



## **Wisconsin natural resources. Vol. 3, No. 2**

### **March-April 1979**

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# Wisconsin

## NATURAL RESOURCES

MARCH - APRIL 1979 • VOLUME 3, NUMBER 2

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# Tigers on the prowl



**GEORGE J. KNUDSEN, Chief Naturalist, DNR**

It's late March! The snow is thawing, ponds are opening and tiger salamanders are on the prowl!

In early spring, on rainy nights, they slowly, but surely, creep and wriggle across fields, lawns and highways to still icy ponds to mate and lay their gelatinous eggs. On rainy, late summer nights adults and four to five inch young move away from the breeding pond areas, then burrow into the earth for the winter. During these "salamander migrations" they fall into window wells and basements, are run over by cars and power mowers, are dug up in gardens and are caught by small boys!

Tiger salamanders live in southeastern, east central and west central Wisconsin. In certain areas they

are quite abundant. Tigers are black with irregular, olive-brown to greenish-yellow markings, and are usually eight to nine inches long at maturity.

Close relatives, spotted salamanders, live in northeastern and north central Wisconsin where they are uncommon to rare. "Spotties" are bluish-black, with two even rows of round, yellow to orange spots running lengthwise along their backs, and are six to seven inches when adult.

These pop-eyed, spotted or splotch-marked, long-tailed amphibians belong to a group called "mole" salamanders because they live underground most of the year. Both species eat earthworms, grubs and other very small soft-bodied animals.

Photo by Roger Reif



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### Wisconsin Natural Resources

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### Front Cover

At the age of five weeks the majesty of a bald eagle is mostly innate. A story about the bird's endangered status is on page 29.

### Back Cover

The cougar is the 1979 symbol for National Wildlife Week, March 18 through 24. Also known as the mountain lion, puma, panther, painter, catamount, deer tiger and Indian devil, it can weigh up to 200 pounds and ranges from Northwestern Canada to Southern South America. There are an estimated 16,000 cougars in the U.S. and Canada. In Wisconsin, where it ranged statewide in pioneer times, the cougar is now listed as extirpated (no longer here). The last absolutely verified record was in 1905 when one was killed in Douglas County. However, in the past three years there have been new sightings by reliable sources and it's possible a few may be back. Reports come from Waupaca, Washburn, Lincoln, Burnett and Bayfield Counties. Nothing confirmed yet though!

"Conserve Our Wildlife" is the theme for this year's Wildlife Week which has been sponsored by the Wisconsin and National Wildlife Federation for 42 years.



Indian pipe. See story page 26.





# Living fossil

The Wisconsin Lake Sturgeon is no Loch Ness Monster, but has some of the same characteristics. Elusive and prehistoric, it grows very big, lives very long and inhabits our largest lake. This time of year, it's spectacular.

*DAN FOLZ, Area Fish Manager, Oshkosh*

Not all fossils are dead plants or animals from an early geologic period. Some are alive — one right here in Wisconsin. It is our largest fish, the lake sturgeon — a “living” fossil. These fish have bony plates on their bodies, a tail fin which resembles a shark's, a swim bladder that has retained some lunglike structure, and instead of a backbone, a flexible rod encased in cartilage. The rod is called a notochord.

Lake sturgeon live in Lake Winnebago and the Wolf and Fox River systems, the Menominee River where it borders Michigan, the Great Lakes and the Wisconsin, Chippewa and Mississippi Rivers. A few stocked long ago still thrive in Lakes Mendota and Monona.

Another very distinct species of sturgeon — the shovelnose or hackleback — lives in channels of some state rivers. It is found in the Wisconsin, Chippewa and Mississippi. The shovelnose is small — never gets longer than three feet and weighs only six or seven pounds.

There are no shovelnose in Winnebago land waters. However, two separate lake sturgeon populations live there — one in Lake Winnebago and the other in upriver lakes Poygan, Winneconne and Butte des Morts. They do not intermix except in the spring spawning run. Then they spawn primarily in the Wolf River, with some activity also in the Fox. Preferred sites are rocks, boulders or concrete slabs that have been placed as rip-rap on outside bends of the river. In many instances, mankind has destroyed fish spawning habitat; but for lake sturgeon, erosion control has actually

Some sturgeon migrate 125 miles to spawn.  
Photo by Dave Misterek.





created it. Some sturgeon migrate up the Wolf as far as the Shawano Dam — a run of 125 miles.

Unlike most fish, sturgeon do not spawn every year after reaching sexual maturity. Incredibly, a female spawns for the first time when she is 24 to 26 years old and about 55 inches in length. Thereafter, rather than annually, spawning occurs only once every four to six years. For males, sexual maturity is reached at age 14 to 16 when they measure about 45 inches. Spawning frequency is only every other year.

In the Wolf River, the run takes place in late April and early May. Then water levels are high and water temperatures rise slowly. When 53½° F. is reached, spawning starts. Males arrive at the sites first and spawning begins as soon as a ripe female enters the group. Several males crowd around a female and as the group swims against the current, eggs are dropped and fertilized. Randomly scattered, the eggs are adhesive and stick to rocks or other solid material in the water. Females lay 100,000 to 700,000 each, but, strange to say, only two or three spawning adults result from this fecundity.

Lake sturgeon spawning is spectacular. It is not unusual to see 50 or more giant fish at one location. The commotion they make is unforgettable. When spawning is concluded, the adults return to the lake from which they originated.

In the lakes, sturgeon live on the bottom where they swim along dragging sensitive barbels or feelers in a search for food. As soon as the feelers touch anything to eat, the tubular mouth extends downward to suck the morsel in, bottom materials and all, like a huge vacuum cleaner. Soft, non-edible matter is then puffed out through the gills and the food swallowed. In Winnebago waters, the midge or lake fly larva, which is present in great numbers, is the primary source of food.

Wisconsin lake sturgeon are not mere prehistoric curiosities for fish watchers. There's a hook and line season every fall in most of the river systems they inhabit. On Lake Winnebago, spearing sturgeon through the ice has been a sport unique to Wisconsin ever since 1932.

During the season, from the second Saturday in February through March 1, spearers sit in a darkened shanty, peering into a three by five foot hole — a window in the lake. They hope a sturgeon will swim through. Each year 2,000 to 6,500 people purchase a license, then wait and watch from sunrise to sunset, hoping to

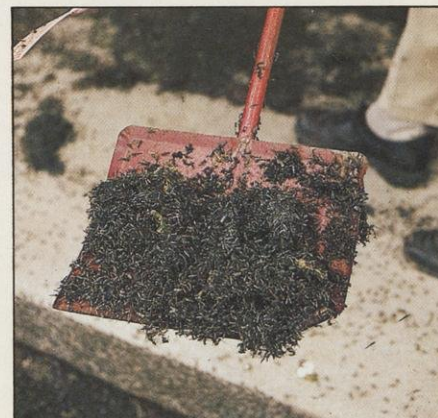
get a trophy. The minimum size is 45 inches. Success is influenced primarily by clarity of the water. When it's murky in the window, spearers can't see. Harvest over the years has varied from a low of eight fish to a high of 1,500. Sturgeon spearers have to be patient. Many have tried for years without success.

The heaviest fish ever speared in Lake Winnebago weighed 180 pounds and was 79 inches long. But sturgeon can get much bigger. Two 310-pound monsters are on the record: one caught in Batchewana Bay, Lake Superior in 1922 and the other more recently in Lake Michigan in 1943.

Although few taken from Lake Winnebago are over 40 years of age, the oldest was a granddaddy that had been around 82 years. And again, even older ones have been recorded elsewhere. The oldest came from Lake of the Woods, Ontario in 1953, and was 152 years old.

The fact that sturgeon live long and spawn late has many management implications. Sort of like a forest, they can be stockpiled and only a

harvestable surplus taken every year. A careful count is kept of all fish legally bagged. The season is short and only one sturgeon per year is allowed. The idea is to guarantee perpetual renewal of the fishery. DNR takes no chances. Management is purposely conservative and the future is bright. A species that's a living fossil deserves never to become a dead one.

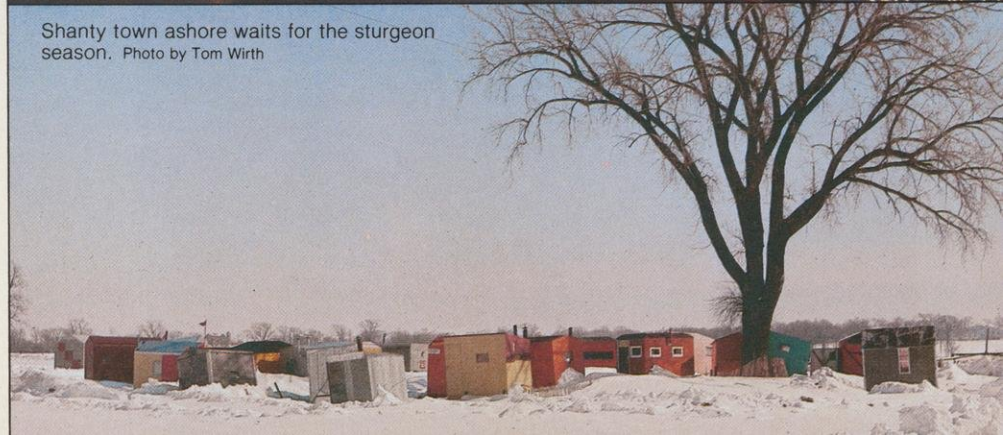


These adult lake flies can be pesky, but in the larval form as little red worms, they are the primary source of food for sturgeon.

Photo by Dave Crehore



DNR researcher. Photo by Dave Misterek.



Shanty town ashore waits for the sturgeon season. Photo by Tom Wirth



## DNR fights poachers

Poachers hit sturgeon at spawning time if they can get away with it and DNR hits back. Commercial operators brag about taking as many as 2,000 pounds a week. The fish are easy to catch when spawning and black market sales bring \$2.75 a pound.

DNR counter-punches with a special 24-hour sleep-in field headquarters in the Wolf River Valley, assignment of 35 wardens from all over the state on a round-the-clock basis and a team of undercover agents to ferret out commercial violators. A volunteer group of about 40 dedicated DNR employees babysit spawning sites night and day, watching for illegal ac-

tivity. They come from every department discipline — clerical, forestry, environmental protection and others.

Bottom line is enforcement that gives the would-be violator pause — numerous arrests, fines of \$100 to \$300 for each fish, confiscation of equipment. Last season, undercover agents purchased 31 sturgeon and to protect the resource, turned down offers for more.

Enforcement is complete enough to make it mighty risky to be a violator. Sportsmen back the effort all the way, report law breakers and make arrests possible. The consensus is that sturgeon poachers should be caught and punished. DNR does its darndest to make sure that happens.



A mouth like a vacuum cleaner.







Turk's Cap Lily

LYNN ENTINE and TOM GRIFFIN  
UW-Extension, Madison

Going back to school to study the environment doesn't always mean leaving home and heading out to a university campus or some other school. Every year about 300 people do it by mail. They enroll in one of the University of Wisconsin Extension's (UWEX) 10 environmental Independent Study Courses. Working at their own pace, at home, they study textbooks, do laboratory experiments, and submit written lessons for instructor comment.

Students in geology learn to identify mineral and rock samples as the instructor guides them via tape recording. Forestry students calculate board feet and learn to measure DBH (diameter breast high) while Physical Geography students practice deciphering topographic maps.

