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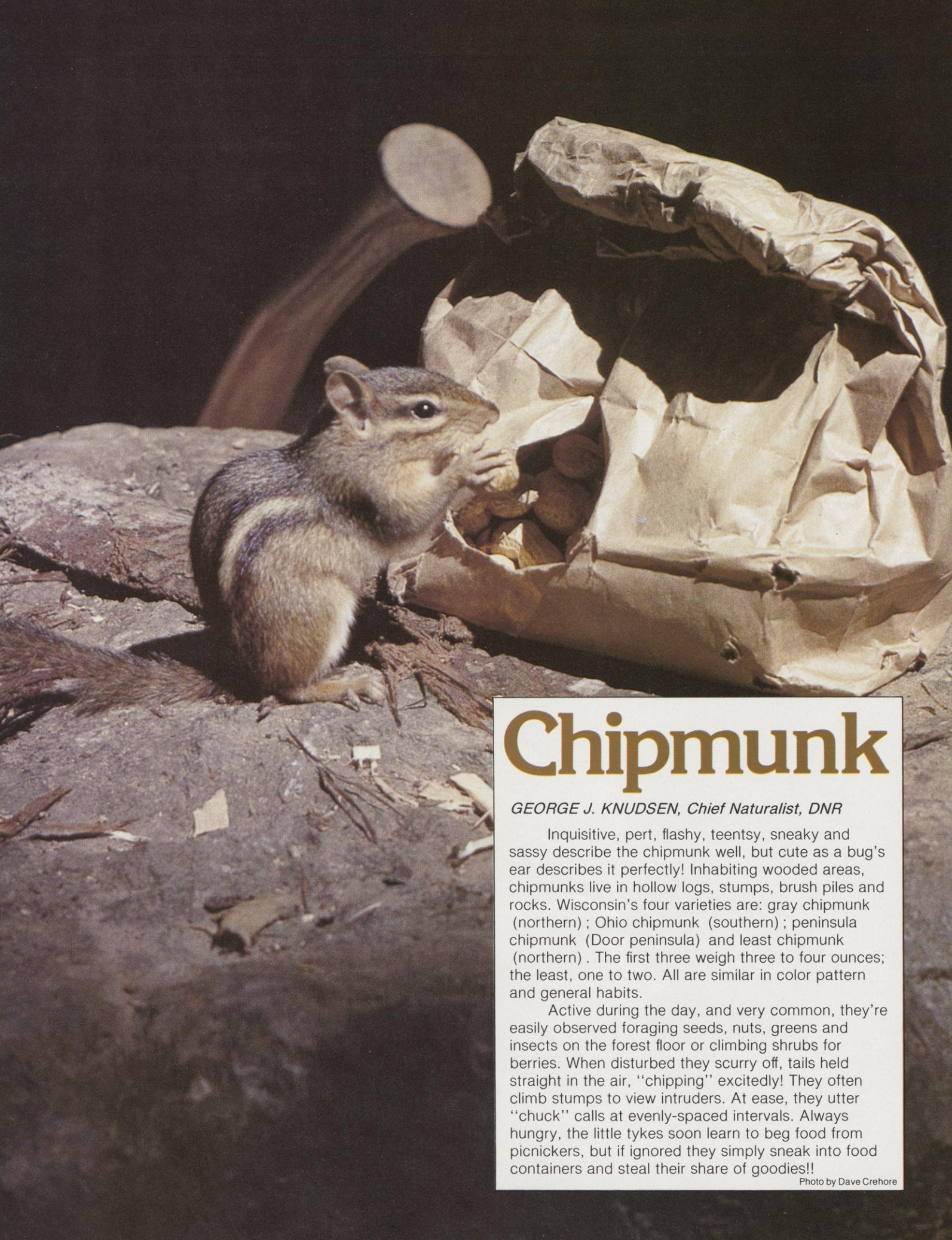


Wisconsin

NATURAL RESOURCES

MAY - JUNE 1978 • VOLUME 2, NUMBER 3

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Chipmunk

GEORGE J. KNUDSEN, Chief Naturalist, DNR

Inquisitive, pert, flashy, teentsy, sneaky and sassy describe the chipmunk well, but cute as a bug's ear describes it perfectly! Inhabiting wooded areas, chipmunks live in hollow logs, stumps, brush piles and rocks. Wisconsin's four varieties are: gray chipmunk (northern); Ohio chipmunk (southern); peninsula chipmunk (Door peninsula) and least chipmunk (northern). The first three weigh three to four ounces; the least, one to two. All are similar in color pattern and general habits.

Active during the day, and very common, they're easily observed foraging seeds, nuts, greens and insects on the forest floor or climbing shrubs for berries. When disturbed they scurry off, tails held straight in the air, "chipping" excitedly! They often climb stumps to view intruders. At ease, they utter "chuck" calls at evenly-spaced intervals. Always hungry, the little tykes soon learn to beg food from picnickers, but if ignored they simply sneak into food containers and steal their share of goodies!!

Photo by Dave Crehore

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Front Cover

Pond Life: a painting by Mel Kishner from The Milwaukee Journal. For more about Kishner's art and the way he depicts outdoor Wisconsin, see page 4.

Back cover

American bittern fledglings. These babies will grow up to become the familiar "thunder pumpers" of Wisconsin marshes. DNR photo.



From a painting by Mel Kishner, *The First Season*.





Mel Kushner's art: The Fourth Season

Outdoor Wisconsin has been his subject, his credo to depict a mood. It is important not to be a mere renderer. Like the title of one of his own paintings he enters *The Fourth Season*: retirement — from *The Milwaukee Journal*.

*J. WOLFRED TAYLOR, Editor,
Wisconsin Natural Resources*

Mel Kushner's art has appeared in *The Milwaukee Journal* for nearly 40 years. He will retire in May. For hundreds of thousands of people, his work catches the mood of outdoor Wisconsin—the chill solitude of a deer hunt at dawn—or the haunting line of a snowy hillside at dusk. With earthy good humor he calls his very funny and popular cartoons about opening the hunting and fishing seasons “the best known privy art in the state.” For the hunter, angler, skier, boater, hiker and others he captures the emotion of their activity as it relates to the pervasive and distinctive presence of the Wisconsin landscape. These people will miss the easy opportunity to see his work in the paper.

But they can still find it in the galleries. For years Kushner has had a parallel career in fine art—more than 100 one-man shows and exhibits in numerous halls, nationwide. His work hangs in many collections. Even though the search for mood pervades these gallery paintings and the “feel” of a scene is often the real subject, the style of his commercial and fine art are not absolutely distinct. Mood runs deep in the best of the newspaper art too.

Kushner, who retires from *The Journal* as director of its art department (“I hate being an office boy.”) has strong feelings about the relationship of fine to “so-called commercial art.”

“There is a nebulous demarcation. Years ago commercial art was cut, dried and mechanical but today many of its people are even more talented than those in the fine arts. They draw heavily upon one another.”

Kushner says outdoor Wisconsin evolved as a dominant theme for him as a result of two influences.

“I was a city boy all my life until I got married. Then circumstance forced a move to 11 acres in the country near Pewaukee. I resisted it, but fortunately got out at a time of year when the weather was decent. I started to enjoy seeing something beside concrete sidewalks and hearing something beside streetcars. I began to really enjoy the sounds and the look of nature.

“Then I got tangled up with a raunchy character named Mel Ellis (longtime *Milwaukee Journal* outdoor writer). We worked together and he became one of three people who had a very strong influence on my philosophy and my life. I've found Mel to be one of the most sensitive people I've ever met. We'd go out on assignment and he'd bring something to my attention that I'd never noticed, something little and insignificant that suddenly became very important.”

The two others who had a strong influence were artists. One is Edward Boerner. “Ed made me try to be a good painter. Surprisingly I still think to myself as I paint, ‘How would Ed feel? How would he react to this as a piece of art?’”

The late Robert Von Neumann, a Kushner instructor at the old *Milwaukee State Teachers College* was the third. “He was inspirational as well as a great teacher. Bob made me understand that there was more to painting than just being a renderer.”

Kushner's wife, the former Jane Pierce of Madison, is of course another influence. He met her at a teachers convention where she was performing with a group from the UW School of Modern Dance. They have four children, three daughters and a son, ranging in age from 20 to 37. Surprisingly, after graduating from college, Kushner wanted a career in athletics. Jane helped him decide on art.

“All through high school and college my main interest was athletics.” He was on the track (100 yards in 9.7) and football teams at Teachers College and after graduation became an assistant coach there. He also coached at St. John's Cathedral High School and has officiated in football, basketball and track as a hobby for nearly 25 years. In 1973, he was named to the UW-Milwaukee Athletic Hall of Fame.

“As time went on I was never certain in my own mind which was more important, the arts or sports. But one day my wife brought home a point. She said, ‘You're hard enough to get along with under normal circumstances, but when you're coaching, you're impossible.’”

Shortly afterward in 1940, he was offered a job in *The Milwaukee Journal* Art Department and took it.

Of his years there since he says, “I occasionally go back and look at some of the things I did in my early days and wonder why they ever kept me around. That's the truth! My drawing ability has improved a great deal here and I've learned how to translate an idea into an illustration. I think one of the things you develop is an escape from doing the obvious—not doing the first thing that comes to mind.

He said that the pressures of the deadline helped develop spontaneity and freshness. “These are the things that carry the feel and the emotion across. If it looks overworked it's just going to be dull to look at.”

At age 63, Kushner still approaches his art with humility. “I've been painting for more than 40 years and am just beginning to scratch the

surface. If I live another 40 I might really start learning the fundamentals.” It's difficult for a lot of people to realize how much an artist gets involved with the surface he's working on. What's happening there is much more important than what the painting says from the standpoint of story.

“The literal content is a takeoff point as far as I'm concerned. When I'm through, if the painting has no literal quality at all, it's perfectly all right as long as I'm completely satisfied in my own mind that I've treated the surface of that paper or board in the best possible manner for spatial relationships, for color texture, for design and for things that I look for in painting.

Kushner says he hits spells when for weeks at a time he does not paint. “I feel I have nothing to say when I'm dried out. I go down to the studio, look at the paintings and find myself cutting a frame or cutting a mat and doing everything under the sun except paint. But when I'm in the swing of it, I'm very productive. It goes in cycles and I can't

predict the cycles. The dry spells always seem to fall when I need paintings the most.

“I've been very fortunate in the past 15 years in that people want my paintings. They're in demand. But I can also honestly say that I don't paint to sell. I paint to satisfy myself first. It's a considerable bonus that other people might like what I do and be willing to pay for it.”

At this writing Kushner is getting ready for another one-man show in Tucson, Arizona. After retirement, he and his wife will leave Wisconsin to live near there. They are busy planning the new house for their 20 acre home site. It will have a kitchen with a view that looks at the mountains.

People familiar with Kushner's work will be watching to see how the arid southwest affects a style so expressive of Wisconsin. Meantime, outdoor enthusiasts here sincerely wish him that additional 40 years. Doubtless, the famed Arizona landscape will get a new look.

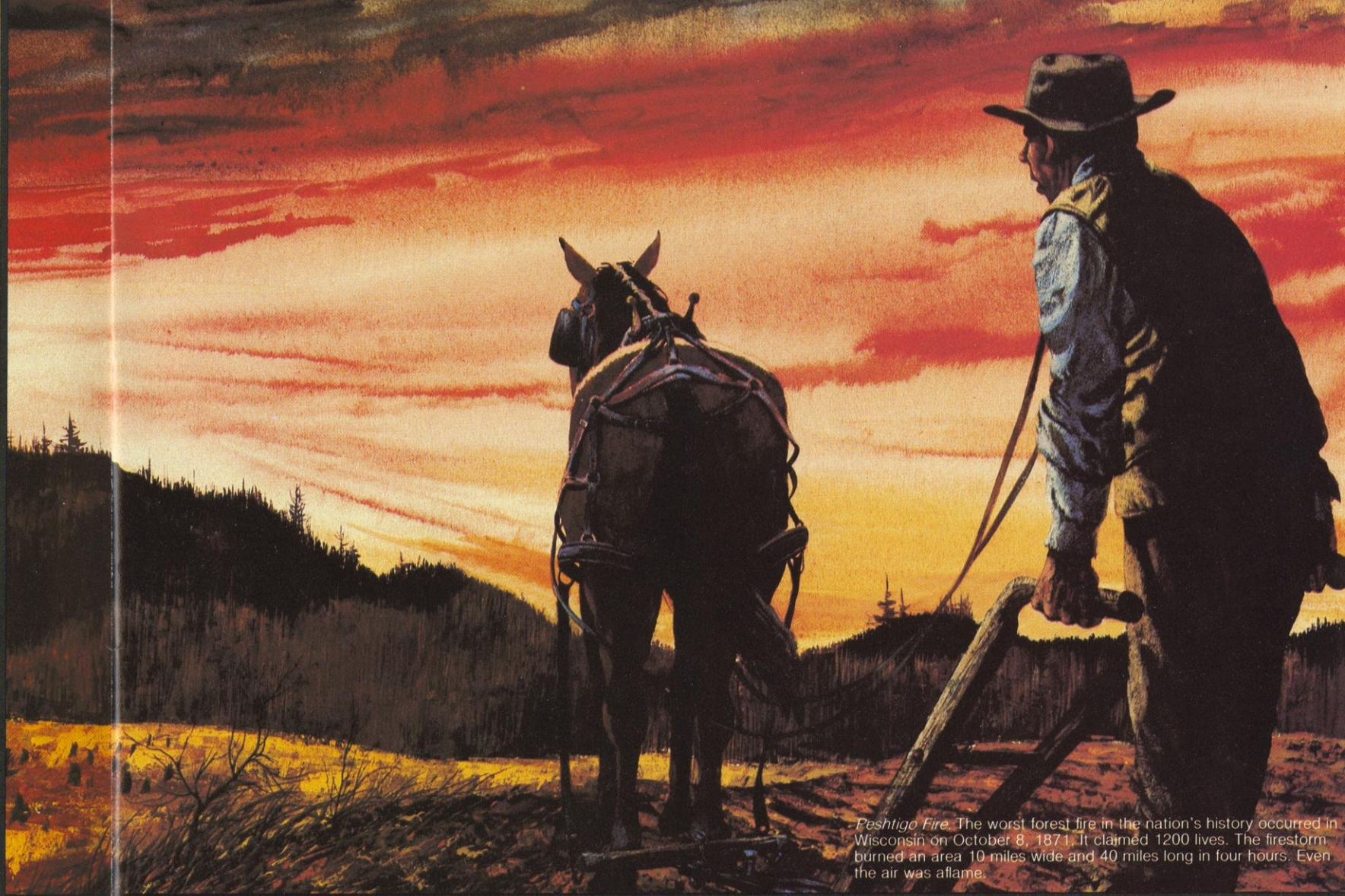


Mel Kishner at work with a palette knife.

