they catch are bigger. Since much of the fun in fishing is catching fish, these proposals maintain an important part of the angling experience.

DNR fisheries managers and biologists carefully considered size regulations of smallmouth bass, largemouth bass and walleye. Their recommenda-


tions, reactions from the Warmwater Study Committee of the Conservation Congress and comments from other angling groups formed the basis for our current 14-inch minimum size limit on bass in southern Wisconsin counties and our 12-inch minimum limit for northern counties. See page 11 of the 1989 fish regulations for a map of the zones.

This spring, a proposed 15-inch minimum size limit for walleyes will be debated at the Spring Hearings held statewide at the end of April. The proposal also has the endorsement of the Conservation Congress study committee.

Size limits won't work everywhere and plans are being made to exempt these waters from any proposed size limits. Waters that have poor food supplies and are heavily fished won't grow big, brawny fish. In these waters, a protected slot size may rebuild populations. In a slot-size fishery all the fish below a certain size can be kept, and fish larger than a set size can be kept, so we are protecting middle-sized fish. This fishing system is being tested in several lakes, but we don't have enough research results to know if slot sizing will be an applicable tool on Wisconsin waters.

The issue of self-imposing size limits on fish comes down to a question of determining public standards for fishing quality. Would anglers rather take home small fish or have the fun of catching a lot more fish while taking home fewer but larger fish?

— John Klingbiel, warmwater lakes and regulations specialist.

Inches	1	2	3	4	5	6	7	8	9	10	11				
for fish, for fun,				Wisconsin's Record Fish											
<div>Wisconsin's Aquatic Resources Education program</div> <div></div> <div>for the future!</div>				Largemouth Bass 11 lbs. 3 oz.				White Crappie 4 lbs. 8 oz.				Chinook Salmon 43 lbs. 3 oz.			
				Smallmouth Bass 9 lbs. 11 oz.				Coho Salmon 24 lbs. 6 oz.				Brook Trout 9 lbs. 15 oz.			
				Bluegill 2 lbs. 6 oz.				Carp 57 lbs. 2 oz.				Brown Trout 32 lbs. 8 oz.			
				Catfish (Channel) 44 lbs. 0 oz.				Muskellunge 69 lbs. 11 oz.				Lake Trout 47 lbs. 0 oz.			
				Catfish (Flathead) 62 lbs. 2 oz.				Northern Pike 38 lbs. 0 oz.				Rainbow Trout 24 lbs. 4 oz.			
				Black Crappie 3 lbs. 6 oz.				Yellow Perch 3 lbs. 4 oz.				Walleye 18 lbs. 0 oz.			
For a full list of all freshwater angling records, write the Bureau of Fisheries Management, P.O. Box 7921, Madison, WI 53707.															

For a full list of all freshwater angling records, write the Bureau of Fisheries Management, P.O. Box 7921, Madison, WI 53707



A new Door County attraction

An angler casts a large bucktail in a weedy bay ending each retrieve with a sweeping figure-eight. It's a motion that musky fishers repeat hour upon hour in search of the black and green behemoth. It's a common sight in the Northwoods, but now, they're doing it in Green Bay off Door County!

Since 1976, the Department of Natural Resources with help from the Wisconsin Musky Alliance has released between 500 and 5,000 muskies every other year in Sawyer Harbor near Potawatomi State Park and on Little Sturgeon Bay. These 12- to 14-inch stocked muskies are growing quickly in the warm bay waters. Several 32-38 inchers were netted last spring in fish surveys around Sawyer Harbor.

Here's a fishing tip: Use the same musky methods you would in northern Wisconsin but pay close attention to the weedy beds in Sawyer Harbor and inside Little Sturgeon Bay. On a calm night, try quickly retrieving a bucktail right over the top of the heavy weeds or try a noisy surface lure. And, by the way, if the thrill for you is simply catching a musky, please release your fish so this young fishery will continue to grow.

These waters are famous for salmon, trout and perch, but sport anglers can really latch into some hot fishing action later in the fall. I know it's kind of early to talk about fall fishing, but make sure to save some vacation time to fish the Sturgeon Bay area from September through mid-October for northern pike. The charter boats commonly catch northern pike on spoons and plugs in the Sturgeon Bay shipping canal while trolling for salmon from Strawberry Creek north to the shipyards. Some hot spots for

fall pike just off Sturgeon Bay include the Michigan Street Bridge near pilings and docks and the heavy weed-line from Peterson Builders to the new Highway 42-57 Bridge all the way down to Big Creek and the yacht harbors. Try trolling floating lures or casting spoons.

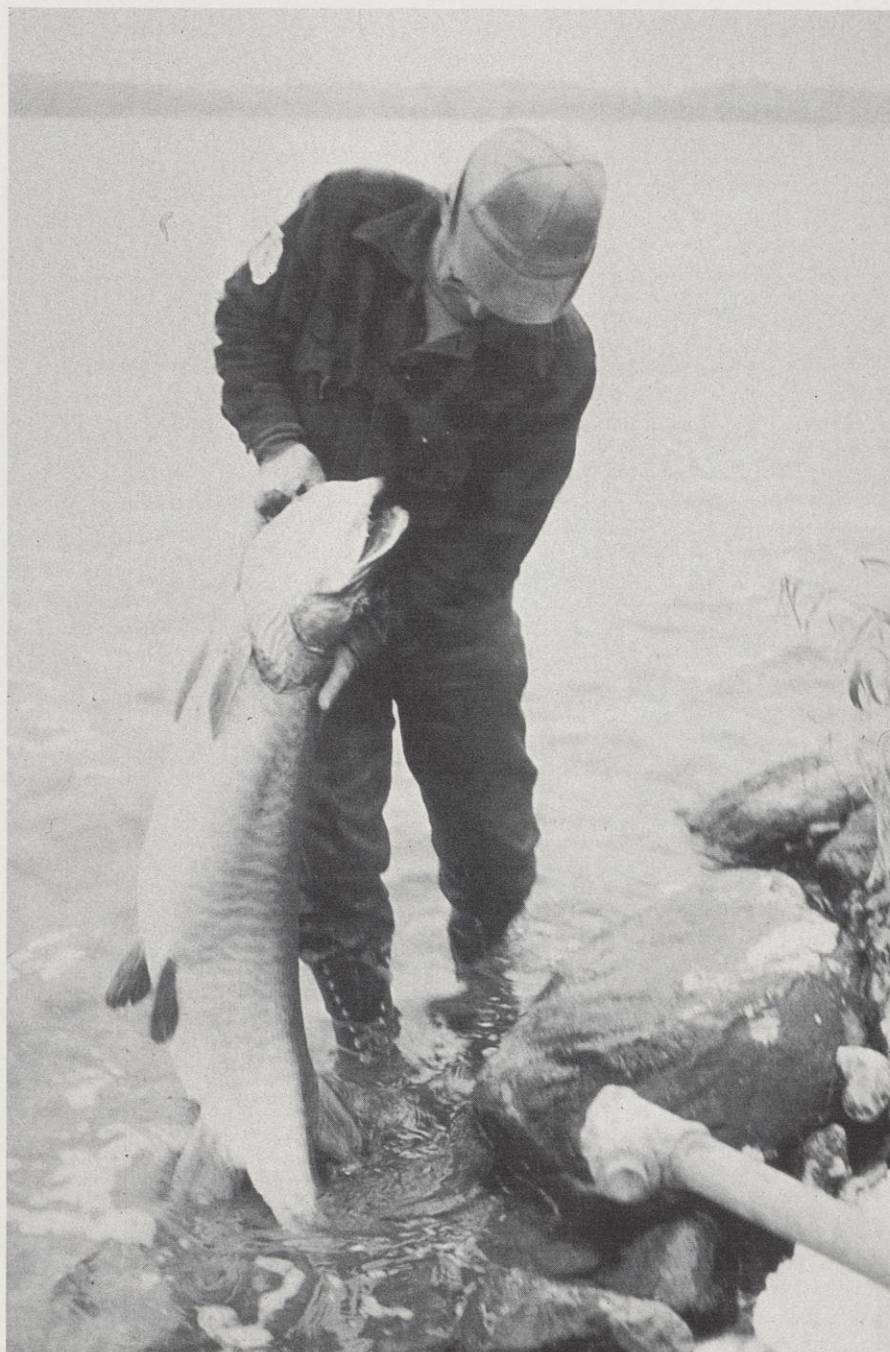
Shore anglers aren't left out of the fun. Cast spoons from shore along the old "railroad trestle" now called Bay

View Park. Water depths right near shore range from three to 25 feet deep.

If you're going to cruise around the tip of Door County by boat, you might try fishing for trophy northern pike and bass in the Mink River off Rowley's Bay or Detroit Harbor at Washington Island.