"Ecosploring," a non-credit ecology course, teaches seven basic environmental principles through the use of student-selected outdoor laboratories. Finding a suitable woods area is the first requirement for this course. Then each lesson in the study guide sends students out to dig soil, identify trees, birds and plants, rake up leaves, and follow animal signs.

The University of Wisconsin has been offering high school and college credit courses to students from all over the world for more than 100 years.

Many enrolled in Independent Study hope to pursue college training. Successfully completing the courses often gives them the self-confidence to work for a degree at a nearby UW campus.

Lavonne Swiggum (Top)  
Carol Carroll (Left)

## Backwoods classroom

Mrs. Lavonne Swiggum has her own outdoor classroom, 10 acres of woods on her rural Gays Mills farm. For the first time in 24 years, Mrs. Swiggum is back in school with the UW-Extension correspondence course, "Ecosploring."

She says it's having an effect on her new career of interior design. "Designers say variety plus unity equals good design. In nature, there are a variety of things unified by growing in an ecological balance."

"There doesn't appear to be any set pattern, but the beauty is there in the variety. Everything is equally important."

Mrs. Swiggum cited part of the ecological design of her woods — a slow progression from an oak forest into a maple climax forest. "In the course we have the question 'What will the woods be like in 100 years?' Well, I knew it was supposed to be maple in this region, but I had never seen any in our woods. When I was out ecosploring, lo and behold, I found two hard maples, so I know it's going in that direction."

## Turk's Cap Lily

Mrs. Swiggum has a collection of over 160 pictures of Crawford County wildflowers which she shows to local garden, 4-H clubs, and church groups. She learned about many of them in the UWEX Ecosploring course.

"I took them for fun," she said. "We're rather unique. Because of our geography in Crawford County, we have varieties of species not found in most parts of the state."

# Mail order ecology



James Engle

## "Shoe-in" for Mineral Point shop owner

James Engle sometimes studies general geography in the backroom of his Mineral Point shoe store.

"Geography is something I've wanted to learn about for a long time. When you drive around our area, you see fantastic rock formations. But how the heck were they formed?" he asked.

The only way to find out is to study it for yourself.

Though he had not been in school for forty years, Engle scored high in his geography course. "It was a lot of fun," he said. "I like to learn and this is something I've wanted to learn about."

"I never took a correspondence course before," he said. "When I was young, I wanted to go to college so bad I could taste it. But it was the Depression. If you could eat, you were doing well."

Engle said all his children have now gone to college. And in mid-life, his wife attended UW-Platteville part-time for six years and graduated with a teaching degree in art.

## Putting it back together

The last lesson in her ecology course requires Carol Carroll to dissect a square foot of soil, then put it back exactly as she found it.

"I knew what was coming in that one," she said. "There's no way you can ever put it back. It all seems to be so beautifully planned. That's the thing I've really learned."

"I'm not so hung up on bugs and worms as I was," she continued. "They all have their place. The caterpillars I find in the parsley, I really enjoy them now."

When she moved to Dodgeville recently with her husband, Mrs. Carroll felt like a "displaced homemaker." She was looking around for something to do when she spotted the Extension Ecosploring course in a newspaper flyer.

"It's helped tremendously in so many ways," she said. "I'm now meeting people who share my interests. I have so many questions, I have to call around asking people for information." That's how she met her neighbor, the DNR game warden.

"I wanted to know if grouse eat acorns. He'd been out hunting that day, so he slit some birds open he'd bagged and found them just full of whole acorns."

Following instructions isn't always easy. One lesson requires raking all the leaves in a 10' x 20' section of the outdoor laboratory. The study guide said to weigh the leaves, dry them in the sun, and weigh them again.

Mrs. Carroll figures her neighbors think she's pretty odd, bringing leaves into her backyard and spreading them out with a rake. Then, after three days of rain, there were more funny looks when she was out in a drizzle bagging them up again.

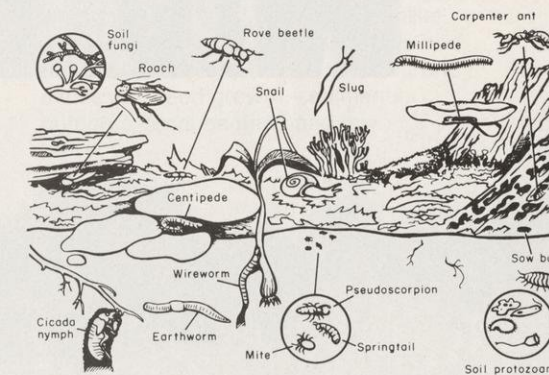
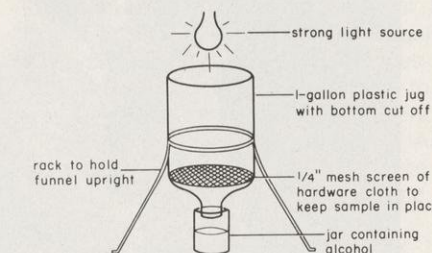
"I finally had to put them in the clothes dryer! After that," she laughed, "the neighbors are ready for anything."

"My daughter, who's in college told me that it's the lab work you remember," Carroll said. "It's given me a new kind of appreciation. It's not just something to look at and enjoy. It's more!"

## The good earth

As part of the forest ecology course, Mrs. Swiggum dug up some earth from her forest floor. She put in a makeshift funnel with a screen and then placed a light bulb above the earth.

"The heat from the bulb drove the insects out of the ground and into a bottle of alcohol placed below the funnel," she explained. "It's amazing what lives in the ground under the decaying leaves. There are hundreds of larvae and grubs."



Heat from the bulb drives insects out of the ground.

For more information about Environmental Independent Study write: Environmental Resources Unit, University of Wisconsin-Extension, 1815 University Avenue, Madison, WI 53706, or contact your local Extension office in the county courthouse.



# Cleaning the Rock

The Rock is a river with big problems and a small task force. The task force knows what to do. Next thing is to get it done.



*STEVE SLACK, Editorial Intern*

Mark Twain once noted that the boat ride along the Mississippi River between St. Louis and New Orleans was getting shorter every year. The old, meandering bends would eventually curve back into themselves, forming oxbow lakes and straighter channels. If the trend continued, he wondered, would the two cities be neighbors soon?

Plans for cleaning up our waters can be skewered the same way. Water doesn't get any cleaner by having people diagnose what's wrong, who's responsible and what should be done. That just gives a better line on the problem. Water only gets clean when we do something — couple good plans with money and cooperation. Reimbursing nature for mistakes is not easy or cheap, so planners play the vital role of putting what resources we can spare into the best channels. Results take a firm commitment and a long time.

The Rock River task force is one of several teams across the state charged with laying out the best course to clean water. Results of its five-person, three-year effort will be one chapter of Wisconsin's water quality management book: The Rock River Basin Plan.

The team published a preliminary plan in November 1978. This year it will gather more data, project populations and water uses, assess damage caused by pollution, find solutions and get local views. Because of low rainfall the first year and consequent reduced runoff, water samples did not reflect actual pollution. The 1978 findings are more in line.

"Technical problems can usually be surmounted by ingenuity and patience — at least they're physical so you can get a handle on them. But social and economic problems are much

*Top left:*

The Rock River Task Force: (left to right) Roger Fritz, Lakshmi Sridharan, Gloria McCutcheon, Eric Thompson and Greg Hill.

*Bottom left:*

Wild rice was once plentiful.





more unwieldy," says the task force. "That's why we're required by law to get to the people whose jobs, recreation and land this plan may change."

The task force holds local meetings and listens to farmers, townspeople, hunters, wildlifers, restaurant owners, merchants, industries — anyone with an interest in the Rock River Basin. From all they hear — complaints, arguments and suggestions, the handful of planners must weigh and choose fairly, always remembering that the goal is clean water. Things were not always so complicated.

The wetlands of the Rock River are among the most productive plant and animal communities in Wisconsin. Nutrients have been collecting in the shallow depressions since glaciers retreated 10,000 years ago. As they grew more fertile, they came to support luxuriant aquatic plants and abundant fish and wildlife. Wild rice once stood seven feet high and waved over 100 square miles like a "sea of green" the first trappers said. Through the maze of underwater shoots swam 30-pound pickerel and 25-pound catfish. Elk, deer, beaver, mink and otter also thrived.

The forests have sheltered native civilizations since prehistoric times. The Sioux, Fox, Sauk, Algonquin, Potawatomi and Winnebago all found homes on the wetland shore. But it took less than 200 years for the axe and plow to bring a demise unlike any in all the time before they came. Clean water that gave vitality to the wetlands was fouled by growing cities and their need for more farming, transportation and waste sites. Native life in delicate balance was choked out by species tolerant to pollution. Algae and carp dominate today.

The Rock River basin covers 3,750 square miles in nine counties and contains 141 streams, 161 lakes and 85 dams. Five people have difficulty keeping tabs on all that, so the task force aims at the basin's major features — Lake Koshkonong and Horicon Marsh.

Phosphorus, because it is most easily monitored with current methods, is used as a general index of pollution. Suspended solids, sediments and oxygen are also measured.

The area is primarily an agricultural watershed. Runoff from cropland, pasture, barnyards, lawns, streets and construction sites carries many pollutants to the water. When pollutants upset one part, the whole system is thrown out of balance. For example, fertilizers containing phosphorus over-enrich the water. Weed and algae populations explode. Then a massive die-off occurs. In deep waters, the dead material falls to the bottom, out of the sunlight and can't be used again. In shallow waters like the Rock, however, it's recycled and nuisance growth continues. Meanwhile, the dead matter decays and robs fish of dissolved oxygen. There are fish kills, both winter and summer. Tons of rotting fish and weeds give off foul odors and spoil recreation.

But the shallows are not doomed! In fact, wetlands are natural water purifiers and eventually can lock nutrients away so that they cause no harm. The wetlands also buffer floods. They sponge up excess water and release it later at a slower rate. Severe floods though, can suddenly wash out tons of trapped material and cause problems downstream.

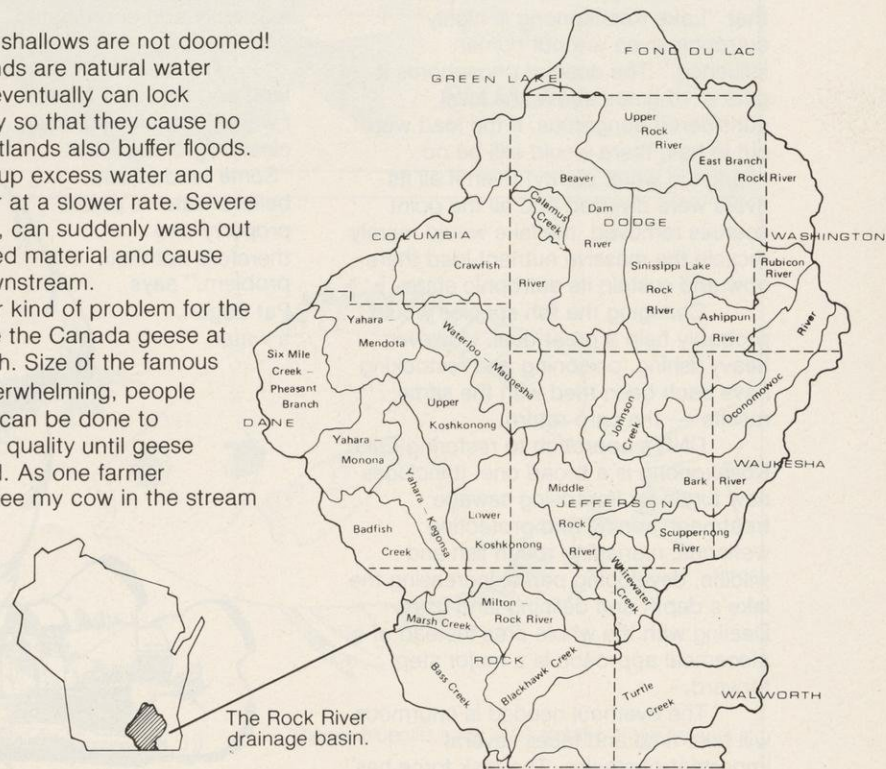
Another kind of problem for the task force are the Canada geese at Horicon Marsh. Size of the famous flock is so overwhelming, people think nothing can be done to change water quality until geese are controlled. As one farmer put it, "You see my cow in the stream

and say it's pollution, but 50 geese are wildlife, so they don't pollute."