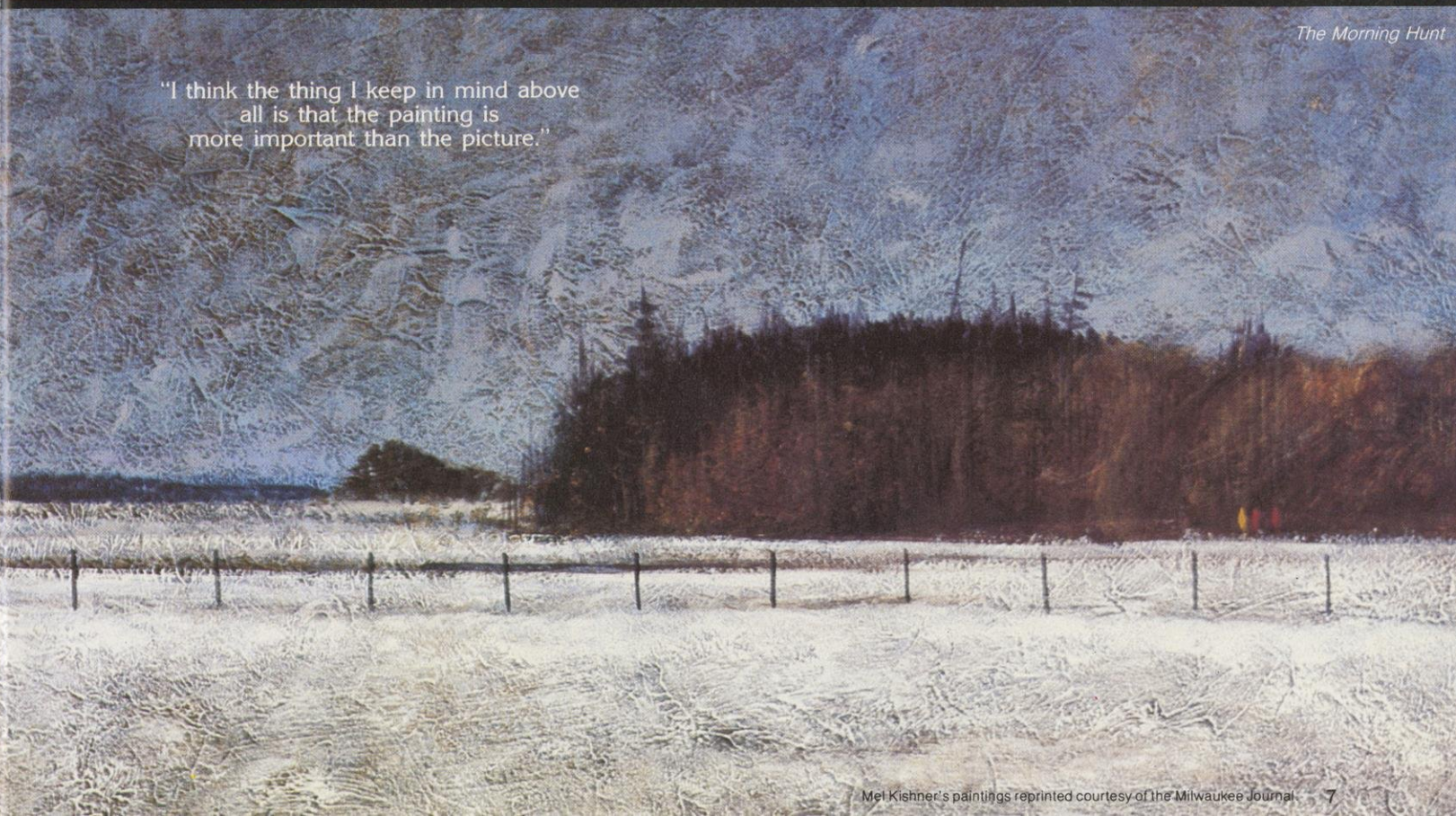
"A mood is very important to me. When people think of my work they think of a Wisconsin winter with bare trees. Well, that's the subject matter, but the subject matter again is only a means to an end. I paint the Wisconsin winter because I like the color pattern, the feel of the grey and the earth tones, the muted colors, the snow, the ice, the mists. The bare tree is a design and a decoration that plays very sharply against, perhaps, the softness of a wet watercolor or the rough texture of an acrylic surface. I get much more involved in these considerations than in saying this is a particular spot in Wisconsin, a particular rock in the driftless area. That sort of thing I can do with a camera."



The Third Season



Peshtigo Fire. The worst forest fire in the nation's history occurred in Wisconsin on October 8, 1871. It claimed 1200 lives. The firestorm burned an area 10 miles wide and 40 miles long in four hours. Even the air was aflame.

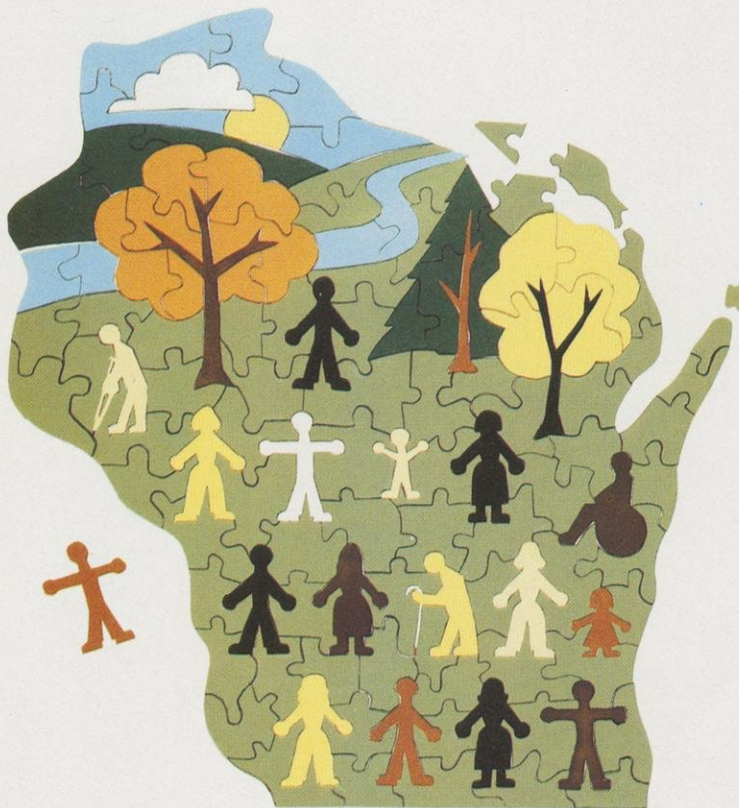


The Morning Hunt

"I think the thing I keep in mind above all is that the painting is more important than the picture."

DNR signs: hablan Español

DNR is making some small changes for users of its outdoor recreation programs. We want them **all** to feel comfortable and welcome. You'll see the signs this spring.



Map by Georgine Price

**Wisconsin State Parks:
No one is left out.**



DAVID A. TORRES, *Affirmative Action Officer, DNR*
DAVID C. SHOUDER,
Superintendent, Big Foot Beach State Park

Upon entering Big Foot Beach State Park this year to purchase your admission sticker, one of the first signs you see will say "Estacionamiento." Along with it will be the English, "Parking."

All Big Foot signs have been converted to a bilingual-pictograph system, Spanish-English or international symbols. This is to accommodate non-English speaking peoples who use the park. Approximately 95% of them speak Spanish. They enjoy beautiful Lake Geneva, the park's more than 40 acres of quality picnic area and its places for swimming, soccer, softball and other activities. Spanish-English signs will be of help to them and so will the pictographs.

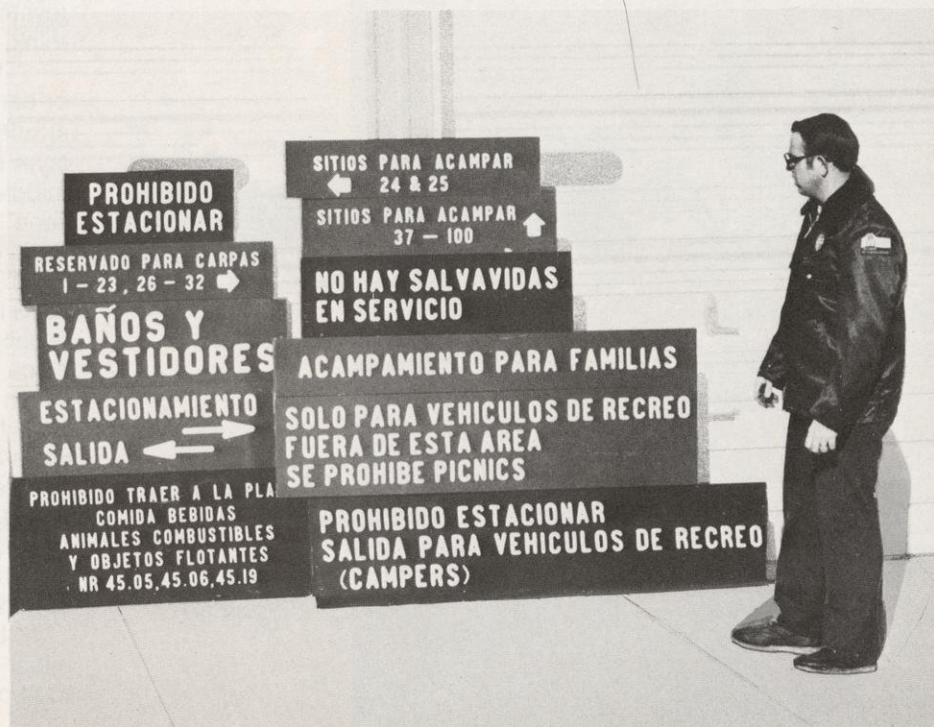
Most people are already familiar with many of the international pictograph symbols that give directions and information and are commonly seen along highways and at airports and other public buildings. The wheelchair is probably the best known but these signs are a regular universal dictionary for all sorts of information.

DNR personnel at Big Foot have picked up a little Spanish out of necessity, though its accuracy is questionable judging by polite smiles that sometimes light the faces of visitors. Even so, language has never been a large difficulty. Usually several members of a family can interpret when a problem arises.

To reduce the language barrier even further and provide Spanish speaking visitors with a closer link to the natural and human history at Big Foot, DNR plans to print the park newspaper in Spanish next year. Called the *Park Visitor*, the paper will be filled with the same information as its English counterpart.

The efforts at Big Foot are part of a statewide DNR reassessment of accommodations at all installations. More of these little changes are coming to open the out-of-doors even wider. The object is to help everyone, including the aged and handicapped enjoy all DNR facilities everywhere in comfort and dignity.