— Tim Kroeff, fish technician, Sturgeon Bay

Hellooooo, lunker! This trophy musky was landed on Pewaukee Lake, less than a half-hour drive from downtown Milwaukee.



Randy Schumacher



Tim Kroeff

Northern pike, like this one netted by fisheries crews, should provide hot fall fishing in southern Door County.



Angling tips in Sheboygan, Ozaukee, Washington and Waukesha counties

Anglers around here like a species-by-species tip list. Here's where I'd go in 1989:

Largemouth bass — A lot of anglers hit our smaller lakes pretty hard. Those in search of bigger, three-pound-and-up fish should head for the bigger, deeper waters. They are harder to fish, but worth the work. I'd go to Nagawicka Lake in Waukesha County and Big Cedar Lake in Washington County; both have produced wallhangers in recent years. Remember, bass have to be at least 14-inches to keep this year.

Smallmouth bass — The strongest populations are in Lac La Belle, North Lake and Pine Lake in Waukesha County and in Big Elkhart Lake in Sheboygan County. Big Elkhart produces many fish, but they're smaller. Lac La Belle responded well to carp removal and gamefish are on the rebound. North Lake has fewer smallies, but they are heftier. Pine Lake is a good, all-around lake with a nice smallmouth population.

Northern pike — Almost all area lakes will produce northerns, but the big fish are in the big waters — Big Cedar and Pike lakes in Washington County; Big Elkhart Lake in Sheboygan County; Pine, North, Oconomowoc and Okauchee lakes in Waukesha County. Fish 25-30 feet deep in midsummer with large chubs along the outside edge of weedlines.

Walleye — Generally, we have to stock walleye heavily to keep the populations up in the southeastern lakes. One exception is Pike Lake in Washington County. Lots of anglers

flail its waters, but it holds a good walleye population. We've stocked walleye for the last three years in Big Cedar Lake in Washington County. A few lakes in Waukesha County have smaller populations of walleye. You won't catch them often, but if you do latch into one, it will be a dandy fish on Nagawicka, Pewaukee, North, Upper and Lower Nemahbin and Okauchee lakes as well as Lac La Belle.

Muskellunge — Pewaukee Lake is our best musky producer, but it's been fished hard, so there are fewer trophy fish here. A concerted catch-and-release effort by local musky anglers should help grow bigger fish. Okauchee Lake was first stocked with muskies in 1981 and is starting to produce fish. Another good bet is Random Lake in Sheboygan County. Big Elkhart Lake was also stocked but the fish won't be keeper-size until 1990.

Panfish — The good news is that all area lakes have good panfish popu-



Randy Schumacher

Quite a basket of bucketmouths! Despite chilly weather, these anglers had a great day on Nagawicka Lake, Waukesha County.

lations. The bad news is they are so popular with anglers that they don't get a chance to grow more than seven or eight inches long. For bigger fish, try angling on lakes bigger than 50 acres in size. Fish them shallow in the spring and deeper as the summer progresses. At midsummer, bluegills are "suspended" feeders in 12-18 foot water.

— Randy Schumacher, fish manager, Eagle work unit



Southeastern Wisconsin is a hot corner

What luck that the highest concentration of people in the state live within an hour and a half of some of the hottest angling Wisconsin has to offer. The lakes and streams of Walworth, Kenosha and Racine counties are really productive. Fish grow fast and big here. Let me whet your appe-

tite and get your casting arm twitching.

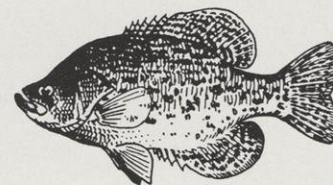
Walworth County — Lake Geneva is the county gem of 35 lakes. The water quality is excellent, it's 135-foot deep and holds strong populations of bass, walleye, trout and panfish. Night fishers are bagging some dandy walleyes in the summer. Large northerns cruise the weedbeds. Lake trout hit well in late summer and fall and panfish are taken through the ice. Just north, Lake Como may be the best largemouth bass water in the area. Easy access on Lake Delavan makes it a popular destination for anglers after walleye and perch. The lake is scheduled to be treated this fall to remove rough fish and rebuild gamefish populations. Lake Beulah, northeast in the county, has good bass and northern populations. Whitewater Lake, northwest, offers good bass and panfish action. The Lauderdale Chain of Lakes provides good bass, walleye and panfish angling. Largemouth bass anglers head to Pleasant Lake and Lake Wandawega. Bluff Creek south of Whitewater holds brown trout.

Kenosha County — The southwestern corner is home to Elizabeth,

Marie and Powers lakes which all produce walleye. Lakes Benedict, Tombeau and Rock provide excellent bluegill fishing. Musky anglers concentrate on Silver Lake. Largemouth bass, northerns and panfish can be hooked on Camp, Center, Hooker, Montgomery and Paddock lakes. Stream trout anglers can find good brown trout action on Palmer Creek.

Racine County — Browns and Rockland lakes near Burlington provide quality largemouth bass, bullhead and bluegill action; follow special requirements for bass this year. Tichigan Lake offers good fishing for walleyes, crappies, catfish and large perch. Wind Lake will provide crappies in the spring. Tichigan Creek provides tempting trout angling since crews deepened the channels and built more streambank cover.

— Doug Welch, fish manager, Kansasville



South Central Wisconsin lakes

Lake Wisconsin produces a variety of fishing opportunities year-round. Walleye and sauger are fished hard in March and April and again in the late fall. Crappie action is excellent, yielding 10- to 14-inch fish during April. The white bass start their spawning run in late May. Our special project at Lake Columbia next to the power plant is producing excellent catches of channel catfish. I'd head to Lake Puckaway early in the season to hit the white bass run and later in the summer for crappie and perch. Silver Creek Bay of Green Lake is a favorite spot of mine for channel catfish and smallmouth bass.

— Jim Congdon, area fisheries manager, Horicon

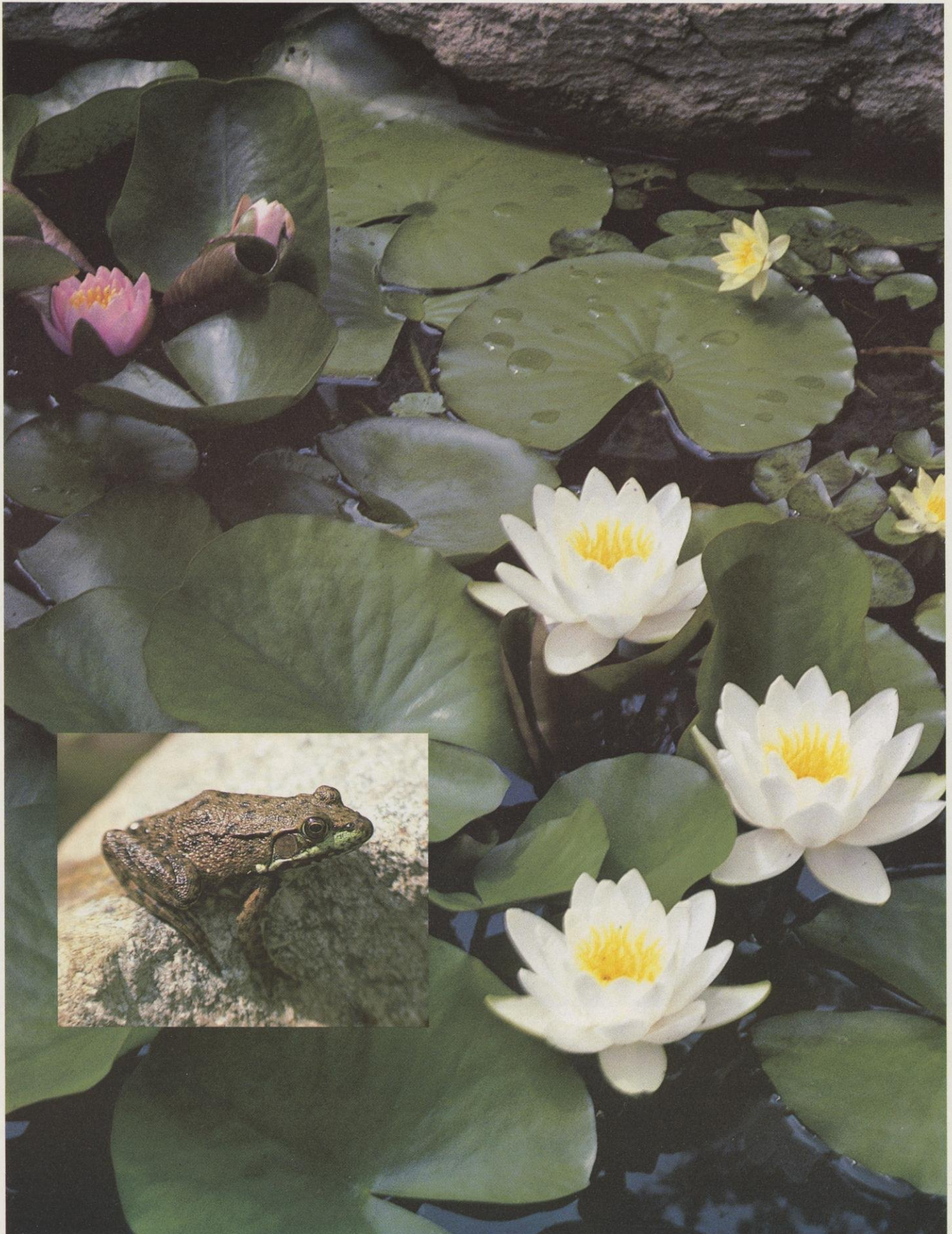
PLUNGE INTO WATER GARDENING



Timothy Sweet

Beautiful water plants offer a backyard
alternative to peppers and posies.