But this is what task force studies reveal:

Of the 139 tons of phosphorus entering the marsh every year, geese put in only 2%. This is nothing compared to sewage plants and industries. They contribute 43%. Runoff is the worst. It adds 55%. Geese, it turns out, largely recycle nutrients while other sources continually put in more. This is not to say the geese should be ignored. Eric Thompson of the task force says, "Any decrease in geese would also reduce potential problems from water borne disease."

Lake Koshkonong (from the Algonquin kus kuo o nog — meaning where there is heavy fog) is not unlike many other lakes set amidst people and their pollution. These waters suffer from excessive weed growth, sediments, nutrients, fecal bacteria and low





dissolved oxygen. Though it covers 16 square miles, Lake Koshkonong is only five feet deep! Originally, it was more a meadow than a lake until the dam created a shallow flowage. Then there was great duck hunting; but when carp were introduced in the early 1900's, bad news followed. Carp not only helped wind stir up the bottom, they also destroyed aquatic plants by eating the new shoots. Between the continual stirring, high water and massive pollution, natural vegetation vanished and the game fish were right behind. Only carp and algae prospered. Great duck hunting is a memory.

Lake Koshkonong is burdened with failing septic systems, poor sewage treatment plants and animal feedlot runoff — all potential health hazards. Harmful floods are possible because of poor dam control and inadequate gate capacity.

If it sounds bad for Lake Koshkonong, it is. The EPA said in its National Eutrophication Survey in 1974 that "Lake Koshkonong is highly eutrophic even without human influence." The dose of phosphorus it gets is 10 times above the level considered dangerous. If the load were cut in half, there would still be no change in water clarity! Even if all its rivers were diverted and all the point sources removed, the lake would merely recycle the massive nutrient load there now and sustain its eutrophic state.

Changing the fish species would probably help a great deal. However, heavy fishing, poisoning and restocking have each been tried with the same results — the carp return.

DNR's approach to restoring Lake Koshkonong is a broad one. It includes new funds for improving sewage treatment, zoning and protecting wetlands, managing rough fish and wildlife, developing parks, increasing the lake's depth and defining land uses. Dealing with the whole area instead of a piecemeal approach is a major step forward.

The overhaul needed is enormous, will take time and faces several important obstacles. The task force has

listed the major ones. It says there is lack of leadership and authority, no coordination between groups, little money to spend on solutions and that correcting offenders takes forever. For the entire Rock River, the task force sees runoff as the largest problem. It recommends simple, traditional, conservation practices as a solution. These can be cost-shared with the government, yet only 28% of the landowners participate. "Ideas aren't enough," says Thompson. "Coordination is the key. We try to find cooperating parties, such as the Soil Conservation Service, local governments, citizen groups and individuals to put ideas into action. If no one will assume responsibility, the DNR must."

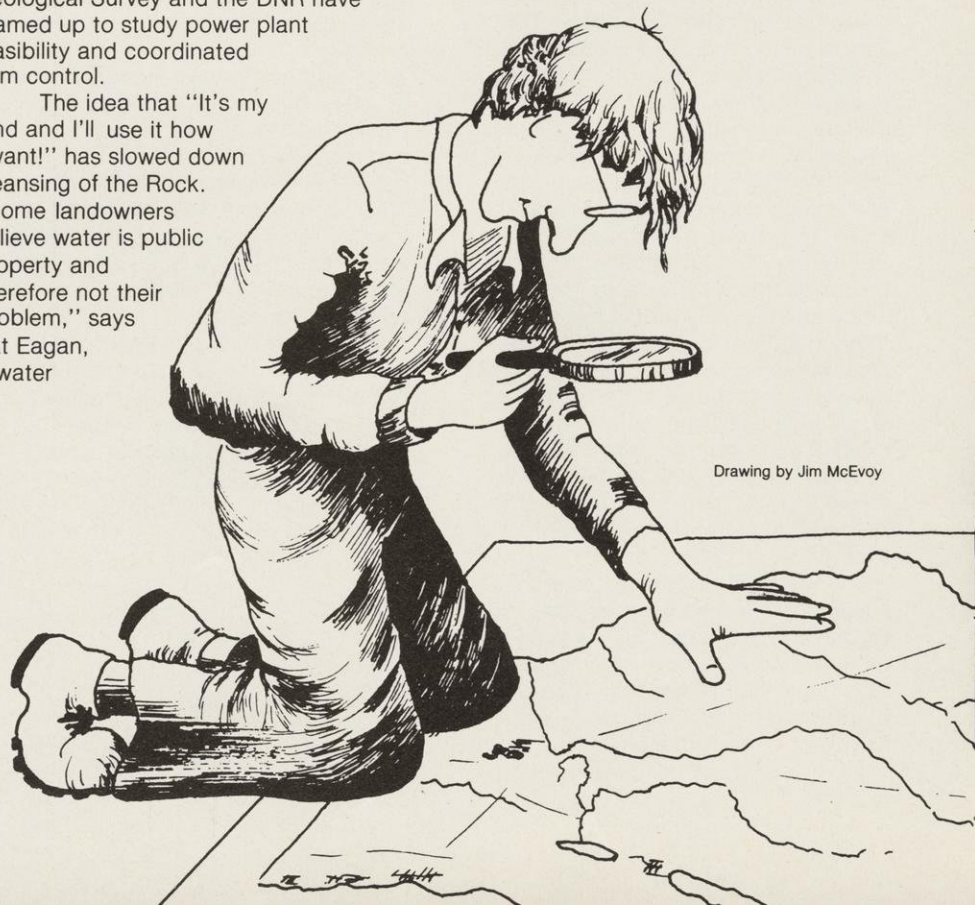
Some steps are being taken already. The Koshkonong Sanitary District is a great improvement over old, faulty septic systems. The United States Geological Survey and the DNR have teamed up to study power plant feasibility and coordinated dam control.

The idea that "It's my land and I'll use it how I want!" has slowed down cleansing of the Rock. "Some landowners believe water is public property and therefore not their problem," says Pat Eagan, a water

resource specialist on the team. "That's very convenient for them, but not a very sound argument."

It's hard to restore a devastated area from history books. Perhaps this explains the confusion among farmers, hunters, cities, the state and others in deciding on a common goal. Farmers want marshes drained for more cropland, hunters want them managed for wildlife habitat. Some would like to see recreation developed, others the restoration of native wildlife and vegetation. A stalemate often results.

"We are actively seeking opinions on what people want," says Thompson, "but people must accept the Rock River for what it can naturally be instead of demanding it meet their expectations. Its natural potential is basically limited to a wetland, and any drastic alterations will only damage it further. This potential, however, is far from being realized. But we're working on it!"



Drawing by Jim McEvoy



# Settle out of court

Mediation, not litigation could be the wave of the future in environmental matters. Time and experience will tell.

*CYNTHIA SAMPSON, Wisconsin Center for Public Policy*

As long ago as Shakespeare, Hamlet soliloquized about the "law's delay." Today, 300 years later, there are a lot more laws, and things are worse. In matters environmental, the articles of faith are that legal action will be complicated and costly with settlements that sometimes take almost forever. And the public will pay, especially when different governmental jurisdictions fight each other. So what's new?

Well, the Ford Foundation has come up with a fund to try a different track — mediation, not litigation. And this is a case history of a Wisconsin success in what might have been an interminable expenditure of money, time and court action.

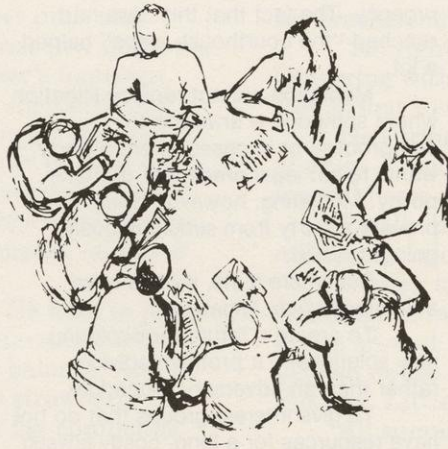
The confrontation was typically complicated. Principals were the City of Eau Claire, DNR, the Town of Seymour, the Public Intervenor, Trout Unlimited, the Lake Altoona Rehabilitation District, Eau Claire County and Northern Thunder.

The problem: get a new sanitary landfill for the City of Eau Claire. The old one was hopelessly over-full, had been ordered closed four years ago by DNR. It was polluting the Chippewa River.

All eight groups had widely different views on what to do. So did many private citizens.

The city purchased land in the Town of Seymour and asked DNR for a license to operate a landfill at Seven Mile Creek. But the town objected. It tried various legal means to stop the project: an appeal to DNR, a court order to force DNR to amend its environmental assessment, a court injunction to halt construction. Soon the town had spent more money than intended for the fight with no end in sight.

The town had an ally in the Public Intervenor. His job is to watchdog DNR's environmental protection activity. And he was concerned about two things: whether the city and DNR had adequately considered alternative sites; and whether the landfill would contaminate a trout stream.



He was joined by Trout Unlimited and the Lake Altoona Rehabilitation District.

The county was involved because it owns the source of clay the city hoped to use to line the landfill. It also owns one of the alternative sites the Public Intervenor thought should be considered. And the town maintained that any landfill within its boundaries, if, indeed there

were ever to be one at all, should be operated by the county.

Finally, Northern Thunder, an environmental group, wanted recycling and there was none.

This complexity of groups and issues is not uncommon. And attempts to halt or delay a project through protracted court proceedings are not unusual. Often a legal maneuver is the only method of influence available.

But not this time. Another way was found through the Wisconsin Center for Public Policy and the Ford Foundation Grant it administers. To their credit, everybody decided to give environmental mediation a try, including DNR, the Public Intervenor, his citizen Advisory Committee and the other various principals. Two mediators, Ed Krinsky and Howard Bellman were selected for the job.

This is what happened:

Public Intervenor Tom Dawson met with the City of Eau Claire and DNR to talk about adequate evaluation of alternative sites and about the Environmental Impact Assessment.

The Seven-Mile Creek landfill that caused all the trouble.





Upshot was that the city made soil borings at another location. DNR provided additional information on environmental impact and the Public Intervenor reluctantly withdrew from the case.

In the second phase, the city, the Town of Seymour and DNR hammered out a series of agreements covering construction, use and longevity of the landfill. To reach this point took a lot of mediation. Many contacts, meetings and phone conversations were held with each of the eight parties. Krinsky and Bellman learned each group's position and discovered what each would accept in settlement.

The final pact contained a dozen provisions detailing rights and responsibilities of the jurisdictions involved. Questions of long-term ownership, future planning and monitoring of the agreement were covered.

Such voluntary settlements have two opposite perspectives: the ways in which they fulfill each party's concerns or the ways in which they fail to do so. They are solutions all parties can live with, but compromise nonetheless.