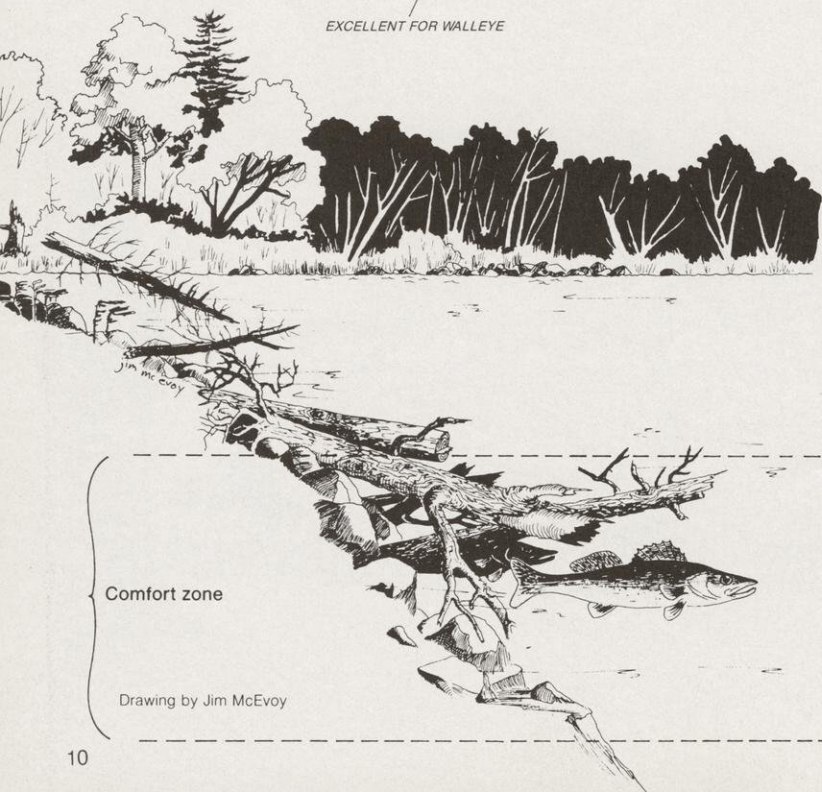
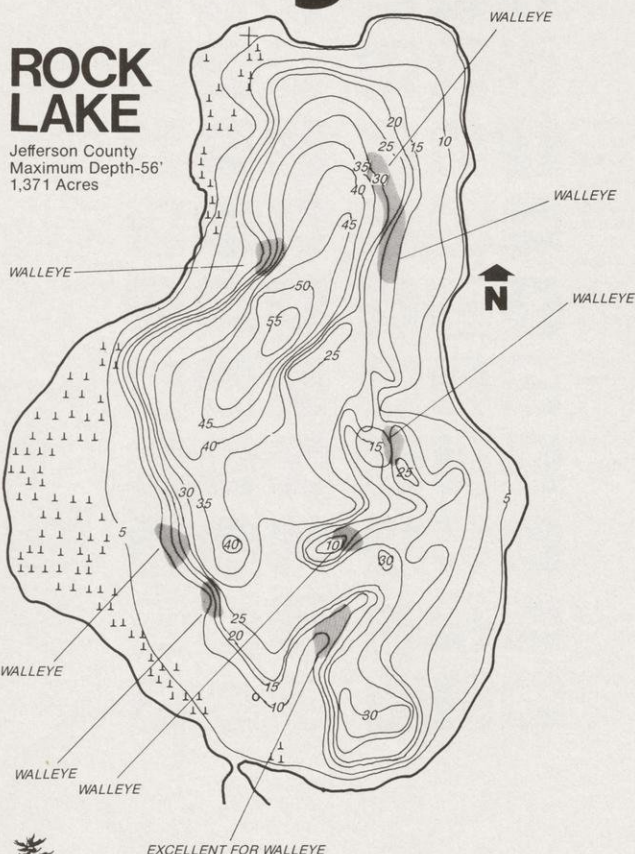
GENERAL		RECREATION SYMBOLS					
Firearms							Picnic Shelter
Smoking							Trailer Sites
Automobiles							Trailer Sanitary Station
Trucks							Campfires
Tunnel							Trail Shelter
Lookout Tower							Picnic Area
Lighthouse							Kennel
Falling Rocks							WINTER RECREATION
Dam							Winter Recreation Area
Fish Hatchery							Ski Touring
Deer Viewing Area							Downhill Skiing
Bear Viewing Area							Ski Jumping
Drinking water							Sledding
Information							Ice Skating
Ranger Station							Ski Bobbing
Pedestrian Crossing							Snowmobiling
Pets on Leash							WATER RECREATION
Environmental Study Area							Marina
ACCOMMODATIONS							Launching Ramp
OR SERVICE							Motor Boating
Lodging							Sailboating
Food Service							Row Boating
Grocery Store							Water Skiing
Men's Restroom							Surfing
Restrooms							Scuba Diving
Women's Restroom							Swimming
First Aid							Diving
Telephone							Fishing
Post Office							LAND RECREATION
Mechanic							Horse Trail
Handicapped							Trail Bike Trail
Airport							Bicycle Trail
Lockers							Recreation Vehicle Trail
Bus Stop							Hiking Trail
Gas Station							Playground
Vehicle Ferry							Amphitheater
Parking							Tramway
Showers							Hunting
Viewing Area							Stable
Sleeping Shelter							Interpretive Trail
Campground							Interpretive Auto Road
							Prohibiting Slash



Dog day walleyes

ROCK LAKE

Jefferson County
Maximum Depth-56'
1,371 Acres



Drawing by Jim McEvoy

May 6 is opening day this year, but for anglers who want to catch walleyes in midsummer, the structure of the bottom line is a top consideration.

JIM KLEINHANS, DNR Bureau of Information and Education, Madison

One hot, sticky summer evening, Al Lindner came off Tomahawk Lake to give a fishing clinic at Lakeland Union High School in Minocqua.

An angler in the crowd asked Al what he would do if he were out in the middle of a lake and his depth-finder malfunctioned. Said Al, "I'd get off the lake."

Lindner is the originator of the famous Lindy Rig and one of a handful of the most proficient anglers in the United States. He was telling the audience that without a depth-finder to define the lake bottom he'd literally be lost and simply quit fishing.

Most seasoned anglers know full well that an electronic depth-finder really shouldn't be used to "locate fish," as some manufacturers would have us believe. Rather, it should locate the "structure" fish are likely to frequent.

"Structure" can take many forms—deep mid-lake rock bars, sand bars that jut out from shore points, weed beds, man-made fish cribs, or steep drop-offs.

Different species of fish prefer different types of structure at different times of year. This article is about walleyes and because anglers have a tough time catching them during the dog days of summer, I'll concentrate on how to find them then.

Between now and mid-June, the average angler will do pretty well on this great tasting fish. After spawning, walleyes will remain in the vicinity of the spawning grounds (less than 20 feet deep) feeding quite heavily. But then, all of a sudden, they disappear mysteriously into the unknown—or as many anglers think, they suddenly stop feeding. Right? Wrong.

What happens is that sometime during late June or early July, depending on weather, the deeper lakes stratify to form three distinct layers of water. The top layer is too warm, the bottom is too cold and the middle just right. The middle layer is the "comfort zone" walleyes seek out and that's where you'll find them during July, August and early September.

The exact location of the comfort zone varies in each lake, but through experience I've found that it's usually between 20 and 30 feet. The trick is to find a piece of structure in the middle of the lake that falls within this depth category.

It's also good to know that a walleye in some ways is a lot like a ruffed grouse and other terrestrial wildlife. It's an "edge" creature. You usually won't find a partridge in the middle of a mature forest, but at the edge where forest meets open land. Same with a cedar swamp—the ruffed grouse will flush from the edge where swamp meets the uplands.

Likewise, the walleye. It won't be found in the midst of a weed bed, but at the edge, not on top of a rock or sand bar, but at the edge.

With this in mind, you can anticipate that walleyes in mid-summer will be in 20 to 30 feet of water, at the edge of a structure, whether it be a rock bar or a steep drop-off. And, you can be pretty sure this structure won't be found near shore but some distance out in the lake. The question is how to find it.

First of all, get a recent contour (depth) map of the walleye lake you're fishing. These can be purchased from sporting goods stores, map companies and other sources. Most good ones are based on DNR data, though DNR does not sell or distribute them.

The contour map will show where the structures you're looking for are located. An electronic depth-finder, which can be purchased for less than \$150, is an invaluable aid to the serious walleye angler. There are less sophisticated ways of locating deep-water structure, but an electronic depth-finder makes it quick and easy.

Once you've found the preferred place it's good to remember that walleyes follow rather narrow migration routes in mid-summer. They'll likely use only a certain portion of the structure, such as one edge. The trick is to locate the fish. After that you can be fairly sure they'll frequent that same area day-after-day.

Most anglers feel to catch walleyes they must be on the lake in late-evening, night or early-morning.

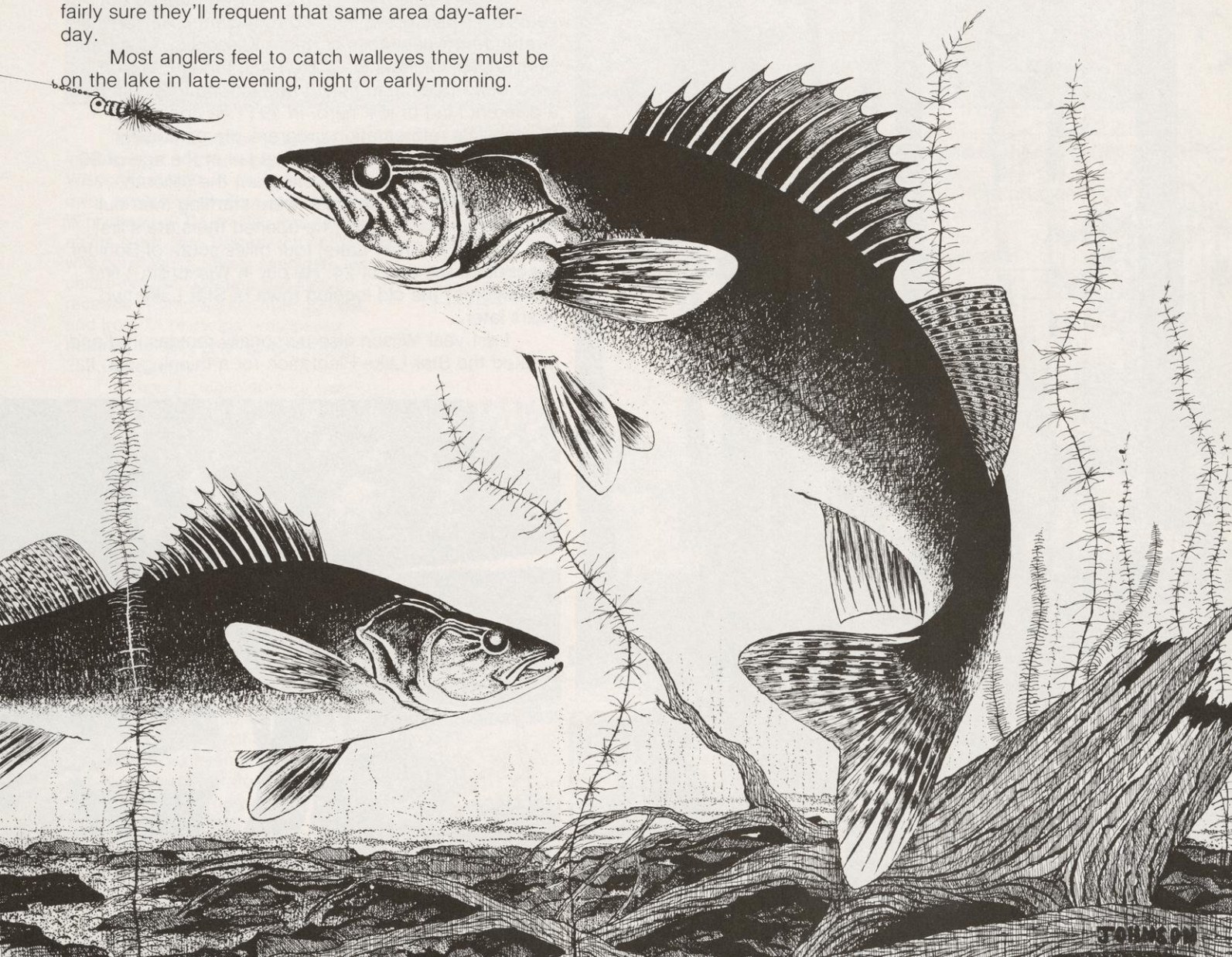
Maybe this is true other times of year, but during mid-summer, mid-day can work.

The walleye is very light-sensitive. However, light doesn't penetrate to depths of 20 to 30 feet and down there walleyes can feed any time of day. Al Lindner, for example, fishes them from 9 a.m. to 4 p.m. in mid-summer and does very well.

It's a fact that 10% of the anglers catch 90% of the fish. A good angler eliminates 90% of the unproductive water and quickly gets to the 10% — which is always in the vicinity of some type of structure that attracts fish.

This knowledge in itself won't guarantee limits of walleyes. There are many days when fish just won't bite no matter how good the location. (Cold fronts are poison). But just as deer hunters must know the habits and movement of whitetails to be successful, so walleye anglers must know the habits of the fish they seek. This piece of information about structures is basic. You can take it from there—and good luck!

Drawing by Tim Johnson, Rhinelander



A billion trees: the legend of Fred Wilson



Foresters speak the name of Fred Wilson and Star Lake with awe, admiration, respect, incredulity. And no wonder!