By Timothy Sweet



Timothy Sweet

The small bug crawled across our living room carpet. Most people would reach for a fly swatter, but my wife and I exchanged glances and smiled as the small dragonfly nymph took an evening stroll between our armchairs.

The previous summer, we had started a small, backyard tub garden filled with water plants and fish. As cooler fall weather set in, we decided to move the tub indoors. Here, months later, the stubby dragonfly nymph was a tiny messenger from the balanced ecosystem nestled in the corner of our room.

We experimented with small water gardens for a few more seasons — observing which plants thrived in our liquid landscape, which insects and fish kept the water clean, what kinds of wildlife would be attracted to the water and what mix of plants, animals and space would form a happy, balanced neighborhood confined in a ten-gallon crock.

In all, we spent about a year and a half tinkering as tub gardeners before we felt confident enough to try building a larger and more permanent backyard pond. We live in town, and we don't have room or the inclination to convert our whole yard into a swimming hole and fish pond. Rather, we thought a small backyard pond would add beauty to our property and lure more wildlife into viewing range of our kitchen window.

We can't pass on all the details you'll need to build a beautiful pond: books and magazine articles at your local library can help and many gardening suppliers produce catalogs and booklets describing the process. We can share the general concepts you'll want to follow.

Before building a pond of your own, it's important to scout your yard for a likely location. Pick a spot

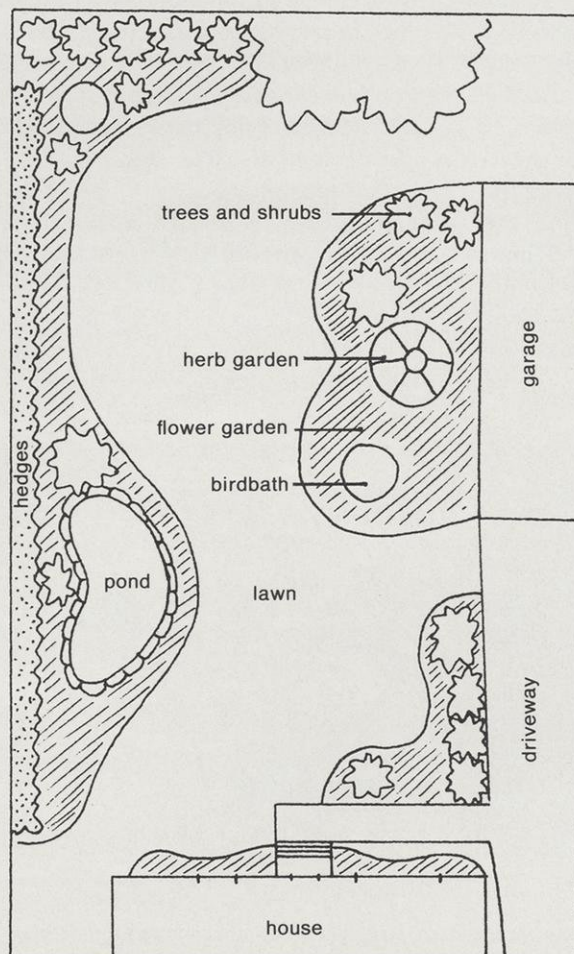
that gets at least six hours of full sunlight each day; that's a must for most aquatic plants. Also, choose a location that's far enough from deciduous trees so falling leaves won't land in the pond. Leaves that sink into water produce a lot of methane gas when they decay. The gas is toxic to most fish.

You may also have to get a Department of Natural Resources permit. Ponds that are built within 500 feet of a navigable stream, river or lake need permits. Also, ponds formed by ditching the pond into a stream, lake or river need to be approved before construction. Ask for the Water Management Specialist at the nearest DNR area office and discuss your plans if you live near the water.

It's a good idea to sketch the pond location and layout on paper, to help visualize where it will fit in and how it will break up backyard space. But

don't just rely on a paper sketch. Take a long shank of rope or a long garden hose and form the desired pond outline on your backyard. Don't rush the planning stage. Leave that rope or hose on the lawn for several days, re-adjust the shape a few times and consider other modifications. Will the pond area be level enough to hold one to two feet of water? Can you see the pond from the windows? Do the kids normally play here when they frog around in the yard? Will they stumble into the pond or around its rocky border? Will the pond disturb a normal pathway? Will you still have room to mow the lawn, rake leaves, have a picnic or barbecue? Are there buried gas lines, cables or electric lines running under the pond site? Is the shape pleasing and does it complement existing property lines and landscaping?

When you can answer these questions, you're ready to begin. Mark the



A backyard pond should fit naturally into your landscaping. Take your time planning before you start digging.

Timothy Sweet is an avid water gardener and teaches third grade students in Clintonville, Wis.

◀ Water lilies as near as your backyard can be the pride of your water garden and a home for frogs to roam.

perimeter of the pond and excavate a slightly sloping hole about 18 to 24 inches deep. Get a good mental picture of your garden before you start digging. Taller plants like cattail, water iris and lotus need to be planted farther back than water arum and lilies. Also, build some shelves in the soil along the edges of the hole. Many water plants, like cardinal flower, will sit on this shelf where they can keep their feet wet in shallow water but the rest of the pot is above water. The shelves should be about six to nine inches deep and about six inches wide to hold plant pots. Remove stones and other debris from the bottom and sides of the pond area. Line the pond with dampened newspapers or about a half inch of sand so the bottom will be smooth. You're going to lay a plastic liner on the bottom, and you want to avoid having sharp rocks, sticks or objects that could puncture the plastic.

Next, lay a black PVC (polyvinyl chloride) liner in place. This 16-mil thick sheeting is available in nearly any size from several mail-order companies specializing in pond and water garden supplies. Farm supply stores may also carry this thick plastic sheeting used to cap silos. To calculate the correct size liner for your pond, use this formula: Measure the overall length of the pond and add twice the maximum depth. The width is determined the same way: Measure the widest portion and add twice the

maximum depth. For example, a pond which is roughly six-by-nine feet with a maximum depth of 18 inches would require a nine-by-twelve foot liner (six feet width + 18 inches + 18 inches = nine feet; nine feet length + 18 inches + 18 inches = 12 feet). A liner this size will cost about \$70.

Don't walk on the liner as you lay it in the pond; carefully tug the edges to get as flat a surface as possible.

Next, hold the sides of the liner in place with rocks or bricks as you start filling it with water. The weight of the water will pull the liner into the contours of the hole. Most wrinkles in the plastic will disappear as the pond fills up. Once it's full, let the water stand for a few days so the liner can settle and chlorine (if you've used tap water) can dissipate into the air.

Trim the excess PVC liner so only six to eight inches remain around the pond perimeter. Cover this exposed flap with the edging material of your choice. We chose a kind of volcanic rock because it looked natural and it was lightweight, but I have to tell you, we ended up spending more on 210 pounds of volcanic rocks than we did on the PVC liner and all of the water plants. You could build an equally pretty border with native granites, smoothed shore rocks or other materials readily available where you live. Wash off stones with a hose to remove any surface grit before placing them around the pond

border. Avoid limestones that might leach alkali into the pond. Stones of irregular shape and weight can be combined in very pleasing arrangements.

Planting pond posies

Now comes the fun part as you start planting water plants, tubers, pots and sets.

Just like their terrestrial counterparts, some water gardeners are purists who prefer to plant only native species like cattails, rushes and other native macrophytes. I have to admit that I enjoy a mixture of native and exotic plants that offer showy blooms, shapes and colors throughout the growing season.

Water lilies are one of the beautiful highlights of a water garden. Both hardy and tropical lilies are available from commercial growers in a wide range of color. Most water lilies will grow easily in water covering them to a depth of six inches to 30 inches.