In this case, the mediation sometimes got very tense. When the final meeting hopelessly deadlocked, Krinsky and Bellman somehow managed to keep the parties talking late into the night. Finally, at 3 a.m., agreement was reached, barely rescued from failure by persistence and realization that the courthouse could do no better.

The city got town permission to proceed with construction, but only at the additional cost of building a transfer station to reduce traffic at the disposal site. Traffic would be further controlled by a permit system. Only those users agreed upon by city and town would be allowed in. Also accepted were limitations on the hours of operation. It was agreed that when the landfill was full, ownership by the city would end. And reciprocal arrangements were made for use by the town including a dumping box for convenience of its residents.

All in all, the Seven Mile Creek Landfill illustrates that certain conditions make a case ripe for mediation. These include:

Clearly defined issues.

Parties that are highly visible and deeply involved.

Participation by authorities that have the power to implement or undermine a settlement.

A realization by those concerned that they cannot unilaterally achieve all objectives or win at reasonable cost.

And an understanding that compromise is necessary.

Mediation of this kind works best before a deadlock has been reached but when the parties still feel a sense of urgency. The fact that this case had reached "the courthouse steps" helped a lot.

Mediation will not replace litigation where someone is unwilling to compromise or in cases where a party wants to set legal precedent or make policy. Mediating, however, does not prevent a party from simultaneously going to court.

But where it fits, it does have advantages over litigation:

To create a forum for exploring new solutions—a problem-solving rather than an adversary procedure.

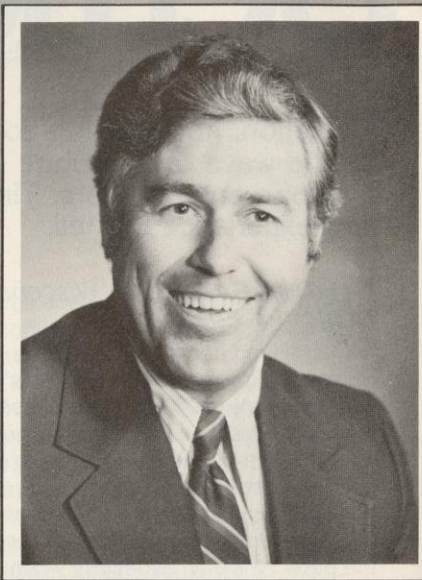
To give interest groups that do not have resources for a long, costly lawsuit an opportunity for influence.

To produce a solution acceptable to everyone and eliminate winners and losers.

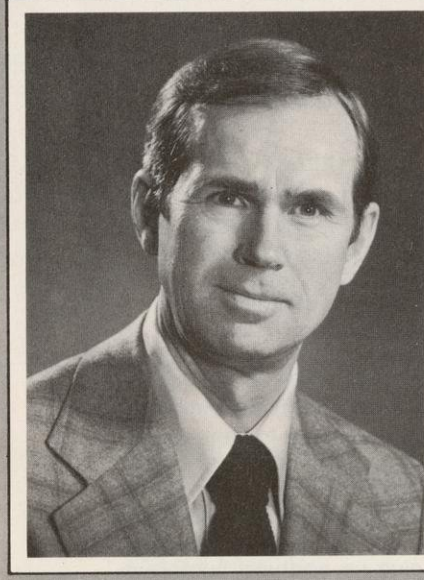
And to address all the issues at hand. A court decision might be based on a technicality.

Bellman and Krinsky have now moved on to other environmental conflicts. Both seasoned labor mediators, they are as yet noncommittal about the extent to which the process can be adapted to environmental matters. They are quick to point out differences, but also realize they are pioneering and feel encouraged. Environmental mediation may be a real comer. A little more experience will tell.

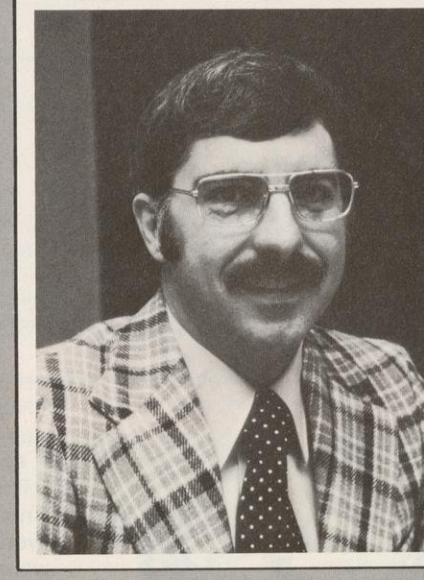
## Was it worth it?



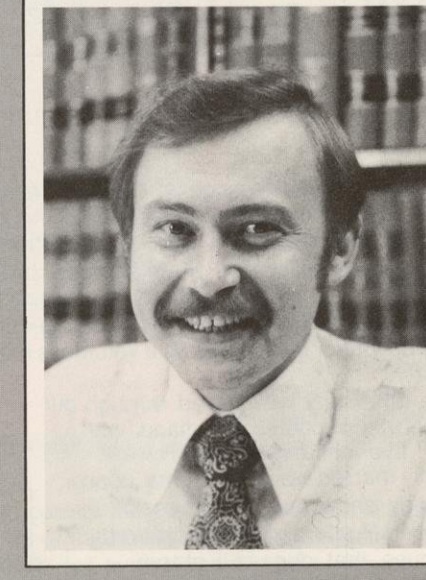
*Jerry Merryfield, Chairman, Town of Spencer:* The town didn't want the landfill, but it looked as though we were going to get it anyhow. We went into mediation to get the best we could. It served a useful purpose.



*Richard Jann, Director of Public Works, Eau Claire:* There are very few problems that can't be solved through honest and open communication between all parties involved.



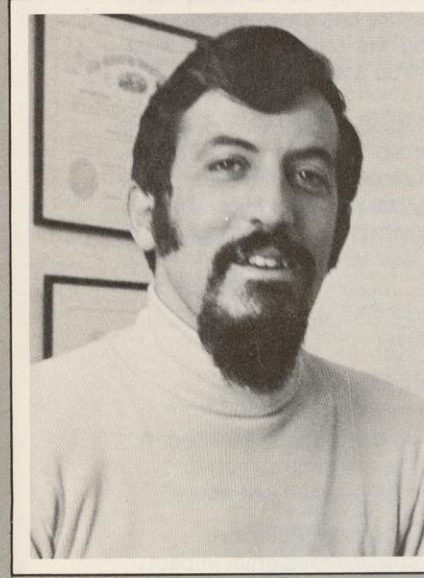
*James Lissack, DNR District Director:* After the first two hours, I was convinced nothing would be accomplished and we should call it quits. When I finally got to bed at 5 a.m., I realized it had been well worth the effort.



*Peter Flaherty, DNR Attorney:* Lawyers often see litigation as the only avenue to resolve disputes, but in reality it's often the worst way. If the parties can get together and work things out, I'm all for it. In this case, it took some pressure to get parties in the right frame of mind, but once mediation started, we were able to discuss the real issues and set the legal ones aside.



*Ethel Nelson, Town of Seymour Supervisor:* It became clear to me that although the site was very undesirable for our town because of pollution and safety factors, the engineering proposed would allow DNR to license the landfill.



*Mediator Ed Krinsky, Wisconsin Center for Public Policy:* It was intense pressure felt by all parties that gave mediation a chance to succeed.



*Mediator Howard Bellman, Wisconsin Center for Public Policy:* What the case highlighted for me was that the process reaches the real problems human beings suffer while the law may only address technical issues.

*Thomas Dawson, Public Intervenor:* Mediation cuts through to the heart of the dispute. It works best when the parties have relatively equal bargaining leverage and can recognize mutually acceptable benefits from compromise. While the power to litigate is a bargaining chip in the process, in some cases it may be the only way to a solution.

*James Kurtz, Director, DNR Bureau of Legal Services:* The department's legal staff sees real potential in environmental mediation and we are using it. However, there are cases where the law does not provide the flexibility necessary to permit a negotiated settlement. When it mandates a specific result, negotiation is out of the question.



## The readers write

Having enjoyed *Wisconsin Natural Resources* this past year, it was extremely disappointing to receive your last "hunting issue." After a hasty mention that non-hunters and anti-hunters exist, you printed several pro-hunting articles. Wouldn't one anti-hunting article balance the issue a little? There is a growing movement that sanctifies all life and it can no longer be classed as a voiceless minority.

The other day we walked through our 80 acres of posted woodland with our five children. Our walk was sadly marred when we came upon bloody snow and the organs of a deer. Hunters give us their tired excuse that deer will starve unless hunted. They profess to love nature and animals, yet it seems they must kill before they're satisfied and drag the animal off past no hunting and no trespassing signs.

**MARY AND GORDON SCHLAFMANN; Onalaska.**

I was shocked and angered by John Reiger's article "American Attitudes Toward Wildlife" in the September-October issue in which he listed the Judeo-Christian tradition as an opponent of wildlife conservation. In it he says that people who cherished wildlife and endeavored to preserve it, had to fight, among other things, "a Judeo-Christian tradition that separated man from nature and sanctified his domain over it."

I happen to be a Christian, a man who has never hunted in his life, one who loves the out-of-doors and one who hates to kill even a squirrel. Nevertheless, I do firmly respect

human life far above animal life, as I would think any reasonable human being would. If I were forced to choose between killing a cat and seriously injuring a man, I would certainly kill the cat—sometimes I wonder whether some of the present-day wildlife fanatics might do otherwise!

**J. GERALD ANDERSON, Eau Claire.**

I read with enthusiasm Prof. Heberlein's article on "Hunter's Choice." Both the any-deer permit and the proposal to hunt a week earlier in the north are good ideas. The early opener in the north would not only reduce crowding on the first weekend in the rest of the state, but would also give us northern hunters a chance to hunt in less severe weather and while the bucks are still in rut. I hope you'll push for this program's approval by the Legislature.

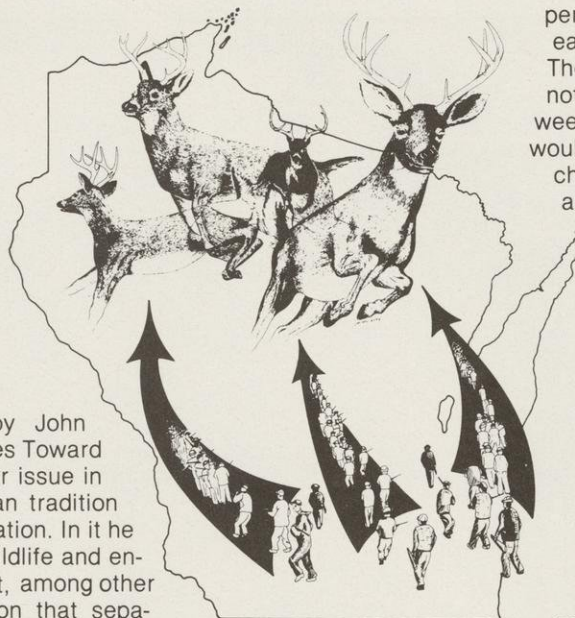
**RICHARD FOLTZ; Madison.**

The "Hunter's Choice" article must have been written by someone from southern Wisconsin. I've hunted in the northwestern part of the state since 1964 and the hunting pressure has grown immensely. Changing the season to lure hunters would be a mistake.