From the Green Bay Press Gazette, Rhinelander Daily News and DNR Digest*

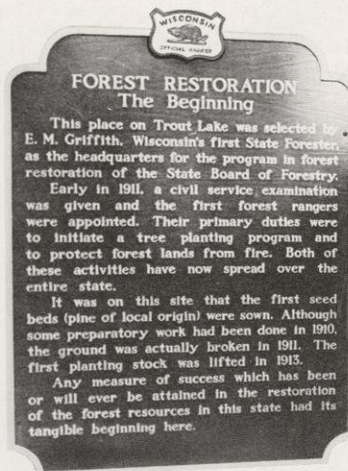
Some of the trees Fred G. Wilson planted 65 years ago have grown into 80-foot giants. His forests stretch for miles across northern Wisconsin. Like Paul Bunyan, he's a legend. Unlike Paul, though, Wilson grew more trees than he cut and among foresters he's a different kind of folk hero. In 1911 he conceived Wisconsin's reforestation program. He personally planted its first tree in 1913. Last fall at the age of 90 he came back to Wisconsin to plant the billionth.

A pioneer whose ideas were startling then but are commonplace today, he opened the state's first tree nursery at Trout Lake, four miles south of Boulder Junction at the age of 24. He put in Wisconsin's first plantation at the old logging town of Star Lake two years later.

Last year Wilson also personally remeasured and marked the Star Lake Plantation for a thinning cut. It



The billionth tree



was the sixth time he had returned to Star Lake for a thinning. Wilson's records on the site are meticulous and renowned among foresters. Star Lake proved that tree planting paid off.

Adjacent to the spot where the one billionth tree was planted at Trout Lake a State Historical Society marker reads: "Any measure of success which has been or ever will be obtained in the restoration of the forest resources of this state had its tangible beginning here."

Wilson is the sole survivor of a handful of men who were Wisconsin's first foresters.

Born in Red Oak, Iowa, when Grover Cleveland served his first term as president, Wilson moved to Milwaukee with his family at the age of two.

After high school he went for a degree in forestry. One of 14 in his graduating class at Michigan State, Wilson returned to Wisconsin and promptly found a job as assistant to E. W. Griffith, Wisconsin's first state forester. From the beginning, their years together were full of innovation and excitement. They set up the first state forestry headquarters, the first system of state fire protection towers and the first state tree plantations.

People laughed at Wilson when he went to the northwoods to plant trees because the north was still thick with them. "There'll always be trees," most persons assumed and the axiom of the day was "the plow will follow the axe." Trees would be a pain in the neck to farmers who followed loggers into the northwoods.

But it didn't happen that way. The growing season was too short, the soil too poor and farmers couldn't survive up north.

Wilson's reforestation project, started with 68,000 trees at Trout Lake, assumed greater and greater importance. In 1926 state nursery production reached one-million. Capacity expanded. New nurseries were built — at Wisconsin Rapids in 1932, at Gordon in Douglas County in 1936, at Hayward in 1944 and at Rhinelander and Boscobel in 1951.

Like all of us, Wilson had his time of testing. In 1916, forestry was outlawed as a state sponsored program because it was an act of "internal improvement" prohibited by the Wisconsin Constitution.

Griffith took the defeat as a repudiation of his efforts and retired to Connecticut. He cut all connections with the forestry profession.

Wilson, out of a job too, left the country to work in British Columbia. There he earned the first certificate issued to a forest engineer under the British Columbia Professional Engineering Act.

Meanwhile in 1921, a forestry amendment to the Wisconsin Constitution passed. State forestry was legal again. This was all it took to get Wilson back to Wisconsin.

In 1922, he became Wisconsin's first Extension Forester. In this position he was an early advocate of land use zoning. His crusade, though highly unpopular at the time, continued until 25 Wisconsin counties had zoned five million acres for forestry and wildlife.

Most people thought cutover land was valueless, but Wilson's faith in trees as a renewable resource led to his most significant contribution. He was the leader in obtaining legislation that enabled Wisconsin counties to take ownership of tax delinquent land. This created Wisconsin's 2-1/4 million acres of county forest — all obtained without spending a single dollar in appropriations. Today it is still the biggest segment of publicly owned land in the state.

Wilson drafted successful legislation in 1924 changing the State Constitution to permit an annual property tax levy for forestry purposes. This method of funding assured continuity of program and is the envy of many of Wisconsin's sister states. It has grown from \$250,000 annually in 1924 to over \$8-million now.

Today, in his 91st year, Wilson stands as straight as the towering pines he planted six decades ago. His words and thoughts flow as clear as ever.

Since retirement, he has continued to serve forestry as a lecturer at various forestry schools, as a consultant and an inspiration to new foresters both public and private. He currently lives at Nogales, Arizona and is completing a biography of the man who hired him, E. W. Griffith, Wisconsin's first forester.

Wilson has had a singularly satisfying career. Because of his foresight millions of acres of Wisconsin will be forest forever — the backbone of a giant industry — a perpetual source of public outdoor recreation. Man and legend, he started it all. Wisconsin is grateful.

*Portions of a story by Mary Good



LAWCON opens the campus wider

Townspeople, joggers, tennis players, anglers, cyclists, high and grade school students, boy and girl scouts and everybody are all doing their thing these days at the nearest University of Wisconsin campus.

DONALD C. GERHARD, Director of Planning and Environmental Affairs, UW Systems

Ten different UW System campuses have recently begun recreation and education projects that under the law have to be used by local residents and students alike. Significant university acreages rich in native landscape will now be open to everyone. The projects are an extension of the well-known legislative mandate which requires the UW System to reach far beyond the walls of the traditional classroom into all areas of life.

Inviting more local people has been made possible by matching money from the Federal Land and Water Conservation Act (LAWCON) administered by DNR. All projects funded by LAWCON must have local community involvement and this dovetails very well with the University's outreach efforts.

Needless to say, community support for these LAWCON projects has been very enthusiastic. Regional plan commissioners, mayors, parks directors and civic-minded groups have all been quick to see the advantages of making valuable university scenic and recreational facilities accessible to the

local population. After all, why should communities use additional space, money, personnel and equipment to duplicate facilities already being developed on state-owned, university-managed property? Tax-dollar savings from avoiding such duplication can be put to good use for local needs such as fire departments, sewage systems and schools.

Local Little League baseball and city summer recreation tennis for example, are played on UW athletic fields. The University makes maximum use of its own facilities while the community is relieved of constructing and maintaining duplicate facilities.

Organized sports are only one aspect of these shared-use projects. Each parcel of land has been chosen both to reflect the diversity in landscape found throughout Wisconsin and to encourage the greatest possible variety of outdoor activities.

A 26-acre tract at UW-River Falls, for example, is a mixture of upland and lowland hardwoods bordering the Kinnickinnic River, which is being developed for nature walks, tennis and physical fitness exercise. The Bayshore Development at Green Bay, on the other hand, will offer shelters and boat landings as well as hiking trails. Other projects include cycling, picnicking, baseball, softball, tennis, fishing and swimming.

Probably the most ambitious one so far under the auspices of LAWCON has been the Schmeeckle Reserve at UW-Stevens Point. Beginning with 186 acres, the carefully planned reserve will have a number of unique features. A natural Wisconsin landscape with 14 native plant communities will be preserved. Multi-purpose woodchip trails 2-½ miles long will allow the public, organized groups, and university classes to observe wildlife and plants and find out about natural ecosystems. A 24-acre man-made lake with native trees, shrubs and groundlayer plants on shore and overlooks, seating areas, and a canoe landing will be created. Habitat will be created for fish stocked by DNR.



UW-SYSTEM LANDS ELIGIBLE FOR LAND AND WATER CONSERVATION PROGRAM

Campus Community	Land (Acres) Acquired With LAWCON Funds	Added UW Natural Resource/ Recreation Lands	Total Acres Now In Program
Eau Claire	0	235	235
River Falls	0	26	26
Whitewater	40	75	115
Stevens Point	70	116	186
Platteville	12	15	27
Green Bay	17	43	60
Rice Lake	0	12	12

▲The Bayshore boating development at UW-Green Bay. LAWCON purchased 1000 feet of shoreline for the project.

An existing ½ mile-long city street which cuts through the Reserve will be turned into a meandering bicycle-pedestrian pathway with benches for those who want to relax, visit with friends, or enjoy a warm spring day.

An earth mound large enough for sliding will also have two trails for beginning downhill skiers. There is another path for cross-country skiing.

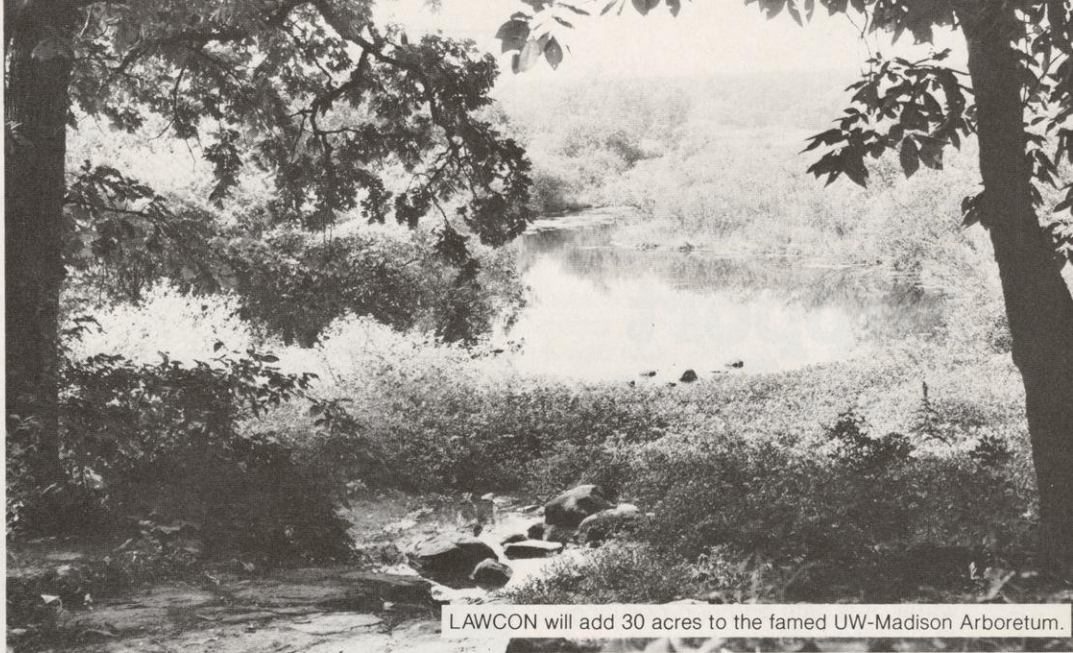
A fourth major feature is a fitness trail, 1-½ miles of pathway for jogging with 23 exercise stations at different points along the path. A UW-Stevens Point graduate student, who has written a manual on this European concept of exercise, acted as a consultant in planning this facility. It is expected to be heavily used by local residents and also by many of the 2,200 people employed in the Sentry office complex nearby.

It's true that development of almost 1,000 acres of land for local educational and recreational use by the largest possible number of Wisconsin residents is an ambitious undertaking. But the UW System is in a unique position to do it. It is the only state agency other than DNR which manages large tracts of recreation-educational lands scattered throughout Wisconsin.

It is represented in 27 communities from Kenosha in the southeast to Superior in the northwest and from La Crosse in the west to Green Bay in the east. More than two-thirds of the state's population is within commuting distance of campuses. A total of 148,000 persons attend the various universities daily. In addition, more than 25,000 university employees and several thousand visitors come to the UW campuses each day. This great potential for reaching such a large percentage of the state population has led DNR to budget \$50,000 annually for LAWCON projects in the UW System.

In addition to more obvious advantages, the LAWCON projects have required campuses to pause in their development programs and confer with local community groups. Together they identify specific areas to be preserved for recreation and natural resource study. These lands thereafter are held in trust for use and enjoyment by everyone and the UW System assumes responsibility for their planning, management and maintenance. Although the early thrust of the program was in land acquisition, the campuses have since included large areas they already owned so that university land acquired with LAWCON funds now represents only slightly more than 21% of the total acreage.

The UW System likes this new chance to attract local people to the campuses for recreation. It is part of what education is all about.



LAWCON will add 30 acres to the famed UW-Madison Arboretum.



Part of the 186 acre Schmeckle Reserve at UW-Stevens Point. This major LAWCON project features a 24 acre lake, and a 1½ mile fitness trail, cross country skiing, cycling and nature hikes.