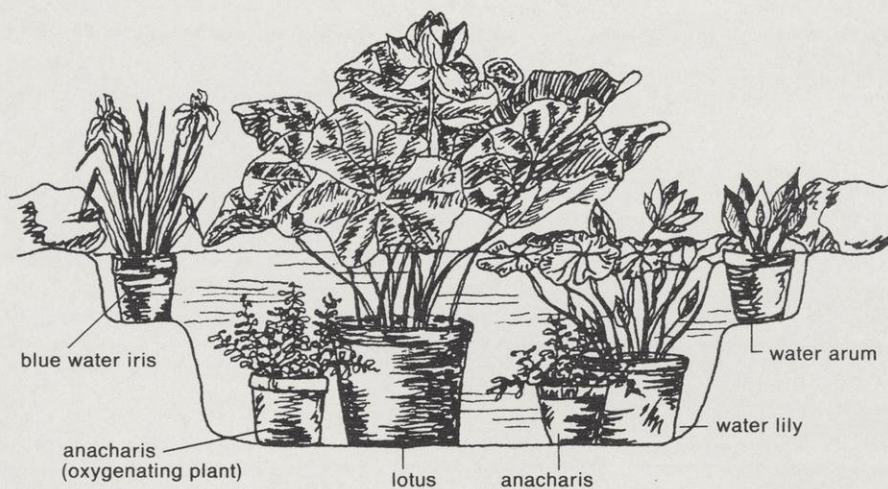
The most spectacular plant in our water garden is a Shiroman Lotus. Its huge leaves and fragrant flowers rise several feet above the water's surface. After the flower petals drop, the spiky pod filled with round balls is left.

We've found it's best to plant water lilies and lotuses in large tubs, baskets or pots before placing them into the garden. Pot-grown plants are easier to anchor and reposition in the garden, and container growing keeps plants from taking over space from other aquatic plants in your pond.

Water lilies and lotuses prefer a rich, garden soil mixed with clay and heavy loam. Regular fertilizing with slow-release tablets is essential to maintain healthy growth and blossoming without encouraging algae and eutrophication.

Bog plants like water irises, arrowhead and water arum add diversity to the backyard pond environment. Most bog plants prefer shallow water near the edge.

Anacharis and water sprite are two examples of oxygenating grasses that help keep the water clean and pure while absorbing carbon dioxide from



A fruitful, attractive water garden balances color, shape, space and a healthy environment for plants, fish and aquatic insects.

Julie Sweet



Timothy Sweet

Exotic Koi and goldfish are a snazzy addition to your backyard pond. If you live near a lake or stream, take precautions to keep exotic fish from escaping into public waters.

fish and releasing oxygen to the water.

Also consider how the exotic plants you bring in may affect the environment. For instance, if your water garden is large enough to attract waterfowl, ducks could feed in your pond and carry seeds to open water. That's one way the invasive weed Eurasian milfoil is spread in lakes. Order plants from reputable suppliers who know which plants should not be imported to Wisconsin.

Fish are a delightful addition to your pond. Consider raising some Wisconsin native fish (see Wisconsin Natural Resources magazine May/June 1987, page 24) like darters, dace, sculpins, sunfish and stonecats. We chose extremely colorful goldfish and Koi (bred from Japanese carp centuries ago). Fish serve as your underwater gardeners, controlling algae and keeping mosquitos in check. Again, make sure that any fish you bring into Wisconsin won't cause problems with wild fish populations. In several cases last year, people illegally imported grass carp into private ponds to con-

trol algae and aquatic weeds. These exotic fish could disrupt natural food webs if they escaped to public waters.

Snails are another essential element for keeping a pond in balance. They help clean up decaying matter that would otherwise accumulate on the bottom.

Other animals may well be naturally attracted to your backyard water source. Frogs and turtles will feel right at home among the lily pads and bog plants. Small mammals and birds will become frequent visitors stopping by for a drink or a dip.

Preparing for winter

Hardy water lilies withstand cold temperatures, but they'll die if they freeze. You'll have to develop a strategy for winter protection. You can keep a shallow pool from freezing solid by covering it with plywood topped with an insulating layer of a foot or more of straw or leaves. Fish can survive over winter as well if open water is oxygenated. Small,

floating electric pool heaters can be purchased, but these 1,000-watt heaters are quite costly to operate.

The safest and most economical way to preserve plants for the next season is to remove them from the pond before the first hard frost.

Drain the water from the pots for several hours, pat a moist layer of peat moss or compost around the damp pots, and wrap burlap around the outside. Then store the pots in a root cellar or a dark corner of your basement. Slightly moisten the bundled plants every few weeks. The trick is to keep the tubers from drying out over winter without keeping them so wet that they mildew or rot. Another method — remove the roots from the pots, place them in moist sand and store them in a cool spot.

Move the fish indoors to a large aquarium and enjoy their company throughout winter. They'll serve as a daily reminder that January is just a chilly diversion between wet, warm seasons of water gardening. ■

Trouble beyond our borders

Shrinking tropical forests place migrating North American birds on a perilous perch.

Craig Thompson

A damp veil of silence hung in the air. Rich, steamy, organic smells and myriad shades of green pervaded the tropical forest. Rising with the sun, our group walked slowly along a sinuous path in the foothills of the Mexican Sierra Madre Orientales. Our faces turned upward, ears perked, binoculars cocked and ready as a noisy squadron of red-lored parrots flew overhead scolding one another. This was the tropics, the epitome of avian exotica — motmots, trogons, woodcreepers, antshrikes — the ingredients of birders' life lists fluttered overhead.

Our guide pointed to the crown of an old strangler fig. Like so many feathered termites, a flock of brightly colored birds was busily inspecting every leaf and twig.

"Yellow-throated euphonia," he called out. "White-winged tanager, tropical parula, scrub euphonia, American redstart!" What? American redstart? My binoculars zeroed in on a male redstart casually gleaning insects from the end of a branch. I smiled, pondering this chance reunion with an old friend from north of the border.

Craig Thompson is DNR's assistant environmental impact coordinator stationed in La Crosse.

For thousands of years what may be the most spectacular biological phenomenon known has proceeded with astonishing regularity. Every fall, millions of birds leave their breeding haunts in North America and travel to points south. During the winter, their absence is as conspicuous as leafless trees. And then, like clockwork, they return each spring.

Why do birds migrate? Biologists theorize that migratory behavior evolved as birds sought more abundant food as the seasons changed. This theory assumes that many North American migrants descended from ancient tropical lineage. Their feathered forefathers gradually expanded their tropical breeding range northward during the nesting season and returned to their original range once nesting was completed. Eventually, these bird species reached temperate North America and found an abundance of food during the spring and summer. As fall and winter weather cut supplies of food, water and shelter, the birds retreated southward to more hospitable climes. The forces of natural selection playing on successive generations resulted in birds with instincts and physical abilities adapted for a migratory lifestyle.

Consider the blackpoll warbler. Weighing an average of 13 grams, this denizen of North America's bo-

real forest flies 80 hours nonstop over the Atlantic Ocean to complete a 1,400-mile journey from eastern North America to its wintering grounds in Venezuela.

Equally astonishing, at only four grams, the diminutive ruby-throated hummingbird flies 500 miles nonstop across the Gulf of Mexico to reach its winter quarters in Central America — a herculean effort for the bee of the bird world.

Every species that winters in tropical America has well-defined migratory routes and winter ranges. Many undertake spectacular and perilous journeys as they retreat southward. Surely thousands must perish during migration, victims of storms, predators and exhaustion. But enough survive the rigors of these life-or-death sojourns to ensure their continuation. Nature has developed a finely tuned system that hangs in a delicate balance. But the scales are tipping.

Appreciate the tropics

Beginning 2,000 miles south of us and lying in a wide band around the equator is a region known as the tropics (or neotropics to geographers). Comprising only six percent of the Earth's land mass, the tropics are home to more than half the world's