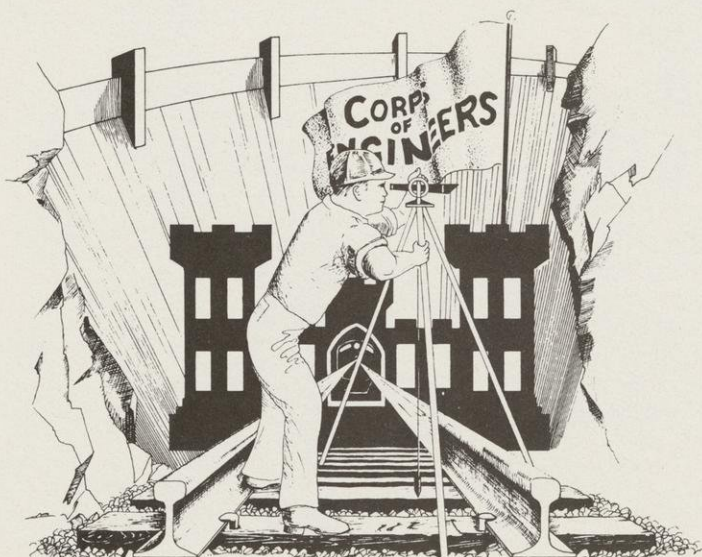
The area I used to hunt was overflowing last year so I was forced to move.

The place I moved to was also crowded. Some have 25 to 30 hunters per square mile! Why not leave tradition alone—there are enough people fooling with it now. Let things be.

**JAMES BAKER; Prescott.**



Drawing by Jim McEvoy.



Drawing by Jim McEvoy

The Corps of Engineers is the largest engineering organization in the world and its tasks have ranged from mapping the frontier to building space program facilities. A new mission, such as rebuilding the railroads as you suggested in your editorial, could be handled just as well.

However, it would not be cheap or simple. Extensive planning, manpower, economic and environmental impact projections, public support and legislative approval would be needed. If the people of the United States want the railroads rebuilt, they should let their representatives in Congress know. Likewise, if they want the Corps to have that mission once it is authorized, tell Congress. The Corps will respond to any new challenge — railroad or otherwise — as it has during 203 years of service.

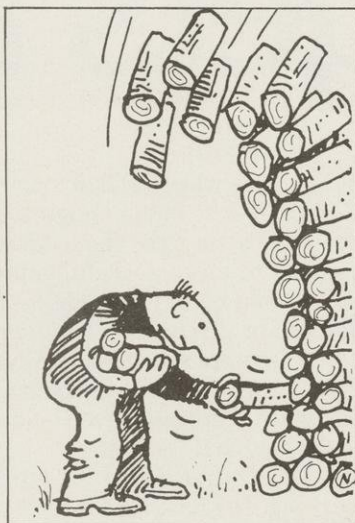
**COL. FORREST T. GAY, III, District Engineer; St. Paul, Minnesota.**



The November-December issue carried an article entitled "Firewood on the Back Burner?" that briefly talked about firewood resources of the state and their future. It also brought up the probable rise of large scale commercial firewood operations.

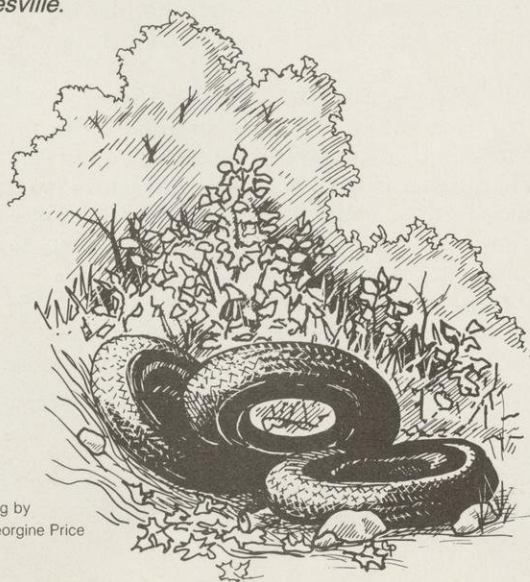
A forest is more than a number of board feet or cords obtainable from its trees. It is a living, dying, rejuvenating system of plants and animals. When the article speaks of "clearing out rough, rotten and cull trees" for firewood, that means upsetting the forest system. So as we put another log on the fire, we should not only wonder if we can afford it in deteriorating economic times, but also if we can afford it in deteriorating ecological times.

**GARY L. POKLINKOSKI;**  
*Madison.*



I want to tell you that your magazine is one of the nicest publications I have seen lately. It is well laid out, the art work is beautiful and the articles are interesting. You are to be congratulated. **MRS. R. W. QUINN;** *Grayslake, Illinois.*

The new format of *Wisconsin Natural Resources* is excellent and I have enjoyed reading the issues. However, since it is part of the DNR, I am not renewing my subscription until the DNR changes its dictatorial policies. **EDWIN SCHOOFF;** *Janesville.*



Drawing by  
Georgine Price

After reading Justin Isherwood's article "The Hedgerow," I would agree with him in the main. Why people have to destroy the habitat of things wild and free I do not understand.

This is one town chairman who would be overjoyed to see hedgerows taken off the tax rolls. If enough of us contact our representatives, maybe the tax laws could be changed to make this possible. I hope to see more articles by Mr. Isherwood. They certainly enhance an excellent magazine. **ROY KISOW, JR.,** *Chairman; Town of Oakland.*

Please allow me to correct the sexes of the Pine Grosbeaks on pages 28 and 29 of the November-December issue. The male (♂) and female (♀) symbols should be switched. **TERRY L. CORNELL;** *Yuba City.*

*Tim Hillary of Chatham, Illinois called them "missexed." Indeed they were.*

Wisconsin high school students are invited to a week long Natural Resources Workshop at the MacKenzie Environmental Center, near Poynette, this summer.

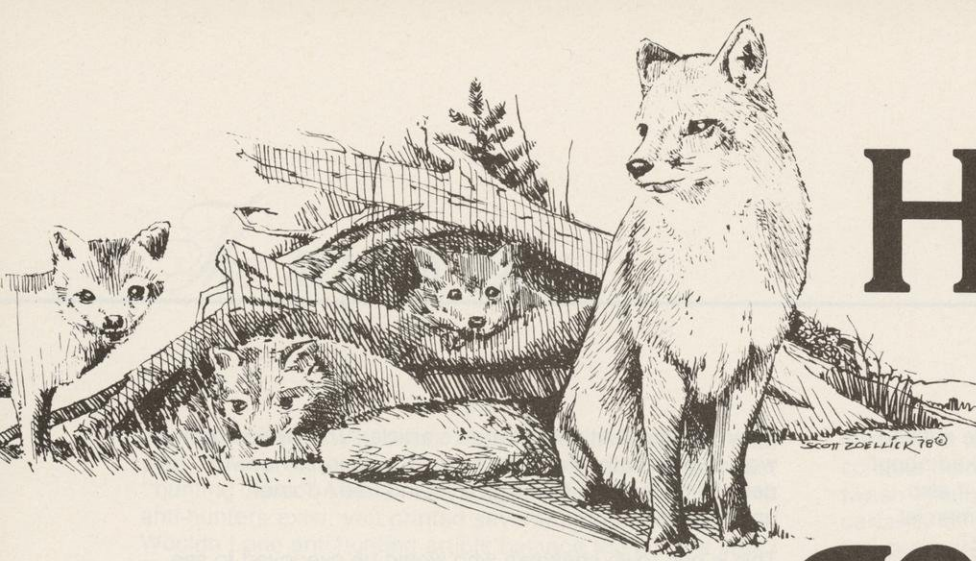
It features "hands-on" experience in forestry, fire-control, fish and game management, and other outdoor activities. There are opportunities to explore career fields in conservation while learning what individuals can do to improve, protect, and appreciate state resources. Cost is \$90.

Sponsored by the Department of Natural Resources, the first session, which is open to boys, runs June 10th through June 16th. Session Two is open to girls and is from June 17th through June 23rd. Some scholarship aid is available. For more information write the MacKenzie Center, Department of Natural Resources, Poynette, WI 53955 or call (608) 635-7311. **GEN BANCROFT,** *MEC Manager*

I have read the reprint of your article on mosquitoes in *Traveler* magazine which is sent to AAA members. You should inform readers that *Aedes triseriatus*, which transmits the La Crosse virus, produces more encephalitis today than any other viral agent in the United States. This year, 100 or more cases will be diagnosed in Wisconsin alone. People in rural circumstances must be made aware of the threat old tires present as mosquito breeding sites. If these can be removed, we have strong evidence that the disease can be eliminated. **CAMERON B. GUNDERSEN, M.D.;** *La Crosse.*

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.





# How a fox gets foxy

*BEATRICE S. SMITH, Westfield*

A fox is a handsome creature. And also a clever one. Though hunted and trapped for centuries, it is the only member of the dog family that still roams wild over most of the world.

The red fox that lives in Europe, Canada and the colder parts of the United States — including Wisconsin — is thought by some people to be the most clever of all.

How does a red fox get to be so clever?

The baby red fox knows very little at first. At birth, it is just a 3½ ounce blind bundle of dark wooly fuzz. All it knows how to do is snuggle close to its mother and drink milk.

The pups have a father, of course. A good father, he helps Mother Fox build the den. And he guards the den's main entrance when the pups are young and helpless.

But fox pups don't stay helpless long. Their eyes begin to open when they are eight or nine days old. Gradually, their legs become longer and stronger. And soon they begin playing in the den.

No one has to show little foxes how to play. They are born knowing. They play with their tails and their feet. They chew and tug on one another and on Mother. They play tug-o-war with a dried bird wing. And they play let's-see-who's-boss-around-here.

Usually, they play the boss game only once. A good thing. For this game often turns into a real

fight to see who is the strongest. The battle doesn't last long. Just long enough to have one little red fox become Little Red, the leader. After that, the pups go back to more peaceful games.

Then comes a nice morning in May. Little Red and his brothers and sisters are now eight weeks old. Their legs are steady, their eyes wide open, their tails bushy, their ears straight, their noses sharp. They are ready to leave the den. And soon they try to do just that.

If Mother Fox thinks it is too soon, she barks a warning. If Little Red or one of his brothers or sisters does not obey, Mother picks up the runaway by the scruff of the neck and totes him back where he belongs. This is Little Red's first lesson. On the other hand, if one hesitates too long, Mother gives him (or her) a nudge in the rear. This is the second lesson.

Usually Mother Fox does not have to nudge Little Red, the strongest one. He comes dashing out, leaping, rolling, tumbling and tackling everything within reach.

He pounces on an insect. It gets away. Little Red dashes after it, misses again, sees another, pounces once more. He gets a grasshopper this time, picks it up in his mouth — and accidentally swallows it.

Little Red gulps. He has never tasted anything quite like this before. It tastes good. He looks in the weeds for another and gets a burr stuck between his toes. He pulls at it with his teeth and sticks his lip. It hurts. He tries again. This time he lifts his lip and neatly nips out the burr, without getting hurt. Not an important lesson, but a handy one.

The pain gone, Little Red yips with joy. He does not notice a dark shadow passing overhead. Not until Mother growls a warning. All the pups, including Little Red, dash into the den. At that instant, from a short distance away, an animal screams. It is a startled, shrill cry, which ends abruptly. A great horned owl has killed a rabbit. It is about the size of a baby fox. Little Red shivers. He



won't forget the shadow and those screams, not in a hurry, he won't.

One evening, a delicious odor comes floating in with the June breeze. An odor of wild strawberries. The noses of the Fox family twitch. Father Fox trots off. Mother follows slowly — so slowly that Little Red is able to follow her. Indeed, he soon passes her and gets behind his father. The other pups stay behind Mother. All follow one another in a single file so exact they often walk in each other's footsteps.