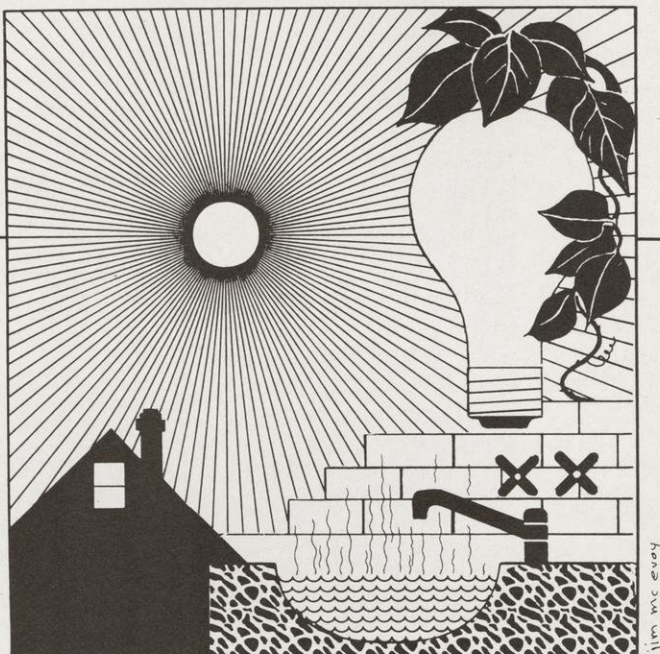
The Putnam Park overlook on the Chippewa River at UW-Eau Claire—part of a LAWCON trail system.

Guest editorial:

Support Sun Day

The sun rises every morning and sets every evening, delivering energy to your doorstep or rooftop without powerline, pipe or hose. The sun doesn't foul the air, land or water. It is safe and non-polluting. There isn't a thing a terrorist, hijacker, multinational company or international cartel can do to prevent sunpower from reaching you.

On May 3rd there will be a national celebration for this inexhaustible, predictable, egalitarian, safe and "free" energy source. It will be called Sun Day. Citizens throughout Wisconsin will participate. Madison will feature a sunrise "run with the sun," a May 3rd Solar Energy Conference,



various workshops and an alternative energy fair on the State Street Mall May 6th. Find out what's happening in your community and get involved.

The idea is to get the U.S. going on technology to harness the sun's energy and put it to work for you. Sunlight becomes hot water through a solar panel, electricity through a solar cell. Wind, rain and

tide can be tapped. These technologies are not "exotic." Many predate oil, gas and nuclear technologies. Effort and money needs to be focused on them. Sun Day is a start. Support it!

Bonnie Albright
Solar Energy Coordinator
Office of State Planning & Energy

FRANCIS "BILL" MURPHY, Chairman of the Wisconsin Conservation Congress says:



fish. Today though, as a result of new statutory status, the role of the Conservation Congress is much broader.

Ever since 1972 the organization has been encouraging people of diverse environmental interest to participate. Conservation Congress committees now work not only on fish and game problems but also on solid waste disposal, water and air pollution and mining. A "ban the can resolution" receives the same care and attention as the opening day of the fishing season up north.

Today, dedicated hunters and fishermen pursue environmental quality with the same fervor that goes into traditional fields. They know that without clean air and without clean water, other efforts may be in vain.

Besides elaboration of strictly environmental concerns, the Executive Council of the Conservation Congress recently supported examination of DNR

The Wisconsin Conservation Congress is an independent organization. For 40 years it has been a voice of state sportsmen. Many hours of debate and hearings have been held on deer, duck and pheasant seasons—other hours on size and season limits for

There's room for everyone

practice in developing campgrounds, hiking trails and preservation of railroad right-of-ways as corridors for human use. Here again, the Conservation Congress is reaching out, taking advantage of its broadened responsibility.

But there is a difficulty. Frankly, the Congress needs a healthy contingent of people interested in these issues to show up at the meetings and participate. We want them in the organization. I know many feel that they will be laughed at or ridiculed if they bring up anything besides fish and game issues. This is absolutely not so. It is just the opposite. We welcome expression of other concerns. We need open and frank discussion on all environmental issues of the day.

The Conservation Congress has a statutory responsibility to advise the Natural Resources Board in all areas of the Board's jurisdiction. As we move toward the 1980's I encourage local leaders to join the Conservation Congress, to seek election to it, and to get all of their environmental concerns before the board. There is no better avenue.

The ideas spawned at the courthouses this April will show up at the statewide meeting in Rhinelander on June 1st, 2nd and 3rd. They will become the laws and regulations of the future.

If you care, if you want to participate, if you have the time, we have the place and the organization. Our statement to all who are interested in Wisconsin's outdoor environment is that *the Conservation Congress has room for everyone.*

The readers write

I enjoyed Mark Stokstad's article on "Cleaning Up" in the January-February issue. While the article was brief, I believe it pointed up a definite need to continue surveillance of mills along the Wisconsin River until all discharging into the river is curtailed. The mills are definitely not going to take it upon themselves to stop polluting this wonderful river.

FRANK J. LUEDTKE, President, Pentenwell Lakes Property Owners Assn., Nekoosa.

"A Borderline Case" in your January-February issue is well-written, well-coordinated and brings out varied viewpoints on the problems being experienced by these three western Wisconsin counties. This feature certainly meets the high standards that I have come to expect from the Wisconsin Natural Resources magazine.

KEVIN W. JONES, Economic Planner, Eau Claire.

I just read the article in the January-February issue by Carol Diggelman ("I don't like snowmobiles") stating what a bargain snowmobile registration fees are. Our family has paid fees on one to three machines since the fee was started. Yet I don't know of a groomed trail within quite a few miles of our home in the west end of Fond du Lac County.

I guess it's okay for people who can afford to spend weekends up north, but for most of us lower income people, groomed trails are a luxury we pay for but can't enjoy.

WINTON E. LENZ, Fairwater.

Have you good folks a thing against maps? Half the January-February issue is devoted to the Twin Cities border, mentioning dozens of places, but nary a map (except three the size of postage stamps). **ROLAND PARRISH, Madison.**

I applaud the change of format of the Natural Resources Magazine. It verges on the elegant in paper quality and excellence of photography and reproduction. The articles are well-written and informative.

I sense a quality of editorial direction which will make this journal significant in education and public relations. You and your staff are to be congratulated for such a step forward on behalf of your readership.

DR. WESTON D. GARDNER, M.D., Elm Grove.

As a result of my article on the Old Copper Culture (January-February 1978) the Justice Department has contacted us regarding mining regulations for Wisconsin. The State Historical Society is now suggesting to the Justice Department ways of preventing destruction of Old Copper and other archaeological sites which could otherwise occur as new mines are developed. **JOHN T. PENMAN, Madison.**

I see that your feature articles are written in accord with the seasons—that's great. Hope there'll be more tips on fishing the various species, but also more detail on their feeding habits, hide outs, best times of year to catch, etc. I'd also like to see articles taking the entire state, county by county, giving as many particulars as possible.

AL WANNINGER, Menomonee Falls.

Readers are invited to express opinions on published articles. Letters will be edited for clarity and conciseness and published at the discretion of the magazine. Please include name and address. Excerpts may be used in some instances. "Letters to the editor" should be addressed to Wisconsin Natural Resources magazine, Box 7921, Madison, Wisconsin 53707.

I've read your publication for about a year and I'm very disappointed. I find none of the information I'd expect from a DNR publication—just pretty pictures and an attempt to compete with other sports magazines.

In order to find out the deer kill for Wisconsin last year I had to read it in a Minnesota newspaper. Have you ever considered asking your readers what they want you to publish? **RICHARD BOLLON, Hudson.***

In "Wisconsin's Old Copper Culture," January-February John T. Penman states, "The copper did not become brittle because it was allowed to cool slowly after being pounded into shape."

Unless the laws of nature have changed recently, copper is annealed by heating and then quenching in water. Steel is annealed by slow cooling. **ROBERT C. WACKER, Madison.**

I thoroughly enjoy reading all your articles. The cover and color photos of wildlife take my breath away, they are so beautiful and real. Especially enjoyed the article "Return of the Native - Turkey" by Ronald Nicklaus in the November-December issue. **BESS KOSOBUD, Adams.**

* This material is published regularly in Natural Resources Notes issued bi-monthly by DNR. Subscriptions are available free by writing to the Bureau of Information and Education, DNR, P.O. Box 7921, Madison, Wisconsin 53707.

Mrs. McCormick: in memoriam



In a memorial resolution, the Natural Resources Board has mourned the death of its secretary, Mrs. Victoria McCormick, 68, Waukesha, who died January 27, 1978, in Madison. Well known for her interest in environmental education, she was the first woman ever to serve on the Board.

Mrs. McCormick had been appointed to a six-year term by Governor Patrick Lucey in 1973, and was reelected secretary the day before she died.

The Board's memorial resolution quoted from her article in this magazine two years ago. In it she said the DNR's prime educational goal should be "to place the environment alongside the three R's in the everyday educational process in our schools."

She was a past president of the Wisconsin Resource Conservation Council and formerly headed the Wisconsin Federation of Women's Clubs. She was a member of many other resource-related organizations.

A memorial to perpetuate Mrs. McCormick's interest in environmental education has been established in her name through Friends of the MacKenzie Environmental Center, Poynette, Wisconsin 53955.

Bubo-goodbye



People used to think great horned owls were enemies, but this one ended up in doll clothes.

GEORGE S. BACHAY, Author and Artist, Albany

Once upon a time a great horned owl was a member of my family. This was before 1970. Owls were unprotected in Wisconsin then.

Altogether my family has raised half a dozen owlets and every one had a different disposition. This one lived with us for five months and when it came time, he didn't want to leave. It all happened in 1956 when our youngest daughter, Terry Hilda was almost nine.

The great horned owl is the first bird to nest in Wisconsin, often incubating a clutch of two or three eggs during the blizzards of late January and February. The nest is about the size of a bushel basket and made of sticks piled on top of an old hawk or crow's nest. Those we've found have been high in the crotch of the biggest tree in a woodlot.

This story began when a farmer came to our door in late March. He said he saw a flock of crows harassing a pair of great horned owls in his woods along the Yahara River so he grabbed his rifle and went to investigate.

"One of the big owls was perched near a huge nest in a burr oak," the farmer said. His son held a baby owl in a cardboard box.

"The other big owl was right at the nest. I shot it and then we noticed a baby peeking out. My son climbed the tree and found two owlets about a month old. He dropped them out. One died, but this one survived."

We named the fuzzy owlet "Bubo" after its scientific name *Bubo virginianus*. It was a miracle Bubo had even hatched because there had been frequent sub-zero temperatures and blizzards in February during the four-week incubation period. Bubo was

mostly white down and pin feathers. Weight was 1-½ pounds, and height 10-inches.

Young normally remain in the nest about six weeks and when strong enough to perch, spend considerable time on the fringe of the nest eating, and exercising their wings. Our owl was too weak to stand, so we hand-fed it raw pieces of rabbit and dead birds which we carefully stuffed into its wide mouth. Bubo gulped meat, feathers and fur just as though he were being fed by his parents.

When five months old, and almost full grown, Bubo was 22 inches high and weighed 3-½ pounds, with a 54-inch wingspread. The girls always referred to Bubo as "he" or "him", but Bubo was really a female — not that it makes any difference to the story.

Despite a ferocious appearance and huge talons, Bubo learned to perch on our bare arms and never so much as scratched the skin. He would actually 'feel' with his feet when he settled on my arm so as not to hurt me. When the girls held the big bird he would comb their long hair with his hooked beak just as though he were preening his own feathers.

When my wife Terry washes clothes she sorts out the colored garments from the white pieces and places them in separate piles. Bubo liked this. He would hop from one pile of clothes to the other and wait until one of the garments was pulled off a pile. Then he would gently grasp the cloth in his beak and pull back like a puppy playing tug-of-war.

Terry Hilda was Bubo's favorite because she played with him often. She dressed Bubo in doll clothes, and the owl would parade on the floor like a fashion model. He followed Terry Hilda around the house, and when she sat on the davenport to watch television or work a jig-saw puzzle, Bubo would fly up and perch on the back of the sofa to watch every move.

While still growing Bubo ate a sparrow, a small fish, and several mice every day. When nearly full grown he gradually tapered his appetite and was satisfied with only one small fish or a

gopher. What he couldn't eat he carried to a dark corner of his pen and hid under the newspaper that covered the floor.

His favorite foods were rats, mice and fish. We lived on the shore of Lake Koshkonong at that time and it was easy to provide fish, but rats, mice, and gophers were sometimes a problem.

People who saw Bubo perched on his teeter-pole in the yard often asked whether he could see in daylight. He could see better in daylight than after dark. He spotted birds flying over the lake before we did. I knew when something was flying over the treetops just by watching him. He always appeared to be snoozing on the teeter-pole, but his keen eyesight didn't miss the slightest movement and he was a good watchdog. When a stranger appeared he clicked his beak. Dogs and cats were afraid of him and kept their distance.

We tested his eyesight at night. If I released a live mouse or rat from a box trap he pounced on it without hesitation, clicking his beak. When a rabbit was released he hesitated, then took off in pursuit. During the day he never missed, but at night he sometimes had to strike several times to make a catch, sort of bouncing off the ground with wings spread and legs outstretched like landing gear hanging from an airplane.