Stephen J. Lang

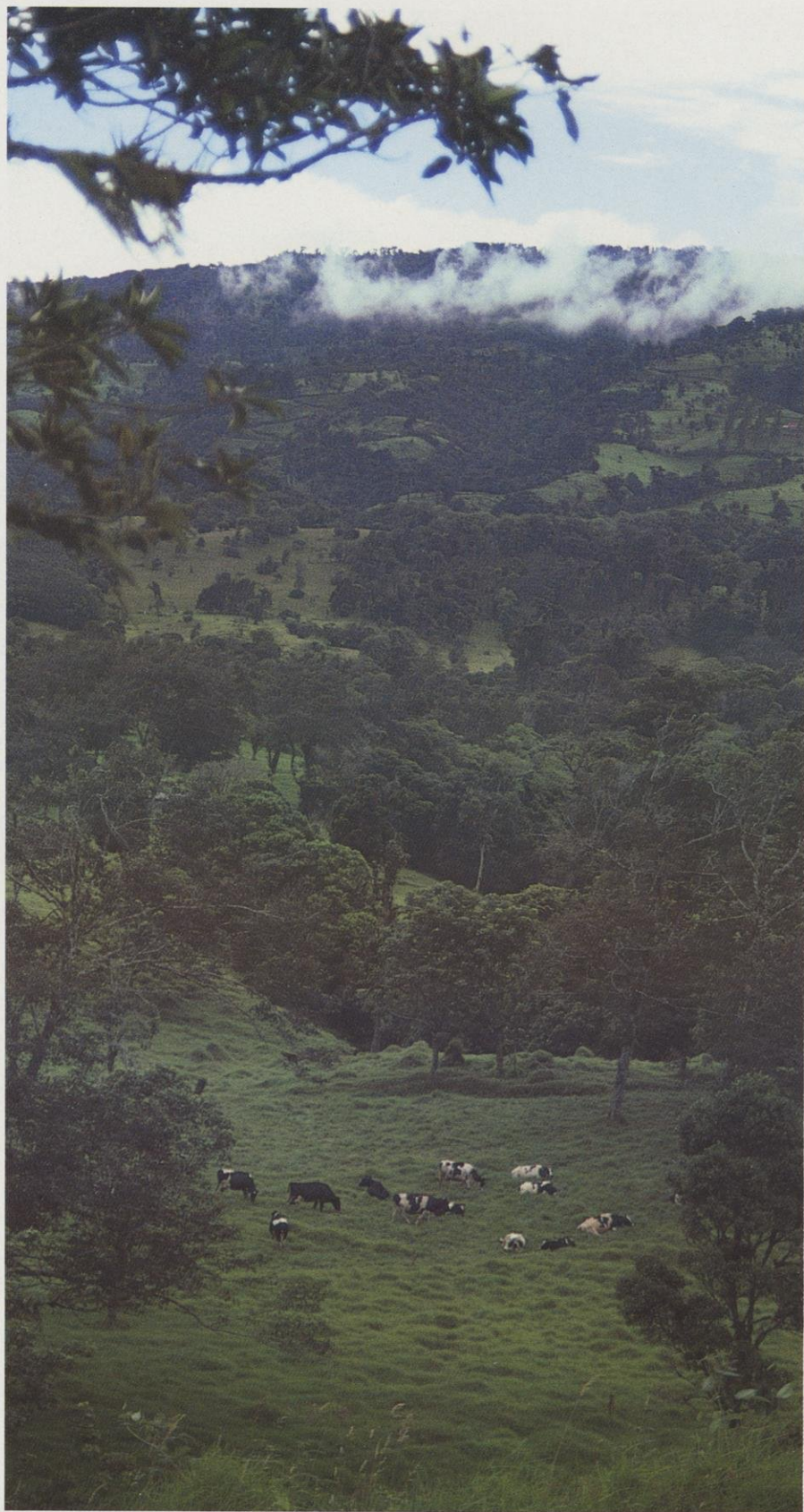
An American redstart (*Setophaga ruticilla*), a Wisconsin "native" that's equally at home in the tropics.

species. The wealth of biological diversity in this region is mind-boggling. Less than half the size of Wisconsin, the tiny Central American country of Costa Rica boasts 848 species of birds compared to Wisconsin's 306; 200 species of frogs to Wisconsin's 15; and 1,000 species of butterflies compared to Wisconsin's 150. On the eastern slopes of the Andes Mountains in South America, biologists have found more than 80 species of frogs and toads within a single square mile, almost more than the total number found in all of temperate North America.

Throughout the tropics, the cornucopia of species is equally impressive. Thousands of years of relatively constant, mild climatic conditions have fostered biologically rich, stable ecosystems that support millions of plant and animal species. What nature has taken eons to create, man may destroy in one lifetime.

The tropics are under siege. Many countries lying within tropical latitudes are experiencing explosive population growth. Burgeoning populations need jobs and resources for survival. Tropical forests are being destroyed to meet those needs. As

settlers and immigrants push further into remote areas, trees are felled for firewood and cutover areas are burned to open land for agriculture. On a single day in 1988, a weather satellite orbiting the earth recorded over 6,000 separate fires burning in Brazilian Amazonia — all from forest clearing activities. The Caribbean country of Haiti, once entirely forested, has lost 97 percent of its original forest cover. Reforestation efforts in the country are often unsuccessful as poverty-stricken Haitians remove newly-planted seedlings to burn for fuel.



Nathan Kraucunas, Milwaukee Public Museum

Adding more fuel to the proverbial fire, the economies of many Latin American countries are inextricably linked to the economic interests of North American companies. Vast tracts of forest are being cleared to supply our insatiable appetite for tropical hardwoods, coffee, sugar, fruit and beef. Profits tropical countries make from selling these commodities are used to pay interest on massive international loans floated by North American banks. Cattle ranching is the fastest growing industry in many parts of the tropics, stimulated, in large part, by America's expanding fast-food industry. A hamburger made from Central American beef costs five cents less than a hamburger made from North American beef, a savings passed on to the consumer. As consumption of fast-food hamburgers increases, the amount of tropical forest destroyed and converted to pasture also increases. The problem is compounded by the nature of tropical forest ecology.

Counterfeit paradise

Because their lush, rich appearance masks their true fragility, tropical forests have been termed a "counterfeit paradise." In reality, the soils which support the thick growth are very poor in minerals and nutrients. A walk through a rain forest will reveal virtually no topsoil and very little decaying organic matter or humus. Dying, decaying plants and animals are quickly recycled back into the living forest. Nearly 70 percent of all available minerals and nutrients are locked up within the living systems. Herein lies the problem. Forested areas that are cleared and burned support vigorous growth for a few years, then the soil becomes exhausted. As soils no longer support agriculture, farmers and ranchers move into uncut areas and clear more forest to maintain production. A destructive cycle of slash-and-burn agriculture is created.

No one knows the exact rate of tropical deforestation. Current estimates range as high as 70,000 acres per day worldwide, meaning we lose

Holstein cows from a Monroe, Wisconsin herd feed in the Cordillera Central (Central Mountain Range) near Cariblanco, Province of Alajuelo, Costa Rica. Rain forests are typically logged, farmed and grazed for seven to 10 years before the thin, fragile soils are exhausted. The United States imports in excess of 300 million pounds of Central American beef annually for the fast-food, pet food, packaged dinner, luncheon meat and baby food markets.

approximately 40,000 square miles of tropical forest per year — an area equal in size to the state of Virginia!

As the forests go, so go their inhabitants: the cotton-top tamarin, the poison arrow frog and the horned guan. Familiar faces closer to home are affected by forest destruction as well...the scarlet tanager, the northern oriole and the rose-breasted grosbeak. Tropical forests are as important to the survival of migratory birds as they are to their other native wildlife.

Just over half of the 650 bird species found in the United States are migrants that winter in the tropics. A partial list includes four of our five

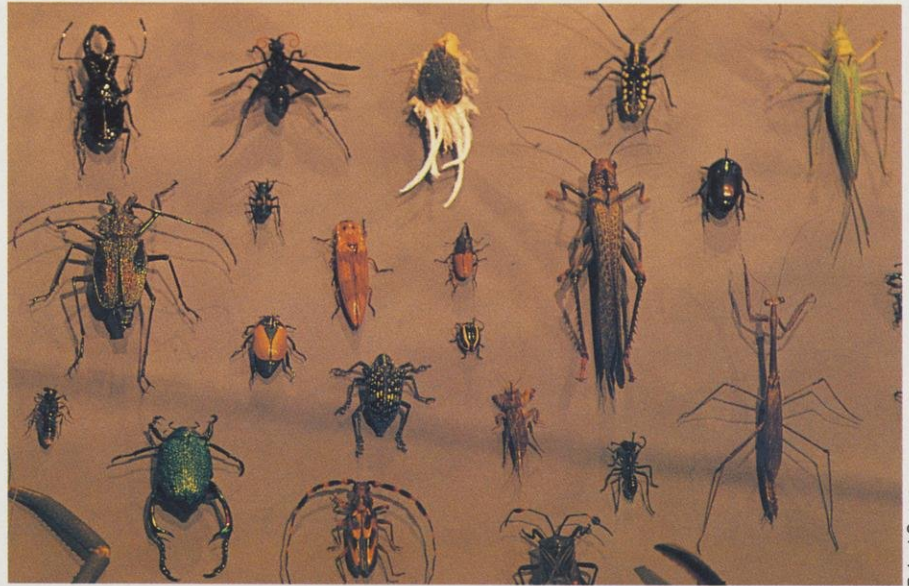


Stephen J. Lang

orioles, nine of our 11 vireos, and 47 of our 52 warblers. Many species we view as "ours" spend only two to three months breeding in Wisconsin while spending six to seven months wintering in the tropics. Their remaining time is spent traveling to and from their continental destinations.