Down a dirt path a few yards, then into the woods and along a deer trail, then into a thicket they go. Father has traveled this route at least once every day for a month or so. He knows every stone, every clump of grass, every tree, every scent. Yet he never passes a fallen log without jumping on top of it to look around.

Little Red watches his father. He tries to jump on logs too. Bump! He loses his balance and falls flat. But the next time he keeps his balance. And by the time the Fox family reaches the strawberry patch, Little Red is almost as fine a log-climber as father.

The night is warm and Little Red breathes hard. His red tongue hangs out over his needle-sharp teeth as he pants.

Clouds of mosquitoes swarm about his eyes, his ears, his nose. He shakes off a few. Still they come, buzzing. Frantic, he runs. Fast! Faster! And he escapes the mosquitoes for a while. Little Red didn't know how to do that before. Nor did he realize what fun it was to run, to simply stretch out and run. Now he does.

One windless morning a few days later, Mother and Father Fox take the pups hunting. Not far from the den is a field overgrown with coarse grass. Here a colony of field mice lives — the easiest of all game for fox to hunt.

"Lie still!" Father growls at Little Red and the

other pups. They do so. Immediately. They have heard that command before. They watch.

What a surprise! Mother and Father Fox are suddenly up on their hind legs. Why? Runs that the mice follow are hidden in tall grass and the only way to find a mouse is to see the grass move. Little Red didn't know that before, either. Now he does. So do his brothers and sisters.

"All right. Come try it!" Mother Fox barks. Quivering with excitement, they join the hunt. Little Red is first to spot a movement.

He springs into the middle of a waving clump of grass — and misses the mouse. He tries once more. Misses again. And again.

Finally he catches one and grinds his small milk teeth into his first self-caught meal.

A week later he goes after a rabbit. It's hard. Rabbits run fast — faster than a fox. But they dodge around trees. That's their downfall, because a fox can dodge better. At least Mother and Father Fox can. Little Red is still clumsy. Soon he won't be.

All summer long he looks, listens, tastes, smells. And he watches his parents who, in turn, have learned from their parents.

September. October. November. December. Little Red is on his own. Each month, he learns something new. Winter comes and spring follows. He's Big Red now and he knows how to hunt, hide, bark, bite, circle, stand, sit, stop, run — and when not to. And that's how a fox gets foxy.

Drawings by Scott Zoellick.





# Baby blues die hard

Anglers love to catch saucer-sized bluegills but in a lot of Wisconsin lakes these fish don't grow much bigger than a silver dollar. That could change if new research projects pan out.



Artwork by Jens VonSivers

## TOM BEARD, Research Project Leader, Spooner

DNR researchers recently finished a six-year life history study of bluegills as part of an attack on the problem of stunted panfish. Bluegills grow too slowly in about a third of the lakes in Wisconsin and anglers won't fish for them — which makes the problem worse. The fish get littler and littler. Management with chemical treatment and drawdowns (where possible) has done some good, but neither is entirely satisfactory everywhere. In too many places bluegills are still a wasted resource.

Initial purpose of the life history study was to determine whether young-of-the-year are selective feeders on certain types and sizes of zooplankton. Zooplankton are the microscopic animals that are nursery food for most game fish. The study looked for a "critical survival period" that might occur between the time fry use up yolk sac nutrients and the time they are able to find food on their own.

\* Plankton

Here's what was discovered:  
The first two to three weeks after leaving the nest, fry feed on a certain size rather than a special type of zooplankton. But, from three to six weeks they feed on all sizes plus some aquatic insects. After six weeks, bluegills eat mainly aquatic insects, supplemented by the zooplankton.

At no time during the six year study did food supply have a great effect on survival of young-of-the-year. The amount of plankton present was constantly monitored. Competition for food stunted growth in some lakes but didn't cut the population. Only a catastrophic loss of food would do that.

Although it was determined that little bluegills couldn't be starved into disappearing, other helpful management hints emerged. The number of fry that populate a lake depends on the two to three week spawning period in June. A lot of nests mean a big year class! But how about a water pump that can suck nests right out of the lake? Pumping could cut a year class even before it

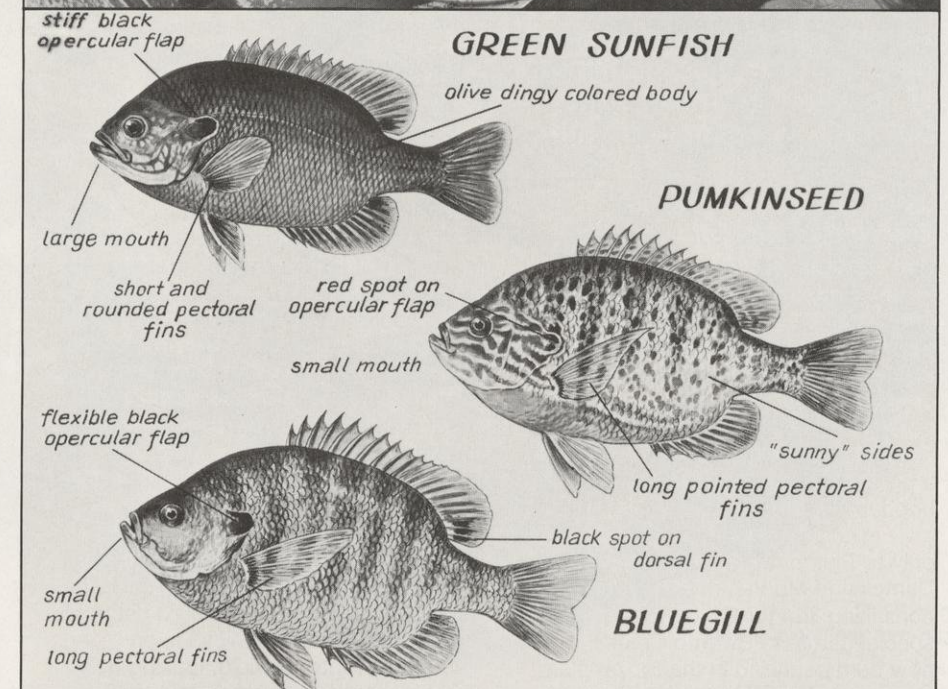
hatches and reduce competition for food. Pumps will now be tried experimentally on small lakes where the economics might make them feasible.

Stocking predators is another way. Walleyes did an efficient job — they wiped out the bluegills. But finding a walleye supply and controlling their reproduction so that stunted walleyes don't replace stunted bluegills are new problems.

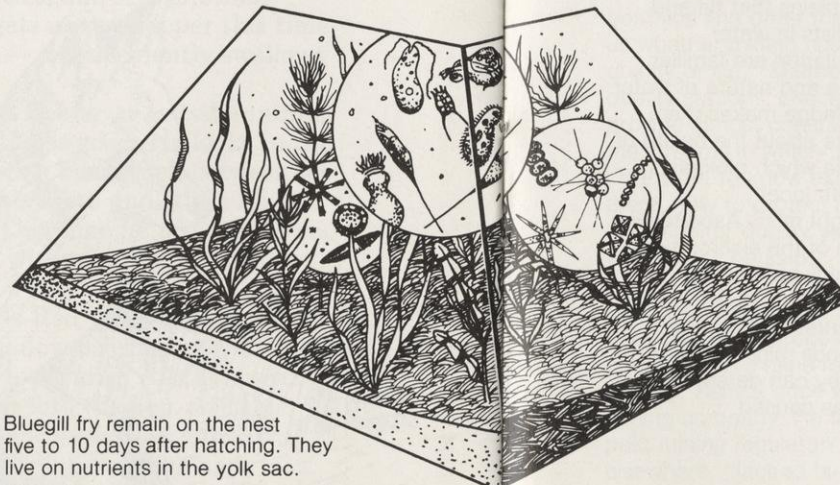
The life history study also revealed that fry migrate to the middle of the lake as soon as they leave the nest. They remain there from 30 to 40 days. This would make them vulnerable to treatment with a mild but selective fish toxicant.

The study turned up all these plus some other options as ways to improve slow growth in bluegills. It's the kind of research that can put fish in the pan. One of these days all those little lakes we've ignored so long may be overcrowded with anglers.

Too little food means stunted bluegills; they don't die of starvation.

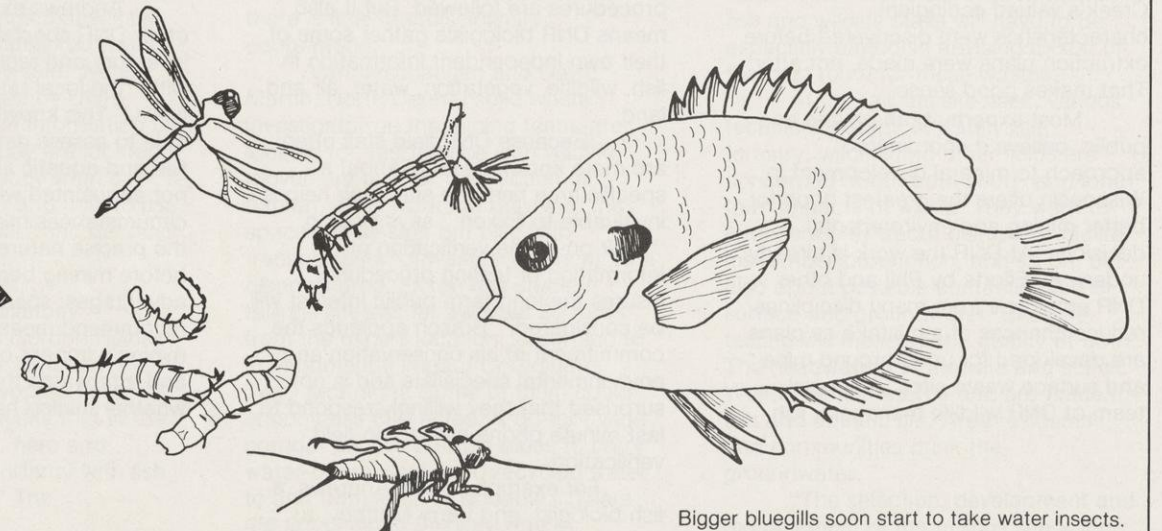


Artwork by Jens VonSivers



Bluegill fry remain on the nest five to 10 days after hatching. They live on nutrients in the yolk sac.

When fry first leave the nest, they eat microscopic "zooplankton." Most any kind will do as long as it's the right size.



Bigger bluegills soon start to take water insects.



# DNR monitors Exxon

A big mine might cause changes in every environmental category anyone can think of. DNR has mobilized all its talent to make sure that nothing escapes scrutiny.

**JEFF SMOLLER, Director, Information and Education**

The wetlands of Swamp Creek in Forest County hold few secrets from DNR Wildlife Manager Phil Vanderschaegen. But even he was surprised to discover an uncommon Calypso Orchid one mid-June day. It confirmed that the cedar swamp was special. There was also an osprey nest, a productive deer yard and a home for hooded mergansers.

The information was valuable not only to Phil, but to biologists from Dames and Moore, an environmental consulting firm for Exxon USA. The special nature of Swamp Creek will now be recognized in the Exxon plan to mine northwoods soil for 70 million tons of copper and zinc. Swamp Creek's valued ecological characteristics were discovered before extraction plans were made, not after. That makes good sense.