Finally it came time to transfer Bubo to a woodlot. It was the end of August, and the girls were preparing to go back to school. Bubo was capable of taking care of himself. He had been practicing a hooting sound. We knew he could catch rabbits and mice, and could fly as well as any member of his kind. He had never been tied down, and often would take off and fly across Lake Koshkonong from Malwood to Charley Bluff, make a half circle to the mouth of the Rock River, and return to perch in the shade on the teeter-pole.

We always knew when he was planning a survey flight. He would bob and weave like a boxer slipping



punches, then spring into the air and fly freely. He could have left anytime, but he assumed our home was also his domain.

The problem of where to release Bubo was solved one night while driving home from Janesville with our eldest daughter Patience and two neighbor boys David and Joe Janitch. In the headlights a rat started across the road ahead of us and suddenly out of the darkness we saw a strange great horned owl swoop down. It picked up the rat in its talons and labored to gain altitude. We had to stop to avoid hitting it.

Later, the farmer who owned the woodlot said we could release Bubo there.

When the day came we took seven white bass and two perch along so Bubo would have food enough for a week in case natural prey were hard to find. We didn't feed him the day before.

My wife, three daughters, and Bubo got into the car. We headed for the woods. It was like driving a hearse. Everyone was quiet even Bubo. We parked the car a quarter mile from the woods, and marched together toward the trees like a funeral procession. Terry Hilda was crying, petting Bubo perched on her arm. Patience and Kathleen each carried a paper bag with fish in one hand while wiping tears with the other. It was supposed to be a happy occasion for Bubo, but even he seemed sad.

In the center of the big woods, Terry Hilda raised her arm for Bubo to take off, and he flew to the top of a high stump where he perched, looking down on the five of us. Then the girls placed the fish in a neat row on a log at the foot of the stump where Bubo could see them. We stood silent for a moment. The girls bowed their heads to say a prayer

for Bubo. It was so quiet I heard an acorn drop on the carpet of leaves.

Before entering the woods we had all agreed that as soon as the owl was perched and inspecting his new environment, we would walk backward to the edge of the woods, then make a dash to the car, and leave. We did that. But when we reached the car, Bubo was perched on the hood, clicking his beak.

We had a conference while Terry Hilda affectionately caressed the owl.

I outlined the new plan of action. "This time we'll go in and wait until Bubo starts eating a fish, then we'll sneak out one at a time. I'll go out first and be ready with the motor running. for a quick getaway."

Bubo turned his head from side to side, his ear tufts laid flat, and his big yellow eyes glaring at me as we hiked back to the woods again.

Terry Hilda placed Bubo down on the log beside the fish while we waited. Then she offered Bubo a six-inch perch.

He took it crosswise in his beak and flew to the top of the stump, facing the other way to pose like a statue. One by one we sneaked away. Terry Hilda was the last to get in the car, and we hurried home, a distance of about two miles.

Everyone was quiet until we parked in the yard. Then Terry Hilda shouted, "Bubo!" He was back on his teeter-pole.

Terry Hilda cried and laughed. Bubo was angry. He clicked his beak and ruffled his feathers when I approached. He didn't like this game. The girls were happy the plan had failed. But that didn't change things. Bubo still had to start living with his own kind.

"We'll do the same thing tomorrow," I said, trying to act serious. "Don't feed him anything, so he'll eat the fish we left. We'll take along a few more."

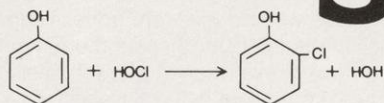
The following day we started toward the woods again from the car same as before, another funeral. The girls and their mother were crying and by then even I had a few tears.

When we got to the stump three of the fish we had left were gone. Terry Hilda placed Bubo beside the remaining four, which were already a bit smelly. Bubo grasped a white bass with one foot and flew up on the stump to eat. Holding the fish in his talons, he began to rip it open with his beak. He was really hungry. As he ate we slowly and quietly began our retreat from the woodlot.

Suddenly we heard the unmistakable spooky call of another great horned owl—"who-who-who-hooo"—coming from the far end of the woods. We all looked at each other in amazement. Then, in a group, the five of us hurried back toward the car. As Terry Hilda ran past me, with blurry eyes, sobbing, I heard her cry, "Bubo - goodbye."



The Fox: chemical soup



FRANCIS J. PRIZNAR, Project Coordinator, Water Quality Evaluation, DNR, Madison

Historically, pollution fighters have been interested in traditional water quality indicators — acids, alkalines, suspended solids or oxygen. But as analyzing tools improve, the ability to understand subtle changes in the environment increases. We now know how to find dangerous toxic water pollutants we didn't even know we had.

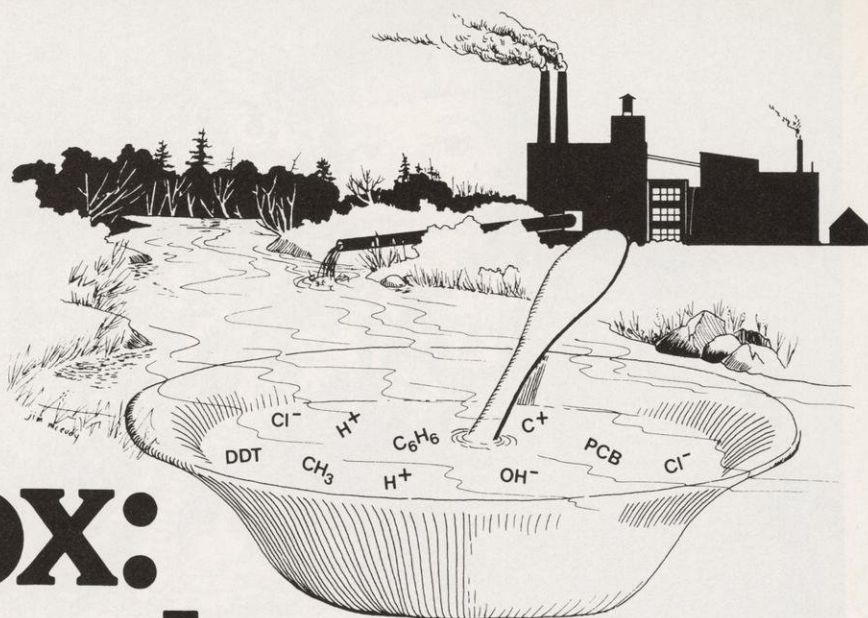
For this reason, DNR and the federal government have taken another look at chlorine in the aquatic environment.

For decades chlorine has been the principal means of controlling water-borne diseases because it disinfected drinking water and sewage wastes. More recently, with the expansion of the electrical power industry, chlorine became an important antifoulant in power plant cooling systems. But these "sanitary" uses account for only 3 to 4% of the nation's chlorine production. Along with increased understanding of ecological problems like chlorinated pesticides and polychlorinated biphenyls (PCBs) there is increasing concern

about the chloro-organic compounds that form when we chlorinate drinking water and process wastes.

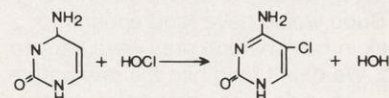
Scientists know that organic compounds exist in the water supplies of some large U.S. cities. A 1974 Environmental Protection Agency (EPA) study shows, for instance, that drinking water in New Orleans contains a variety of organic contaminants. Since then, EPA has investigated the water supplies of 80 other cities under the National Organics Reconnaissance Survey. They found chlorine-like organic compounds to be widespread and a direct result of water chlorination. Indeed, the 1976 National Water Quality Inventory mentioned industrial chemicals like PCBs, phenols and carcinogenic chlorinated hydrocarbons in the drinking water of 78 cities. None in Wisconsin were above tolerances.

Municipal wastewaters that are chlorine treated can also form chloro-organic compounds. For years we assumed that chlorine "sanitized" wastes by breaking them into harmless substances. Recent studies show, however, that this sanitizing chlorine treatment may also produce toxic compounds and create especially dangerous poisons detrimental to health and ecology at very low concentrations. Reports show that, even in small concentrations, chlorine will combine with wastes to form chloro-organic compounds.



New DNR studies with equipment never available before have identified 100 different chemicals flowing in the lower Fox River and ultimately into Green Bay and Lake Michigan. Some are safe and natural, some poisons, some carcinogens. Many come from chlorine used to disinfect or to make paper. More study is needed and DNR will now look elsewhere.

These new compounds have different characteristics than the individual materials they were made from. The new material may be more toxic, and may build up in animal and human tissues (bioaccumulation). If these compounds prove to be cancer-causing, DNR is concerned they may persist and build up in the environment.



One potential problem source in Wisconsin is the pulp and paper industry. While sanitation uses 3 to 4% of the chlorine manufactured in the US, paper industries use 15 to 16%. Chlorine is added to bleach the pulp and make paper brighter. This chlorine is eventually sent to wastewater treatment facilities and thereafter chloro-organics are formed, some of which might be poisonous. This is why Wisconsin's 46 pulp and paper mills are cooperating with DNR in efforts to control these wastes.

Partial listing of hydrocarbons identified in wastewaters discharged to the Lower Fox River

Acenaphthene*	<i>FATTY ACIDS</i>	Phenanthrene, Methyl-*	<i>RESIN ACIDS</i>
Acetone, Tetrachloro-	Lauric acid	Phenol*	Dehydroabietic acid
Acetovanillone	Myristic acid	Phenol, p-tert,amyl-	Pimaric acid
Aniline, Trichloro-	Palmitic acid	Phenol, Ethyl-	Isopimaric acid
Anisole, Pentachloro-	Hepladecanoic acid	Phenol, Decyl-	<i>RESIN ACIDS,</i>
Anthracene	Oleic acid	Phenol, Undecyl-	<i>METHYL ESTERS</i>
(or Phenanthracene) *	Stearic acid	Phenol, Nonyl-	Methyl dehydroabietate
Benzene, Dichloro-diethyl-	<i>FATTY ACIDS,</i>	Phenol, Chloro-	<i>RESIN ACIDS, CHLORINATED</i>
Benzoate, Dimethyl-	<i>METHYL ESTERS</i>	Phenol, Dichloro-*	Chlorodehydroabietic acid
Benzoate, Methyl-methoxy-	Methyl palmitate	(two isomers)	Dichlorodehydroabietic acid
Benzoic acid	Methyl stearate	Phenol, Trichloro-	<i>RESIN ACID METHYL ESTERS,</i>
Benzoic acid, Isopropyl-	Fluoranthene*	(2,4,6) *	<i>CHLORINATED</i>
Benzophenanthrene, Methyl-	Guaiacol	(2,4,5)	Methylchlorodehydroabietate
or (Benzanthrene, Methyl-)	Guaiacol, Dichloro-	(2,3,4)	Methyldichlorodehydroabietate
Benzophenone	(3 isomers)	Phenol, Tetrachloro-	Salicylic acid
Benzothiazole	Guaiacol, Trichloro-	Phenol, Pentachloro-*	Syringaldehyde
Benzothiazole, Hydroxy-	(3 isomers)	<i>PHTHALATES</i>	Syringaldehyde, Chloro-
Benzothiazole, Methyl, thio-	Guaiacol, Tetrachloro-	Diethyl phthalate*	Syringol, Trichloro-
Benzyl alcohol	Hepladecane	Dibutyl phthalate*	Tetradecane
Biphenyl	Hexachlorocyclohexane	Diocetyl phthalate*	Toluene, Dichloro-
Biphenyl, Methyl-	(lindane) *	Phenyl decane	Toluene, Trichloro-
Borneol, Iso-	Hexachlorocyclopentadiene*	Phenyl undecane	Veratrole, Dichloro-
Caffeine	Hexadecane	Phenyl dodecane	Veratrole, Trichloro-
Camphor, Oxo-	Indole, Chloro-	Phosphate, Tributyl-	Xylene, Dichloro-
Carbazole	Naphthalene, Isopropyl-	Polychlorinated Biphenyls	Xylene, Trichloro-
Chlordane*	Naphthalene, Methyl-	(PCB) *	Vanillin
Chrysene*	Nonadecane	Pyrene*	Vannillic acid
DDD*	Octadecane		
DDE*	Pentadecane		
DDT*			
Dodecane			

*Substances also found on EPA Priority Pollutant List.

In late 1975 DNR began an investigation of chloro-organics in Wisconsin waters. A 64 kilometer (40 mile) section of the Fox River from Lake Winnebago to Green Bay was selected as the study site. This stretch of the river was considered a likely candidate for chloro-organic pollution because it receives treated wastes from 19 mills and from 11 municipal wastewater treatment plants serving more than 250,000 people.

Although public drinking water is drawn from Lake Winnebago, no public water supplies are drawn from the test segment.

The study had three major goals:

1. Identify previously undetected chloro-organic compounds in effluents and natural waters.
2. Figure out which methods of water treatment would do the best job of removing chloro-organics.
3. Determine which chloro-organics pose significant health or ecologic hazards and recommend safe discharge limits to meet realistic water quality standards.

The investigation is being completed and a great deal of useful information has been compiled. DNR and the State Laboratory of Hygiene have used several new analyzing

Chart Above: Lower Fox River studies show a great variety of organic compounds to be present. This is a partial list of those which have been identified. Of the 100 here, 19 (those with the asterisk*) are on EPA's Priority Pollutant List . . . that is they are recognized toxic substances and carcinogens. EPA says regulations limiting the amounts allowed in effluent will go on the books September 30, 1979.