I recall the story of an ornithologist studying migrant birds in Mexico's Yucatan Peninsula. Recognizing that natives are often knowledgeable about local wildlife, the ornithologist asked a young man if he had ever seen "this American bird" while pointing to its picture. "Why yes, señor," came the reply, "but it is not an American bird. It is a Mexican bird which travels to America once a year!"

In recent times, we've reached a



Robert Queen



Gregory Scott



Robert Queen



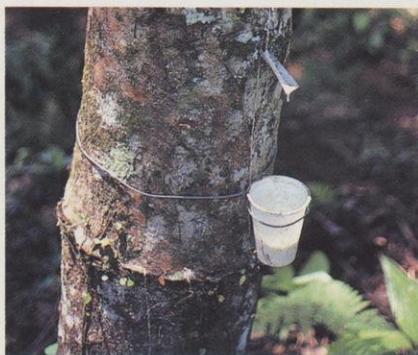
Tropical rain forests are home to a diverse, rich wealth of plants and animals including beautiful insects and frogs.



Just over half of 650 bird species found in the United States migrate to the tropics. Dwindling habitat threatens migrants like the northern oriole (*Icterus galbula*)



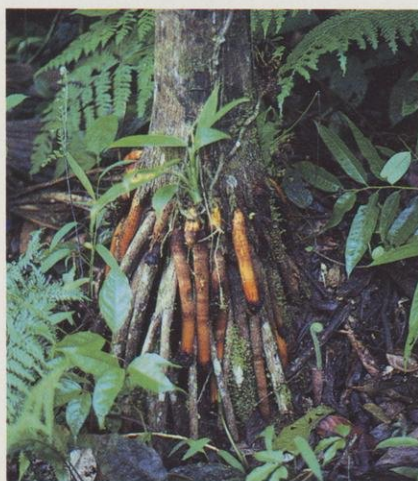
and the rose-breasted grosbeak. (*Pheucticus ludovicianus*).



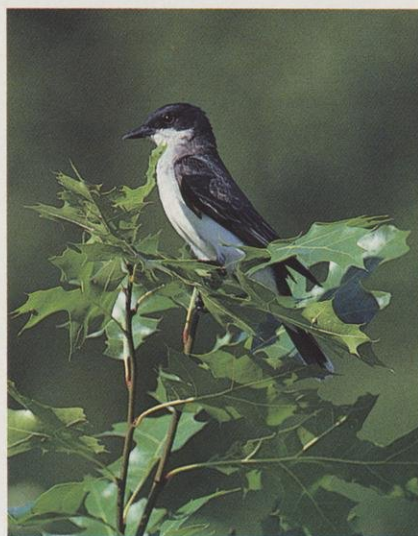
Nathan Kraucunas, Milwaukee Public Museum



Robert Queen



Nathan Kraucunas, Milwaukee Public Museum



Stephen J. Lang

better understanding of the importance of tropical forests to North American migrants. For years, ornithologists assumed native birds competitively excluded migrants from major tropical habitats, forcing them to live on the least suitable periphery. We now know otherwise. Once on their wintering grounds, migrant birds assume an integral role in day-to-day politics of tropical bird life.

Just like people, many birds change their behavior and adapt to a tropical lifestyle. For instance, black-and-white warblers and golden-winged warblers forage alone on their Wisconsin breeding territories. However, when wintering in the tropics, they often forage in mixed flocks of native and migrant warblers. The eastern kingbird changes behavior even more dramatically. In North America, kingbirds are featherweight flycatchers with heavyweight dispositions. Breeding kingbirds aggressively defend their territories against intruders. Some are feisty enough to attack large hawks passing overhead — a bold venture for a robin-sized bird! Once on their wintering grounds in northern South America, kingbirds change in temperament, becoming highly social and congregating in large groups. As if sociability wasn't enough, kingbirds also shift their dietary preference from insects to fruit. Huge flocks have been observed feeding on fruiting trees in Brazilian Amazonia.

Research on the distribution of wintering North American migrants reveals that many species tightly pack into relatively small geographic areas. For example, the melodious wood

thrush breeds throughout deciduous woodlands in eastern North America. During fall, the entire continental population funnels into Central America, occupying a tiny winter range from southern Mexico to southern Panama. As deforestation continues unabated, each successive generation of wood thrushes finds less suitable wintering habitat. Every remaining acre of forest is increasingly important. Biologists estimate that clearing one acre of wintering habitat has the same impact as clearing 10 to 15 acres of breeding habitat for certain species.

Banding studies show many birds return to the same area to breed every year, a phenomenon known as site fidelity. Similar studies discovered some migrants do likewise in the tropics. Many bird species remain in a small area throughout the winter, often returning to that area in subsequent winters. The fact that certain species establish and defend winter territories against their own kind suggests winter food sources may be limited, underscoring the importance of conserving wintering habitat for migrant survival.

Growing evidence indicates breeding populations of many migrant songbird species are declining in the United States. While many factors may contribute to these declines, the probable reason for population decreases of many species is lost wintering habitat caused by tropical forest destruction.

The United States Fish and Wildlife Service has compiled a list of migrant species likely to show population declines in the near future. The list contains many Wisconsin "natives," including the wood thrush, ovenbird, blue-winged warbler,

- ☐ Rain forests provide natural rubber, (*Hevea brasiliensis*),
- ☐ foods, spices and medicines.
- ☐ Who knows if the prop roots of this stilt root palm might provide a pharmaceutical or important chemical for manufacturing? Fully a quarter of our medications are derived from 90 tropical plants. Few of the tropics' nearly half million plant species have been identified and analyzed.
- ☐ The Eastern kingbird (*Tyrannus tyrannus*) is a scrappy, bug-eating fighter in the United States, but a social fruit-eater in its tropical turf.

How could global trends change our environmental focus in the future? Interested readers can obtain a free copy of "Trends in the Global Environment," a publication of DNR's Trends Analysis Group. Write Judy Reuter, DNR, P.O. Box 7921, Madison, WI 53707.

golden-winged warbler and yellow-throated vireo.

Other estimates hit home even harder. Each fall for the last 23 years, Professor Charles M. Weise of the University of Wisconsin-Milwaukee's Department of Biological Sciences has been netting and banding songbirds near Milwaukee. His studies show that bird populations have remained stable for those species

wintering in Wisconsin or migrating only short distances. However, Weise reports populations of birds that migrate to the tropics are declining quite rapidly. For each 1,000 hours of netting time, he captures six fewer long-distance migrants than in previous years. At this rate, his research predicts "Wisconsin" birds that migrate to the tropics will disappear by the year 2011.

We lose more than birds

Contemplating the renewed possibility of a silent spring is food for serious thought. However, the decline of many North American migrants is only one symptom of an enormous problem with global consequences. The Nature Conservancy estimates the world is losing 1,000 species a

A taste of the tropics



Milwaukee Public Museum

Jaguars, reptiles, exotic birds and chunky insects skulk by the path. Strangler figs wind serpentine death grips around massive tree trunks. Amazon parrots, scarlet macaws and squeaky bats hang gingerly from leafy branches.

A world of tropical sights and sounds is yours at the Milwaukee Public Museum's new exhibit, "Rain Forest: Exploring Life on Earth."

Visitors follow a meandering path through the 11,000 square-foot hall passing 78 tropical trees, 1,000 vines, 33 different mammals, 45 kinds of colorful birds and oodles of insects, frogs, lizards and snakes.

The tropics come alive at five video theaters showing the habits of tropical animals, life in the forest

canopy and the rigors of rain forest research.

As you pass by, motion detectors broadcast raucous sounds of rain forest life — cackling howler monkeys, raspy macaw calls, downright noisy oropendulas and cica-das. Every 22 minutes, the sounds of a torrential tropical rainstorm sweep through the exhibit.

Dioramas and displays share the story of the fragility of tropical diversity, vividly showing how deforestation harms migrating animals and important plants. Viewers learn about constant competition for space, light and nutrients among rain forest plants and animals and the consequences of consumer demand for bananas, lumber, beef, cof-

fee and other products of tropical agriculture.

A jungle field station gives a sense of the countless hours spent identifying and sorting the thousands of species researchers collect to better understand tropical ecology.

The impressive exhibit is the collective work of 45 museum staff and many volunteers who spent five years collecting specimens, molding waterfalls and trees, and painting the exhibit hall to re-create this replica of a Costa Rican rain forest.

Some tropical tidbits you will appreciate after a visit:

- Tropical forests are not all dense jungle. They are a mix of cold, arid alpine regions; warm rain forests pelted with more than 80 inches of rain annually; hot deserts receiving less than six inches of rain each year; dry forests; and swampy forests.
- A full 50 percent of precipitation in the rain forest is recycled by trees into the air.
- More than 80 percent of the rain forest's food is produced high above the ground in the tree canopies. Consequently, two-thirds of rain forest plants and animals live in the treetops, not on the forest floor.