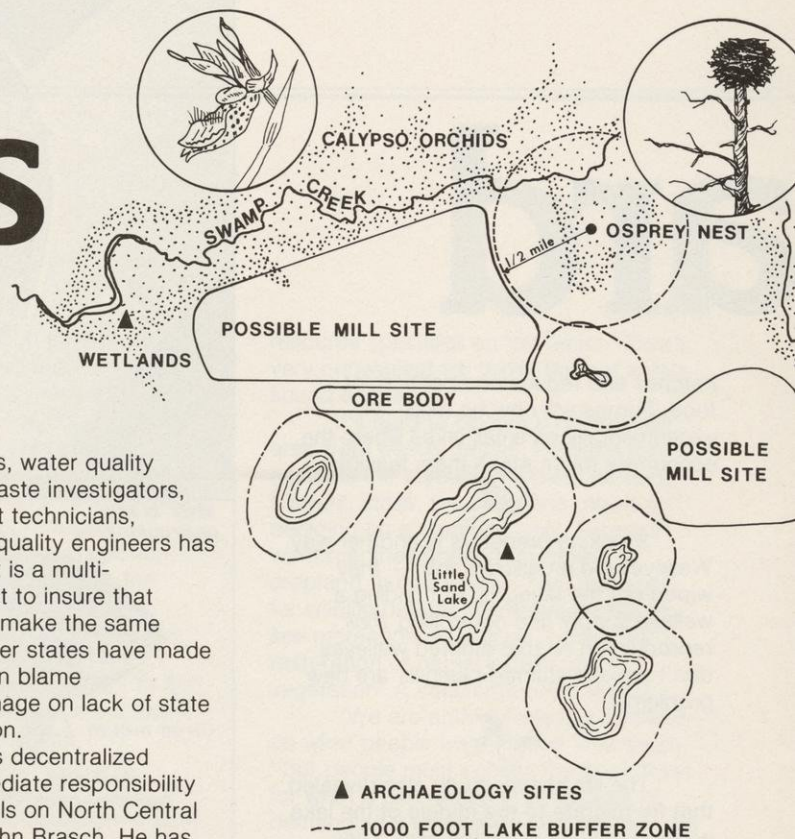
Most experts, both private and public, believe a coordinated approach to mineral development in Wisconsin offers the greatest hope for better mining and environmental decisions. At DNR the work is already underway. Efforts by Phil and other DNR employees from many disciplines reduce chances of a mistake as plans are developed for underground mine and surface waste sites. A special team of DNR wildlife managers, fish

biologists, foresters, water quality specialists, solid waste investigators, water management technicians, geologists and air quality engineers has been assembled. It is a multi-disciplinary attempt to insure that Wisconsin doesn't make the same mistakes some other states have made where citizens often blame environmental damage on lack of state agency coordination.

Under DNR's decentralized organization, immediate responsibility for coordination falls on North Central District Director John Brasch. He has appointed his assistant, Hal Berndt, as mining coordinator and assembled a team of experts from both conservation and environmental protection. Brasch knows fish, wildlife and other resource issues and has a strong commitment to enlightened environmental management. He has ordered that baseline biological data be gathered and verified. To get it, his staff often accompanies Exxon biologists into the field, looking over their shoulders to be certain that proper testing and sampling procedures are followed. But it also means DNR biologists gather some of their own independent information in fish, wildlife, vegetation, water, air and land.

"Because DNR field staff often are more knowledgeable about a specific area near the site, their help is invaluable to Exxon," says Brasch. "Their on-scene verification of information or testing procedures insures the long-term public interest will be considered." Brasch applauds the commitment of his conservation and environmental specialists and is not surprised that they willingly respond to last minute phone calls for in-field verification.

For example, Lloyd Andrews, a fish biologist, and Larry Maltbey, a



water pollution biologist, both recently received evening calls at home telling them important field tests would take place the next day. They were happy to oblige. "We appreciate what Dames and Moore biologists are after,"

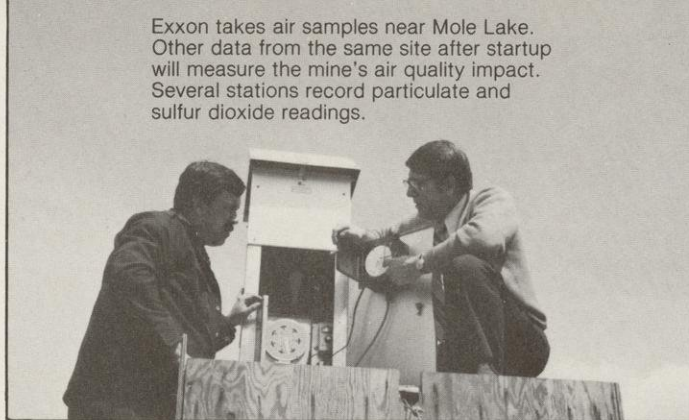
Andrews said. "We know that timing and technique are important, because to understand the resource you need information secured during a variety of natural stages and seasons."

Andrews explains that he and other DNR specialists in water inventory and regulation are familiar with "the local rate and nature of water flows." This knowledge makes them able to assess data about the health of fish and aquatic life which biologists not acquainted with local circumstances might miss. Ascertaining the precise nature of the environment before mining begins has two advantages: specialists can recommend measures to minimize mining's impact once mining begins and afterwards they can determine whether mining has caused



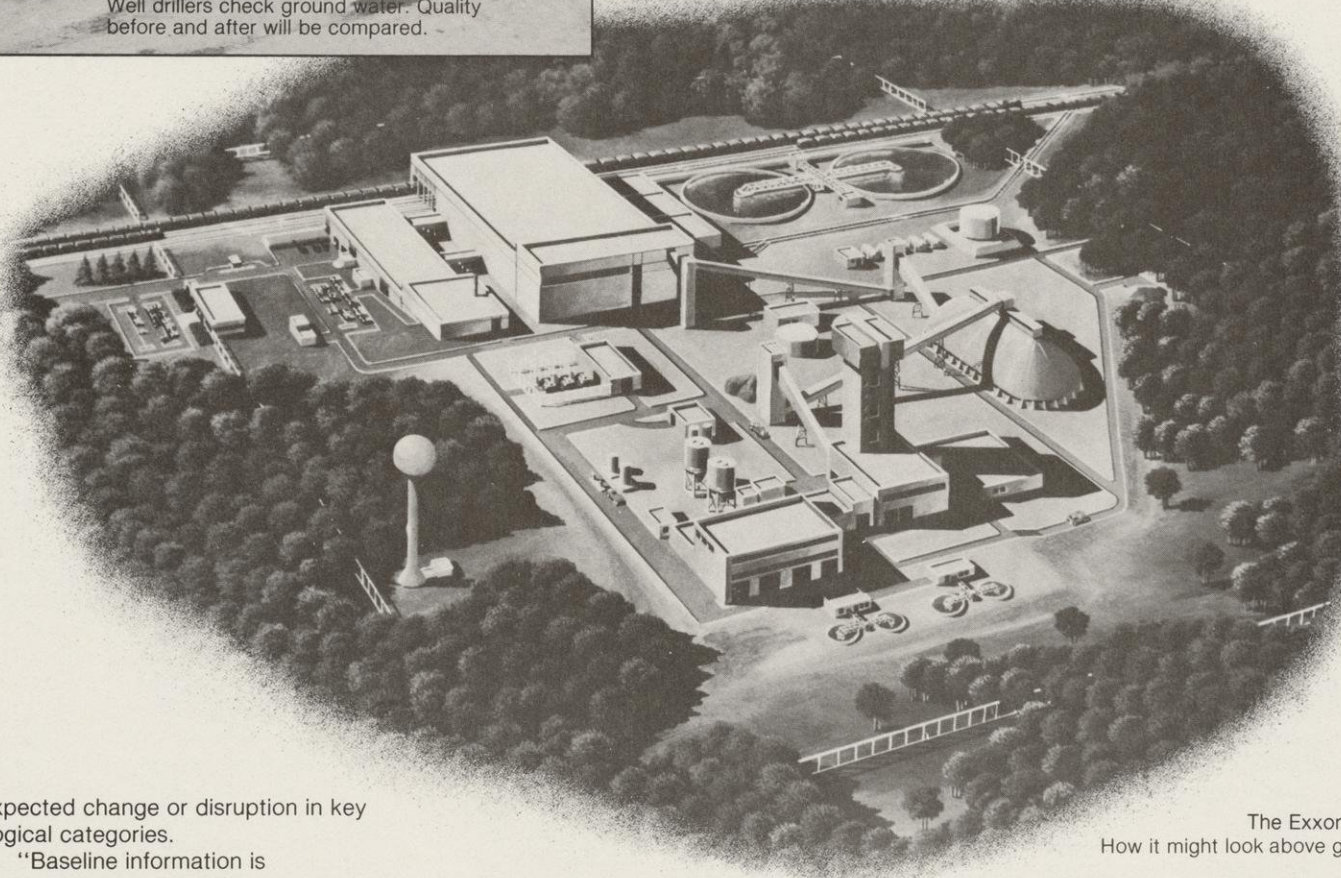


Well drillers check ground water. Quality before and after will be compared.



Photos by Don Bragg

Exxon takes air samples near Mole Lake. Other data from the same site after startup will measure the mine's air quality impact. Several stations record particulate and sulfur dioxide readings.



The Exxon Mine.  
How it might look above ground.

unexpected change or disruption in key biological categories.

"Baseline information is important because years from now we'll be able to monitor water chemistry, zooplankton, macrophytes, benthics and other things that will tell us whether mining has affected water quality or life," Maltbey said. Water quality stations, checked by DNR, provide almost constant information on the streams in which they are located. "We want to know exactly what's there, how to protect it and how to use it to monitor quality years and decades from now," he said.

The way Andrews, Vanderschaegen and Maltbey cooperate encourages Gordon Reinke, chief of DNR's mine reclamation section. Reinke once worked for a mining company. He thinks that in the past mining regulators, here and elsewhere, "lacked familiarity with fish and wildlife concerns." The

consequences, he said, are obvious and continue today in states where there is little interdisciplinary cooperation.

Vanderschaegen and David Martin, North Central solid waste investigator on the mining team, are looking for interference with wildlife movement and for destruction of habitat. They work not only with the specific mine site, but also with transportation of wastes (tailings) to a disposal area. Exxon has studied tailings sites as far away as 25 miles from the mine's location, according to Environmental Impact Coordinator Terry McKnight. Some of them could encompass 600 acres. A 50-foot wide corridor for two 20-inch pipes to carry water-borne waste and recycled water to and from a mill is possible. "There are spots along the way where dumping may take place during

emergency shutdowns," McKnight said. "This means our environmental, fish and wildlife staffs will have to be especially careful in advising Exxon on the best route for these wastes."

At the tailings site itself, various technical experts in water, fish, forestry, wildlife and other fields are concerned about both short- and long-term impacts of waste. They want to know not only about disrupted wildlife, lost timber production, and so on, but also about possible contamination of surface and groundwater. Baseline testing will measure the quality of both. The headwaters of the wild and scenic Wolf River are nearby and are home for fish and aquatic life. Area residents and communities drink the groundwater.

"The selection, development and management of the tailings site will be



the most difficult and important decision of all," said Howard Druckenmiller, DNR's department-wide mining coordinator. "It will call upon the professional judgments of all the conservation and environmental disciplines at our command, and possibly some consultants, taking into account the special fish and wildlife concerns of outdoor enthusiasts and environmentalists."

"Cooperation at an early stage of the project is the key to economic success and environmental acceptability," Druckenmiller continued. "At DNR we are calling together disciplines that, in other states and at other times, didn't get involved until there was a problem, a lawsuit or until it was too late."