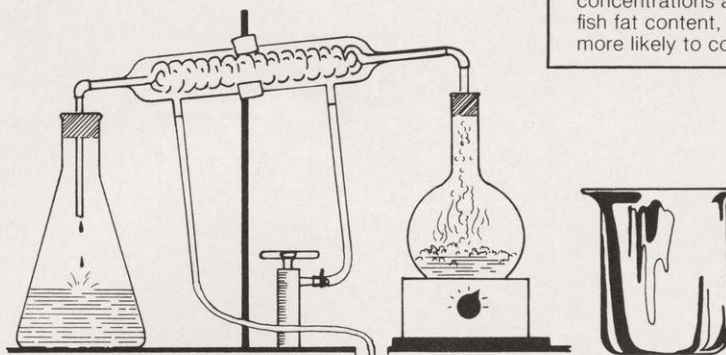
Polychlorinated Biphenyl (PCB) concentration in:

- wastewater from a Lower Fox River paper mill
- fish
- water downstream

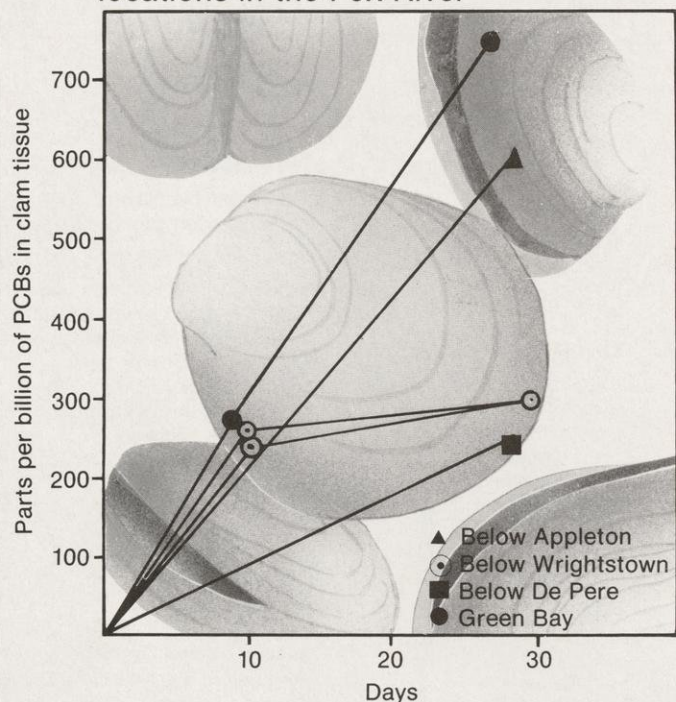
Sample	Concentration
Final mill effluent	34.5 ppb
Mill wastewater from plume two kilometers downstream	0.42 ppb
Little Lake Butte Des Morts	0.15 ppb
Pike (<i>Esox lucius</i>)	2,350 ppb
Walleye (<i>Stizostedion vitreum</i>)	3,500 ppb
Carp (<i>Cyprinus carpio</i>)	44,000 ppb

ppb = parts per billion

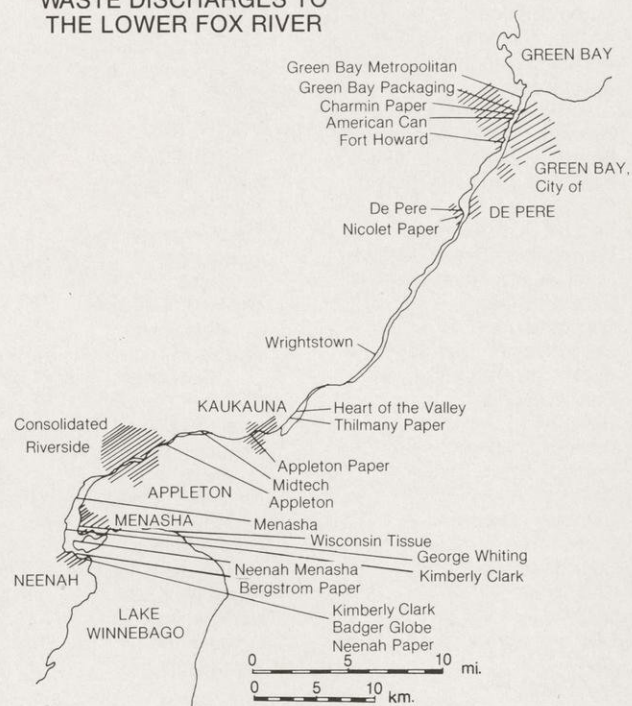
All species of fish collected had measurable quantities of PCBs. When PCB concentrations are plotted as a function of fish fat content, results show a fatty fish is more likely to contain PCB type pollutants.



Uptake of PCB's by clams at designated locations in the Fox River



APPROXIMATE LOCATION OF MUNICIPAL AND INDUSTRIAL WASTE DISCHARGES TO THE LOWER FOX RIVER



When freshwater clams from a pristine environment were placed in the Lower Fox River they accumulated PCB's even though the chemicals were rarely detected in the water.

techniques which had to be specially developed to detect these previously unknown substances.

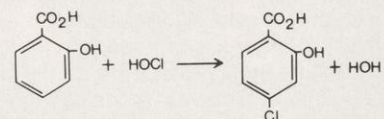
Unfortunately, there isn't much information available on how toxic many of the compounds are. Computerized literature searches provided little help because most current literature only deals with fish and aquatic life, not human beings. This kind of information is difficult to interpret since no two experiments have exactly the same conditions. We still need good, firsthand information on toxic effects of wastewater discharges.

Test results identified a number of chloro-organics. Some are poisonous, some are suspected carcinogens, and many are chemicals which will persist in the environment. Researchers also found a significant number of unchlorinated products which might pose health or ecological problems, including polynuclear aromatic hydrocarbons (PAHs) — known carcinogens.

Once pollutants were identified, investigators tried to find the sources. DNR personnel gathered before and

after samples from each stage of most water treatment systems in the lower Fox River area. Cooperation and mutual concern for the water among industry, municipalities, and the DNR made the sampling process much easier — all the municipal wastewater plants and all but one of the pulp and paper mills provided samples.

To make future water testing a little easier, DNR Coordinating Field Biologist Joe Ball has started a mobile bioassay unit — a minilab in a small trailer which can move to any mill or wastewater facility and make on-site investigations.



The information from Wisconsin's chloro-organic investigations fits very neatly into the Federal Water Pollution Control Act (Public Law 92-500) which hopes to eliminate all water pollution from particular point sources.

The first comprehensive rules designed to reduce suspected cancer-causers in drinking water were announced in January by EPA. The water standard allows 100 parts per billion (ppb) of trihalomethanes (THMs) — known and suspected carcinogens which are also extremely toxic to fish and other aquatics. THMs



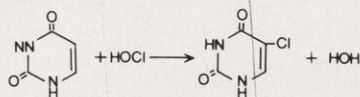
like chloroform may also be formed during water chlorination.

The initial standards will only apply to communities whose drinking water systems serve more than 75,000 people. These communities will have to start monitoring their water within three months of EPA's final recommendations. They'll have to meet the standards within 15 months of that date. If THM levels still exceed the proposed standard, communities will have to install activated carbon filtering systems within five years. Many smaller communities may also have to meet the standards but as of now only monitoring is required. Initially, the effects of these new rules in Wisconsin should be minimal. Five cities — Kenosha, Racine, Milwaukee, Green Bay, and Madison are currently chlorinating water but are well within the proposed THM limits.

By looking at how escaped wastes affect native animal life (usually fish) investigators are learning more about the danger to humans of these newly discovered water hazards. Further laboratory analyses should provide more precise information. There is no doubt that chloro-organics are formed by chlorination processes. And there is no doubt that chloro-organics can cause adverse health and ecological problems.

But the extent and nature of these harmful effects must be refined — and this knowledge will come only with continued research.

We can't eliminate all toxic substances in the environment now. But the field data gathered on the Fox River and at other locations will help state lawmakers form policies on how much of what substances our waters can hold without threatening human, animal, or plant life.



Take a nature hike this year

GEORGE J. KNUDSEN, Chief Naturalist, DNR

Visitors to Wisconsin State Parks are very much interested in, and enjoy the natural beauty and endless array of plants and animals they find. They really want to learn more.

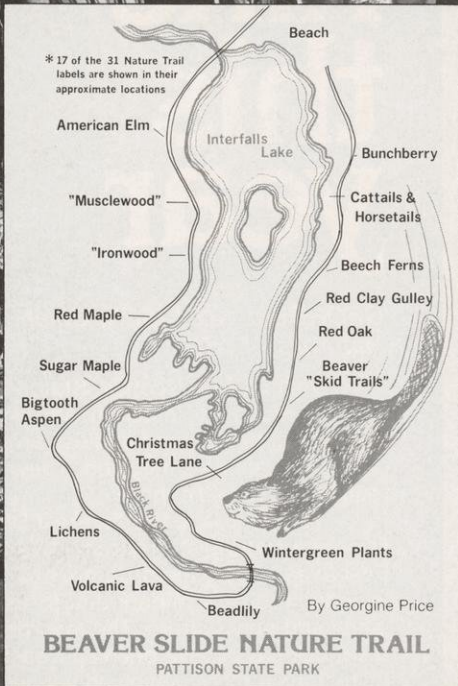
To encourage that interest DNR started a Naturalist Program in 1963. Every year since, the program has included more state park and forest lands and new visitors. The favorable feedback says we've been successful. If you haven't been involved yet, let us entice you now.

The Naturalist Program's basic goal is to acquaint citizens with some of the public land they own, and to make them more aware of their dependence on a clean, well-balanced, natural environment.

Therefore, in certain parks and forests DNR tries to:

- identify some of the plants and animals and explain their inter-relationships;
- explain ecology in interesting, easy-to-understand language;
- help people understand basic field biology, geology, conservation, resource management, natural areas preservation and multiple use;
- and stress the values of natural environments and their components.

Now, follow the self-guided photo tour on the next few pages, and find out what you've been missing. ➡



Places with guided hikes and evening programs—summer, 1978

Devil's Lake, Governor Dodge, Hartman Creek, High Cliff, Interstate, Mirror Lake, Peninsula, Perrot, Terry Andrae, Willow River, and Wyalusing State Parks; Northern Highland-American Legion and Point Beach State Forests; Northern and Southern Units-Kettle Moraine State Forest.

Tentative evening programs
Lake Wissota, Nelson Dewey and Pattison State Parks.

Nature centers

Devil's Lake, Peninsula and Terry Andrae State Parks. Also, a new headquarters complex with exhibit hall at Southern Unit-Kettle Moraine due this year.

Informal exhibit rooms

High Cliff, Interstate, Perrot, Rock Island, and Wyalusing State Parks; Point Beach State Forest, and the Whitewater camping area in the Southern Unit-Kettle Moraine State Forest.

Year-round naturalists

Devil's Lake State Park, Northern and Southern Units-Kettle Moraine State Forest.

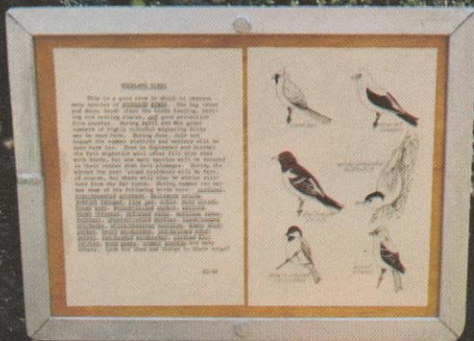
Top right: Park visitors are guided safely into Governor Dodge State Park wetlands.

Center right: The Peninsula State Park nature center is a small natural history "museum" of the park.

Right: The hiker is his own guide on a Devil's Lake trail. Wisconsin has 43 self-guided, labelled trails in 34 parks and forests. Most are short, leisurely, loop trails which eliminate backtracking.

Top left: There's more to the Naturalist Program than hiking trails. Does an explorer hike, car tour, canoe "hike" or night hike appeal to you? Some parks are testing these unique tours.

Left: An outdoor amphitheater. Some parks offer evening slide shows, movies and talks with the naturalists on our environment, natural history and natural resource programs.






Above: Many areas work with special groups. Three employ year-round naturalists so schools, scouts, and nature and garden clubs can attend in the "off-season." Write or call for your reservations.

Right: A Devil's Lake park naturalist talks with his group about local geology. Guided nature hikes take groups out into nature, to learn first hand. Hike themes vary during the week, so go often.