The Milwaukee Public Museum, 800 W. Wells Street, is in the heart of the downtown area. The museum is open from noon until 8 p.m. on Monday and 9 a.m. - 5 p.m. Tuesday through Sunday.



Ugly remains of tropical deforestation on northern Haitian slopes. We will continue to lose plants, animals, soil and rich human cultures if we don't bridle this headlong, uncontrolled dash to destruction. (inset) Logging truck loaded with rain forest trees. Province of Heredia, Costa Rica.

Nathan Kraucunas, Milwaukee Public Museum

year to extinction, primarily from tropical deforestation. Many of these species are not yet known to science. As we lose tropical forests, we also lose potential sources of food, medicine, chemicals and renewable fuels. A full quarter of all our medicines come from just 90 plants and the tropics is home to more than a half million plant species.

Deforestation further threatens worldwide climates and living buffers in the battle to slow down carbon dioxide buildup and the greenhouse effect.

In Central America, South America and Asia, destruction of tropical forests leaves impoverished land; exhausted, eroding soils; silt-laden rivers and streams; and countryside prone to severe flooding.

Despite this litany of ominous predictions, some groups are making progress in stemming forest loss. Pri-

vate organizations, such as the World Wildlife Fund and The Nature Conservancy, are successfully promoting and implementing sound conservation strategies in the world's tropical regions. They help fledge national private conservation organizations that provide grassroots support for growing environmental consciousness within their borders. They have championed the concept of preserving tropical forests in exchange for retiring international bank loans.

Some tropical resources are being protected. Several tropical nations have established systems of national parks and reserves. Costa Rica and Panama have set aside 10 percent and 12 percent of their land, respectively, for such purposes. Recently, Thailand officials discontinued logging to protect remnants of the country's remaining forests.

At dusk, our group headed back to

camp, enthusiastically discussing the day's findings. Amid the clamor about tropical birds, the redstart came to mind. I wondered if these forests would be here next winter, should it return.

Migratory birds are a shared international resource. To protect them, we must protect the ecosystems on which they depend. Looking beyond our borders, it is obvious we all have a stake in the future of the world's tropical forests. Understanding the environmental consequences of our consumption, supporting international conservation organizations and working for a strong national policy to promote tropical conservation are a few of many ways we can contribute to the wise use and protection of tropical habitats.

Readers Write

ASIAN HUNTERS

The article "New traditions in a new land," in your November/December issue was a learning experience for me. Well-written articles help teach us about other cultures and ways of addressing life situations. Prejudice and misconceived notions exist without understanding and awareness. We tend to minimize the heritages, habits and traditions of our global neighbors, believing we are the only ones here. For me, the article bridged a gap of understanding with local community neighbors. Our natural resources are for all citizens and awareness of others' habits and traditions aid in developing clear guidelines for our state. Thank you for publishing the article.

*Frank Schreiter
Appleton, Wis.*

I am particularly interested in the needlework you highlighted in the Hmong article. I own several pieces like the five pieces pictured, but I'd like to buy more. Are those pieces available?

*Mrs. Ethel Mathews
Beloit, Wis.*

Several Hmong artisans continue to create the fine handcrafted needlework which incorporates applique and reverse applique techniques. The artwork we highlighted was done in the Pa'ndau or flower cloth fashion used to recount village life and village stories. Other techniques stress elaborate, colorful geometric designs and patterns.

Some artisans are producing this artwork in the United States; others import it from relatives in Cambodian refugee camps

who are raising funds to emigrate. Many Hmong refugees sell these cloths at community arts centers and art fairs. The cloths we displayed were loaned by the family of Mr. Bee Her, 402 Bay View, Madison, WI 53715. Some of the pieces are still available for purchase.

GAME FARMS

We enjoyed and appreciated John Beth's article on game farms in your November/December issue.

By highlighting the knowledge and expertise of Jim Martin about this growing business we hope your readers will come to understand and appreciate all that game farms have to offer.

The game farm business is hard work and costly to maintain, but we find that our work comes back to us ten times its worth when a young hunter brings back his or her first rooster or a young pup retrieves his first bird and knows he has done something good.

*Debbie & Richard Fernau
Ripon, Wis.*

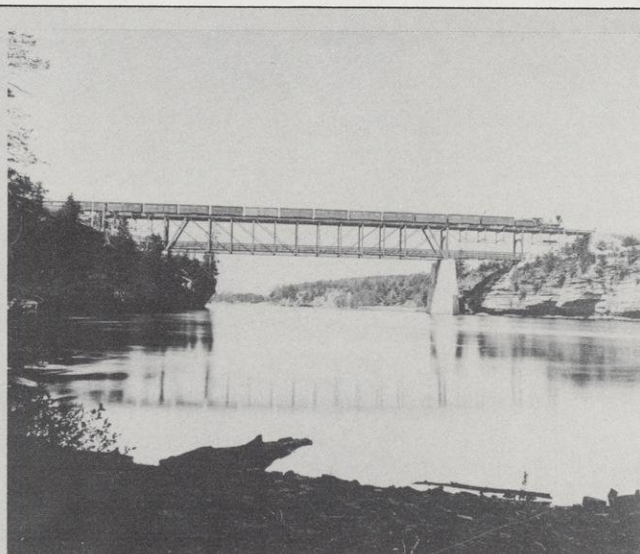
COVERS

My compliments to the photographers and artists who have been designing your covers over the past few months. The butterflies and greenery on the September/October issue was especially beautiful. Keep those delightful covers coming.

*Pat Froebel
Hartland, Wis.*

NEXT ISSUE:

Spring Creek Fly Fishing
Shore Lunch
Municipal Composting

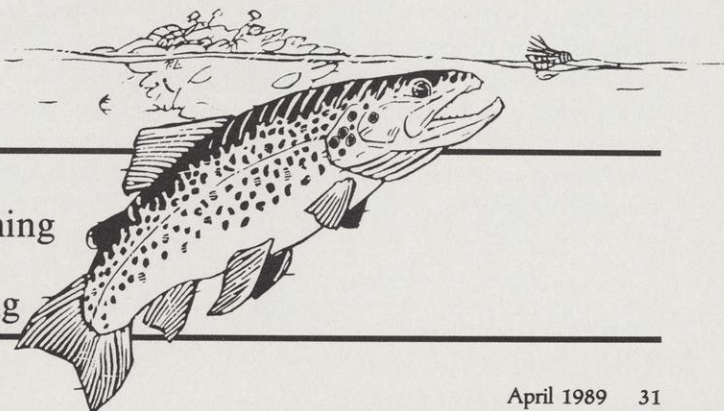


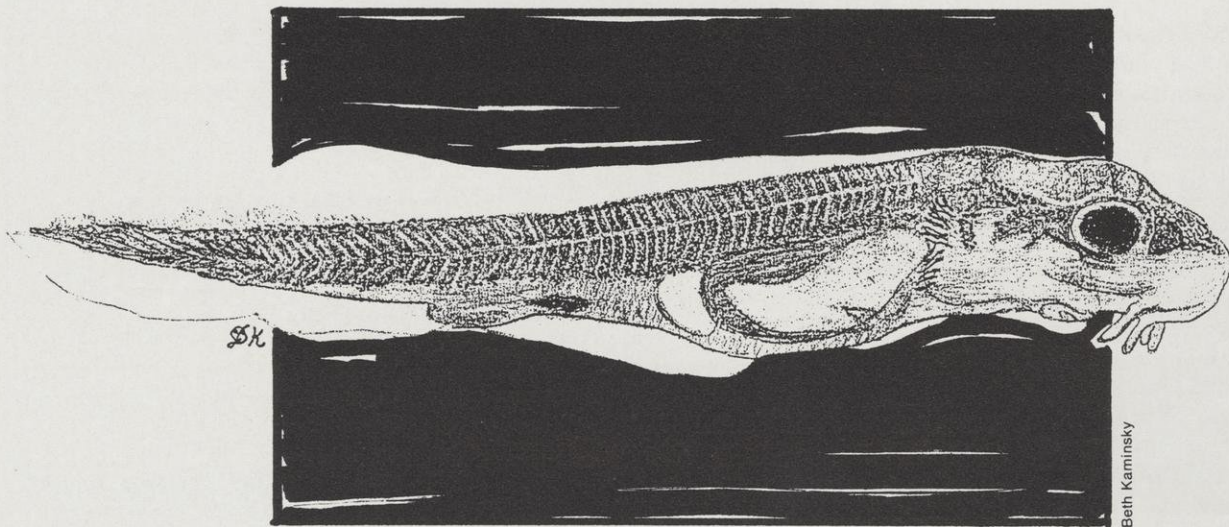
Iconographic Collection, State Historical Society of Wisconsin

This famous bridge...

- a) is on the River Kwai.
- b) has trolls.
- c) was last seen in Brooklyn, N.Y.
- d) spans the Wisconsin River near a ghost town.
- e) none of the above
- f) one of the above, but you're not sure which

You'll find the answer in **Wisconsin Traveler**, a new feature beginning in this issue of *Wisconsin Natural Resources*! Traveler is a guide to the quaint, infamous, unusual, scenic, spectacular, quiet, unknown and well-known attractions in Wisconsin, both natural and human-inspired. With tidbits of state lore, travel tips, maps of scenic routes and more, we guarantee you won't leave home for a Wisconsin adventure without it!





Against all odds

If they make it through the first few days of life, lake sturgeon become Wisconsin's most venerable aquatic senior citizens.

James J. Kempinger

Lake sturgeon are Wisconsin's living fossils, relics from long before dinosaurs made their abrupt exit from Earth's ever-changing stage.

Outlasting the dinosaurs was quite a feat, but coexisting with man may be the greatest challenge facing the ancient species on evolution's long march. The early life of lake sturgeon is a classic example of triumph over adversity, for though the fish grow larger and live longer than any other fish species in Wisconsin, their beginnings are tenuous and easily disrupted by pollution, dams and other human handiwork.

James J. Kempinger, stationed in Oshkosh, is a fisheries research biologist for DNR's Bureau of Research.

The Wolf, Little Wolf, Fox and Embarrass rivers of the Lake Winnebago system in central Wisconsin are the cradle of a self-sustaining lake sturgeon population noted for its ability to thrive while other populations in North America have declined. (Wisconsin's lake sturgeon population is stable enough for a brief spearfishing season to be held in February, but the species is monitored carefully for any signs of decline.) The habits and environmental needs of the mature lake sturgeon in this system had been thoroughly documented, but until recently little was known about sturgeon fry (larval stages).

As more lake sturgeon spawning grounds and habitat were altered or destroyed by land development and dam construction, fish managers real-

ized the importance of finding out more about the early life of the long-lived species. Studies of the lake sturgeon's first days began in 1981 on the Wolf River at Shawano Dam, 125 miles upriver from Lake Winnebago.

On the rocks

Each spring, large numbers of mature lake sturgeon crowd the rocky shorelines of the four rivers, relying on strong homing instincts to locate familiar spawning grounds. It's quite a sight: the huge fish more than four feet long cruising so close to the surface that their tails, backs and snouts are out of the water.

The fish, so near to shore and intent on fulfilling their biological destinies, are especially vulnerable to

poaching at this time. A "sturgeon watch" is held every year to keep unscrupulous poachers away from the spawning fish.

The fish spawn at water temperatures ranging from 48-57°F. A 25-degree drop in water temperature causes the lake sturgeon to disperse; spawning activity resumes when the water temperature rises.

Males arrive at the spawning sites ahead of females, cruising in groups of eight or more. Spawning begins as soon as a ripe (sexually ready) female enters the group. The males swim alongside the female, usually against the current, vigorously thrashing their tails as they release milt while the female scatters her eggs. There's a wide variation in the number of eggs produced by females — ranging from 50,000 to 700,000 eggs in one season.

Now the battle for survival begins. The sticky fertilized eggs, each about one-eighth inch in diameter, cling in clumps to rocks and other solid objects in the water. As observed by a DNR scuba diver who helped with this study, these eggs become irresistible appetizers to crayfish, mud puppies, redhorse and carp. In the Shawano study, even adult lake sturgeon appeared to consume eggs after spawning. Dropping water levels after spawning can expose the eggs to drying winds. A fungus growing on the clumped masses of eggs destroys many more potential lake sturgeon than hungry fish or adverse weather conditions.

The eggs that survive this onslaught incubate for eight to 14 days; an abdominal yolk-sac provides 20 days of nourishment for the developing lake sturgeon. Embryos in fluctuating or low water temperatures must endure a longer incubation period and are even more vulnerable to predators and disease.

A rough start

Fewer than one in a thousand sturgeon embryos will live to the larval stage. Barely one-third of an inch long, the newly hatched larvae tend

to avoid daylight by hiding in bottom crevices, a favored habitat. At the Shawano Dam, a dense layer of cinders deposited on the river bottom during the era of steam-powered railroad locomotives provides ideal cover for the lake sturgeon larvae.

About 10 days after hatching, at the enormous size of two-thirds of an inch, the larvae begin to move downstream in mass, most often at night. During 1982, researchers caught nine times more lake sturgeon larvae at night than in the daytime near the dam. At this stage of growth, the lar-

vae have well-developed gills, fins, mouths and barbels (feelers dangling under the snout).

When the yolk-sac is depleted after 20 days or so, a larval lake sturgeon must begin to fend for itself. Just shy of a full inch in length, the fingerlings position themselves facing upstream in the swiftest river current where there's sand or pea-sized gravel on the bottom and no rooted aquatic plants nearby. Here, the opportunistic fingerlings wait for midge-fly larvae and small mayfly nymphs to drift downriver. Alerted to the pres-



James J. Kempinger

Patricia Anderson, DNR Licensing Section, is one of the DNR employees who annually provide round-the-clock babysitting for spawning sturgeon on the Wolf River.



Fish patrol

They're not especially cuddly charges, but every spring 60 to 80 DNR employees provide round-the-clock babysitting service for spawning sturgeon. The fish are so vulnerable when spawning in shallow streams and rivers that poachers could easily take them. To protect these unique fish, DNR staff who normally work desk jobs, fight fires and write environmental regulations get a chance to see natural resources in action. Workers are stationed on the steep, rocky banks of the Wolf River between Shawano and New London to keep an eye on sturgeon, night and day.

The best spots for public viewing of this annual courtship are in Shiocton, where overpasses and riverbanks bring visitors close to spawning fish.

ence of food by their barbels, the fingerlings extend their retractable mouths and suck up the tasty and nutritious morsels.

The upper reaches of the Wolf River within 30 miles of the Shawano Dam are an important nursery ground for lake sturgeon in the Winnebago system. Fingerlings feed in the nursery area for about six months. In the late fall, when the young fish are seven to nine inches long, they will move downstream into the deeper waters of the river or into lakes Poygan, Winneconne, Butte des Morts or Winnebago. There, they will live a quiet life, foraging for snails, leeches, insect larvae and other invertebrates on the bottom, growing longer and heavier with each succeeding year until they reach maturity and are ready to spawn.

Male lake sturgeon mature in about 15 years; females, in about 25 years. The mature fish will return, provided there are no insurmountable dams in the way, to the river where they were spawned to begin the next generation of lake sturgeon. Males spawn annually or every other year, while mature females spawn every three or four years. Changes in the spawning grounds such as siltation or increased water flow may interfere with the lake sturgeon egg hatch.

Preserving habitat and maintaining proper conditions for larval and young lake sturgeon will help keep Wisconsin's population of aquatic senior citizens intact and living to a ripe old age. ■



David L. Misterek

Sturgeon for the future

People devoted to the preservation of lake sturgeon in the Lake Winnebago system are likely to be members of Sturgeon for Tomorrow, Inc., a four-chapter group 2,800 members strong that supports research and management projects to protect Wisconsin's largest gamefish.

In 11 years, Sturgeon for Tomorrow has contributed more than \$90,000 to the Department of Natural Resources for its work in the Lake Winnebago system and other Wisconsin waters. Minnesota, Missouri and Michigan received fertilized sturgeon eggs and larvae from the group to help re-establish lake sturgeon populations in waters that historically supported the species, but no longer do.

Special equipment was purchased by Sturgeon for Tomorrow to study the early life of lake sturgeon in the Lake Winnebago system. The group also bought electronic water quality monitoring equipment to provide important data that helped solve fish kills on the Fox River, and funded population estimates, exploitation

rate studies and radio telemetry studies to follow the huge fish moving through the vast Lake Winnebago system.

The organization supported research which could develop a sturgeon hatchery program, if needed, to raise the larval sturgeon to fingerling size through their first summer of life. To ensure that there are indeed sturgeon for tomorrow, the group contributes money to fund enforcement efforts protecting vulnerable lake sturgeon at the spawning grounds on the Wolf, Fox, Little Wolf and Embarrass rivers.

Many Sturgeon for Tomorrow members enjoy the unique sport of sturgeon spearing during a season that runs from the second Saturday in February through the first of March. Spearing for sturgeon has been an important activity on Lake Winnebago ever since early Indian tribes settled in the area and fashioned spears to capture the "king of fishes" through the ice. Today, spearers must purchase a special license and are allowed one 45-inch or larger lake sturgeon per year.

- The Wolf River — birthplace and nursery for Wisconsin's largest and longest-lived fish, the lake sturgeon.
- Females spawn only once every three or four years. Their sticky eggs must be fertilized and survive low water, siltation, predation and human interference.
- Sturgeon live for decades but they are slow to grow. Males mature in 15 years; females in 25.



David L. Misterek



David L. Misterek