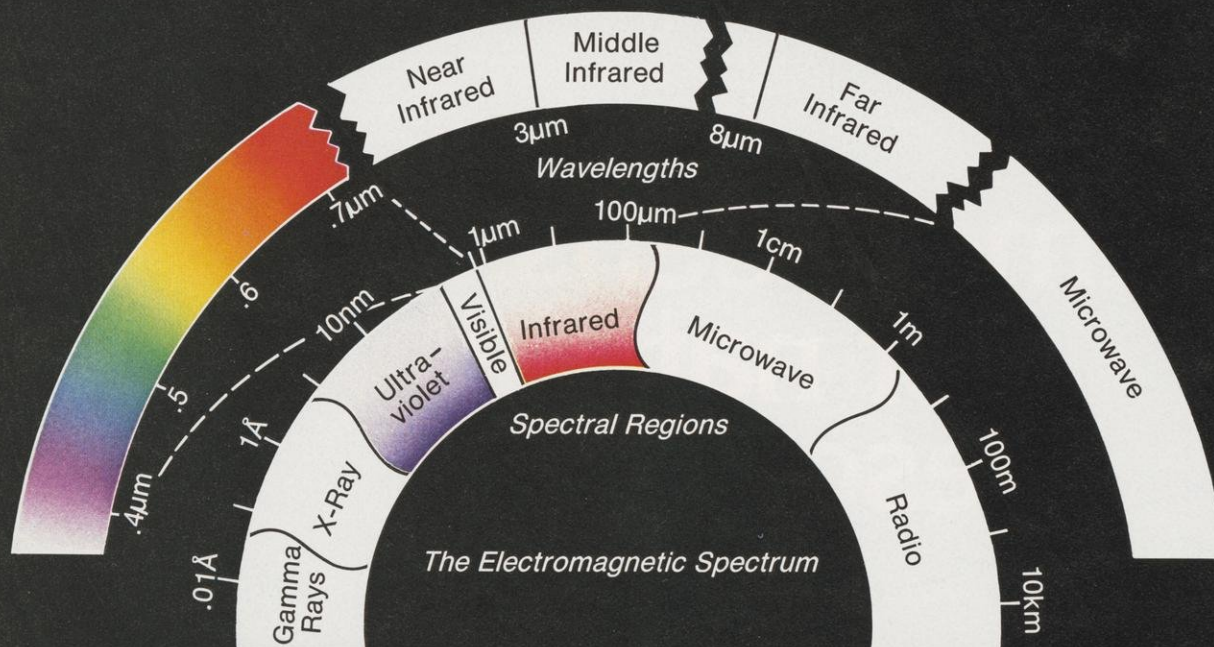
Bottom: This could be you! Join the three million people who've taken part in Wisconsin's Naturalist Program.



An aerial infrared photograph of a forested area. The majority of the trees appear as a dense, vibrant red. A network of roads or paths, shown in a lighter, greyish-brown tone, crisscrosses the landscape. On the right side, a body of water, Eau Claire Lake, is visible, reflecting light in a bright, shimmering area. The overall scene illustrates the use of remote sensing technology to monitor natural resources.

Remote sensing of natural resources

Infrared photo, north end of Eau Claire Lake, Douglas County. Healthy trees are red, dark dots are spruce budworm infected pines. Note the clear cut, upper left, and surrounding infected "aesthetic zone." Photo by Glenn Olson



ROBERT P. MADDING, Project Associate, Environmental Monitoring, UW-Madison
GLENN OLSON, Engineering Technician, DNR, Madison

On a clear summer day a fisherman in northern Wisconsin may be jostled from his reverie by the low drone of a DC-3 aircraft flying back and forth over the landscape. On a cold winter night an observant urban resident may hear and see the same thing. What they are seeing is the DNR's big blue and white DC-3 on a remote sensing mission. For several years Ken Beghin has piloted the DC-3 on these flights, spending hundreds of flying hours over thousands of square miles of Wisconsin. It all started in a small, cramped single engine aircraft with photographer Glenn Olson literally straddling a surplus mapping camera. Since then technology has improved and use has broadened.

The term "remote sensing" implies much more than ordinary photography. It has come to mean the detection, imaging and interpretation of electromagnetic radiation. Our eyes detect only a very small part of the electromagnetic spectrum which we call visible light. But special instruments and films have been developed which allow us to "see" outside the visible portion. Color infrared film was developed by the military during World War II to detect camouflage. Research showed that live, healthy vegetation reflects more "near

infrared" radiation than does dead or fake vegetation. Thus camouflaged gun emplacements invisible to the naked eye or ordinary photographs were clearly visible on the new film. DNR foresters now use it to spot diseased trees. DNR has also used aerial photography to determine flood water levels, assess water quality, document violations and provide a base for mapping.

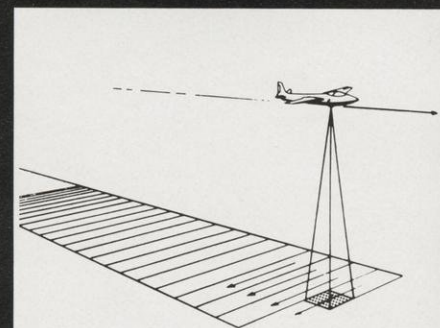
In cooperation with the UW-Madison Environmental Monitoring and Data Acquisition Group (EMDAG) and Marine Studies Center (MSC) DNR has used thermal scanning to monitor heated power plant discharges into Wisconsin rivers and lakes. Thermal scanning has also been used to monitor heat radiated from building rooftops.

DNR has worked closely with EMDAG researchers to take full advantage of the potential economic savings remote sensing offers. Information on natural resources can be gathered, interpreted and disseminated for much less cost than with ground surveys. These techniques do not totally replace, but augment the ground survey, requiring only a spot check to "calibrate" the imagery. The user of these images must clearly define his requirements to the photographer or researcher. For example, spotting individual diseased oak trees on an aerial photo demands a much lower flying altitude than photographing cleared timber areas. In terms of cost-effectiveness the rule-of-thumb is to fly as high as possible and still resolve the smallest object necessary.

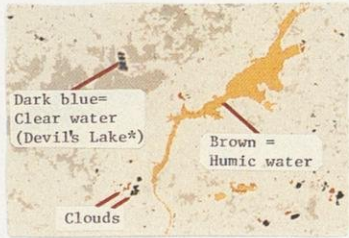
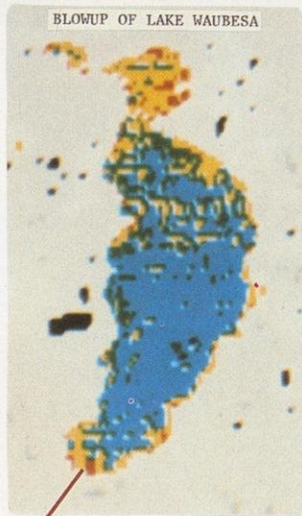
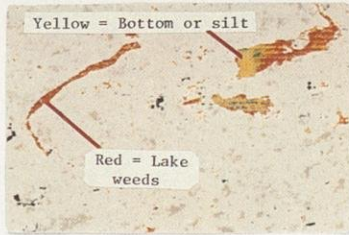
The DC-3 is limited to a maximum altitude of 22,000 ft. For applications where an even smaller scale (higher altitude) suffices, DNR has turned to satellite imagery. The National Aeronautics and Space Administration (NASA) has

orbited two satellites, Landsat I and II, which fly over Wisconsin at nine day intervals at an altitude of 570 miles. The cost of retrieving photographic film from outer space is prohibitive so the satellites radio the information to earth based stations. EMDAG scientists working with DNR have developed computer programs for automatic classification of the water quality of 3,000 Wisconsin lakes using Landsat data. Another project with the US Forest Service uses Landsat data to map defoliation of balsam fir trees by the spruce budworm. For this study the necessary ground calibration surveys were supplemented with low altitude aerial photography to provide areas large enough to "train" the Landsat data.

As remote sensing technology is refined DNR looks forward to its expanded use to economically monitor resources and enforce regulations.



Thermal detectors convert heat radiation to light, which exposes film. A rotating mirror scans a path beneath the airplane, much like the horizontal sweep on a television, and the plane's motion builds up a line-by-line image of the land or water below.



Satellite picture of Madison area lakes. Blue is clear water; green - algae; yellow - silt; red - lake weeds and orange is brown water lakes (from acid soils and undecayed organic matter) .

Courtesy of the Institute for Environmental Studies, UW-Madison



Top:

Computer coded satellite picture shows agitated red clay water at the \$8 million Cloquet, Minnesota, water intake in the Duluth-Superior harbor. This water is undrinkable 50% of the time. If this photo had been available to planners, they surely would have built elsewhere.

Courtesy of James P. Scherz and the Minnesota Pollution Control Agency

Left:

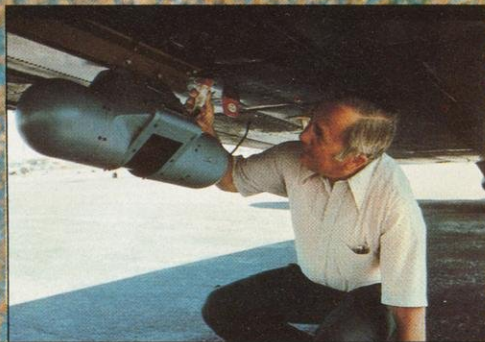
This is a satellite image of the Milwaukee area. The smallest feature the satellite can detect is about one acre in size. A full size image is 100 nautical miles on a side. Red tones denote healthy vegetation. Lakes Michigan and Winnebago appear black. Milwaukee appears bluish.

UW-Madison Environmental Monitoring Group

Bottom:

Another satellite photo of the Madison area, coded for vegetation. Water is dark blue; upland hardwoods - light blue; grasses - yellow and croplands are shades of brown. Bare ground is white, and concrete is coded purple.

Courtesy of Bendix Corporation, Ann Arbor, Michigan



Pilot Ken Beghin checks to make sure the thermal scanner is properly mounted on the DNR aircraft.



Tent caterpillar*

DAVID J. HALL, DNR Forest Entomologist, Madison

Those "white nests" you see on Wisconsin trees in May and June are full of fuzzy worms called eastern tent caterpillars. And every year there's an epidemic someplace where trees are completely stripped of foliage and dotted with basketball-sized tents. Wild cherry, apple and crabapple are favorite victims.

Tents are formed by thousands of strands of silk spun by many caterpillars that congregate in the crotch of a tree. They use the tent for shelter and as a resting place where they periodically shed their skins.

Another defoliator, the fall webworm, is often confused with the eastern tent caterpillar. However, it is active in late summer and early fall and its webs are built out on the ends of branches rather than in crotches.

Baby tent caterpillars hatch when wild cherry leaves start to expand in late April. They feed and develop through May and are full grown in June. Then they measure about two inches, are mostly black and have a white line down the back. A series of thin longitudinal wavy yellow lines also decorate the back and sides and each side is further embellished with a row of vibrant blue spots.

The full-grown caterpillar needs a protected place in which to spin its cocoon. It may wander as much as 100 yards and 'spin up' under a ledge on a house or may just stay in the tent. About 1-1/4 inches long and yellowish, it is within this silk cocoon that the caterpillar transforms into a pupa.

The adult moth emerges in late June to early July. After mating, the female deposits 150-350 eggs in a single mass surrounding a twig of the host tree. She covers them with a foam-like material that hardens into a tough brown protective cover. The new generation remains in the egg mass for about nine months and hatches the following April.

Defoliation by tent caterpillars is often spectacular in appearance, but usually results in little actual damage and new leaves are produced in about three weeks. Heavy defoliation can weaken trees and kill twigs and branches. Rarely, an entire small tree may die.

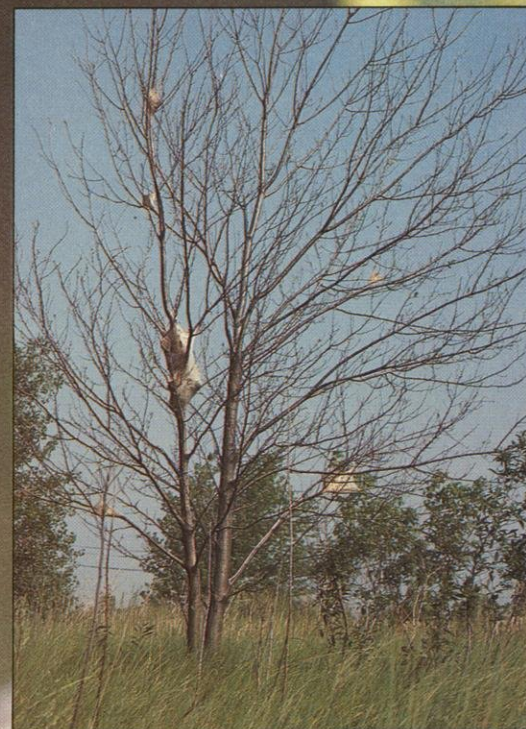
A lawn tree can be protected from defoliation before the hatch by clipping off twigs bearing the egg masses. Small numbers of critters can be picked off by hand. Large numbers can be safely sprayed by using one of the bacterial insecticides available in garden shops.

*The word "caterpillar" comes from a Latin root and means "hairy cat."

Photos by David Hall



Tent and caterpillars



Wild cherry defoliated by the eastern tent caterpillar



Egg mass surrounding a twig



Yellow cocoon bearing the pupa



Eastern tent caterpillar



Adult



Department of Natural Resources
Box 7191, Madison, Wisconsin 53707

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