Druckenmiller's assignment is one of the most important in the department, an opinion concurred in by the state's Metallic Mining Council. The council appreciates the need for coordination. One of its members, James Derouin, also is a respected Madison representative of the Wisconsin Paper Council and of the Wisconsin Association of Manufacturers and Commerce (WAMC). He offers this professional and personal opinion on the need for coordination in making environmental decisions:

"It's hard enough to achieve coordination in one agency let alone more than one," he said. "Some type of unified decision-making process within one agency is highly desirable; it insures a balancing of interests and encourages tough decisions that must be made whenever there is a tradeoff situation, such as is the case in mining." Derouin said there is a "strong relationship" between the so-called traditional conservation functions and new environmental ones. Failure to achieve cooperation would lead to more red tape, bureaucratic delay, environmental mistakes and lawsuits, he fears.

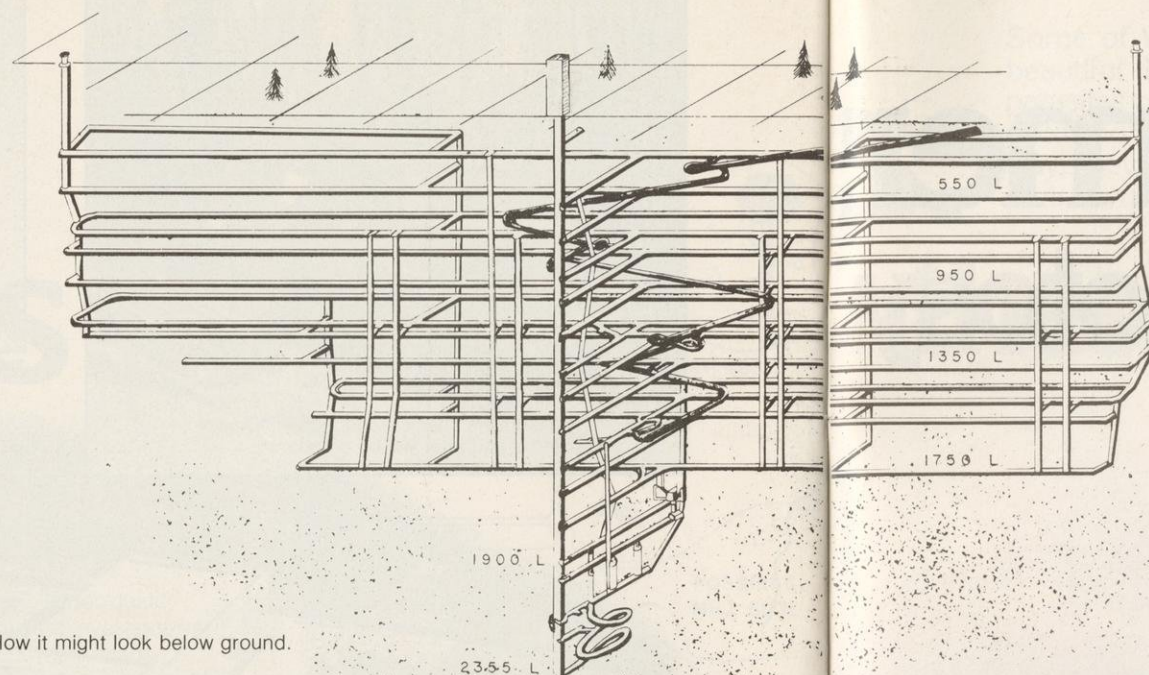
Other states that take economic development and environmental

protection seriously find coordination often is difficult. In one state, a separate agency was created to help business cut red tape and coordinate policies among various conservation and environmental agencies. In another, the governor created a special council to help resolve conflicting resource policies and programs among fish, game and environmental agencies.

"Look at the problems of some of our neighboring states where there isn't the coordination among functions," says Derouin. "There is a multiplicity of agencies in states like Minnesota and Illinois and the frustration level really gnaws at business."

The narrow approach to resource management is a thing of the past. It no longer fits our complicated times. The one thing that the ecology movement told the modern world is that everything is interrelated. In resource management the lesson is basic. Fish managers can no longer merely manage fish nor game managers game. Modern times demand a broad approach that people like John Brasch, Phil Vanderschaegen, Hal Berndt, Dave Martin, Lloyd Andrews, Gordon Reinke, Howard Druckenmiller, Terry McKnight, Larry Maltbey and the others at DNR are able and willing to provide.

It's an approach that business and the general public should be glad DNR is organized to take.



How it might look below ground.

## Data about everything

DNR and Exxon baseline studies at the Crandon mineral discovery are complex. Documenting existing conditions provides a basis for assessing potential mining impacts, helps find ways to counter potential environmental damage and suggests a design for future monitoring systems once mining has begun and after it ends. Chemical, physical, biological, cultural and economic studies are involved. Here are some of them:

**Aquatic ecology** — Documents water quality, plankton (small floating and swimming plants and animals), fish, benthos (bottom dwellers), periphytic algae (attached organisms), aquatic macrophytes (water plants) and sediments. Some 22 biological monitoring stations are near the mine area. There are 13 peripheral water quality monitoring sites.

**Terrestrial ecology** — Describes soils, vegetation and wildlife. Included are soil mapping, forest vegetation studies, wildlife habitat identification, seasonal wildlife sampling and surveys, songbird and plant community relationships, waterfowl surveys, ruffed grouse inventories, small mammal sampling, deer counts, reptile and amphibian counts, chemical analysis for metal content in wildlife species. Sampling for zinc, cadmium, copper, arsenic, chromium, cobalt, lead, mercury and manganese.

**Hydrology and geology** — Details physical and chemical aspects of surface and groundwater and the area's geology. Investigates stream discharges, lake levels, suspended sediment concentrations, stream flow,

and precipitation. For groundwater, there are geohydrologic and geotechnical studies with 80 boreholes where the levels and quality of underground water is measured. Added information is taken from 58 existing wells and from DNR well drilling records. Surface geological mapping of 81 square miles uses aerial photos, topographic maps, road cuts, sand pits and 80 test borings. About 675 soil samples have been collected.

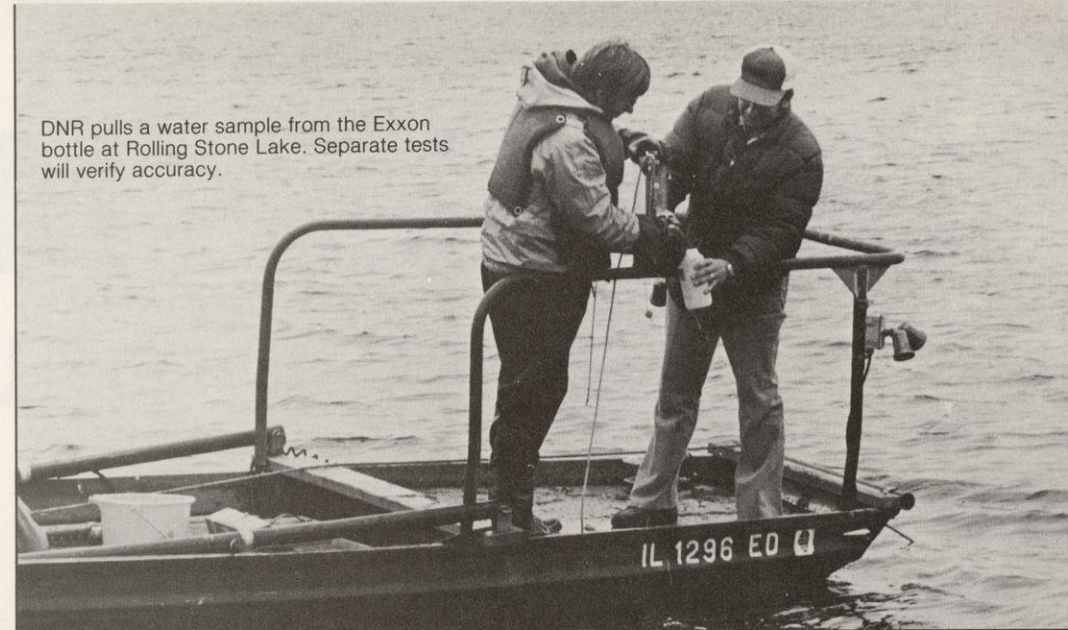
**Land use** — Inventories existing land use and trends. Reviews literature and makes contacts with cooperating agencies, universities and landowners.

**History and archaeology** — Reviews literature and museum records and conducts field surveys of lands potentially affected. There have been 3,700 site investigations, some involving test holes and pits.

**Socioeconomics** — Records basic social, demographic and economic data for the general area. Specifics involve employment, income, taxation, public services, ways of life, housing, etc.

**Meteorology and air quality** — Measures total suspended particulates (fine dust in air) for a 24-hour period every third day at three stations. Wind speed, direction, temperature and rainfall are recorded at one of the stations. About a year of sulfur dioxide measurements have been taken at one station. A year of particulate samples have been chemically analyzed for lead, zinc, copper, mercury and arsenic content.

**Acoustics** — Measures existing noise levels at six locations in and around the project during summer and winter, day and night.



DNR pulls a water sample from the Exxon bottle at Rolling Stone Lake. Separate tests will verify accuracy.



Bird census



Fish and other aquatics from waters near the mine site are trapped, sorted, measured and weighed by Exxon. DNR oversees the work.



# Greenless bloomers:

## flowers without photosynthesis

JERRY D. DAVIS, Chairperson  
UW-La Crosse, Biology Department

Most flowers, but not all, are produced by green plants. Those that are not are unusual, attractive and easy to identify. Wisconsin has many kinds, and unadorned by leaves, the flowers are often of breathtaking beauty.

In scientific terms, flowering plants are referred to as "angiosperms" because they produce seed pods. By far, the majority of angiosperms are photosynthetic — they use their chlorophyll to capture the sun's energy and manufacture their own food.

But those featured here "steal" their dinner from other sources. One kind gets nourishment from dead organic material like fallen leaves and rotting stumps. These are called "saprophytes." (Sapro means decaying and phyte is a scientific word for plant.) Others are "parasites" and grow on a living "host" organism. Ring worm and apple rust are familiar examples of parasites. Many parasitic plants are extremely destructive and, therefore, of considerable economic importance. Fortunately, only minor damage is caused by most of these in Wisconsin.

Saprophytic and parasitic angiosperms are similar to mushrooms and other fungi because they have little or no chlorophyll. But unlike fungi, they usually have flowers which are present most of the time the plant is observable. These forms of angiosperms represent highly evolved organisms since they no longer have to manufacture their own food and they do not kill their host like many animal or fungal parasites do.

Next time you visit the woods, look for them. Identification should be easy, but some are rare and on the endangered list, so "do not disturb."

### Stem parasite

If you've ever seen a parasitic angiosperm, chances are it's dodder. This cosmopolitan genus attaches to a

variety of hosts. Soon after attachment, the plant loses ground anchorage. During late August and September, vines may turn almost bright yellow. In other countries, dodder is a source of commercial tannin.

### Mistletoe in Wisconsin

Dwarf mistletoe is a relative of the larger mistletoes we are familiar with at Christmas time. It's hard to see unless you look for it specifically or have someone point it out. Black spruce is the most common Wisconsin host. To spread, the plant shoots seeds to distant tree branches where they slide to the lower side and germinate, sending food absorbing "roots" into the spruce branch. Some species of dwarf mistletoe cause witches brooms on conifers. These consist of numerous small branches clustered together. Other tree malformations also occur. Because of such damage, there is much study of this species in conifer growing states.

### Heath family

Indian pipe is one of the most easily-spotted saprophytic angiosperms. Its ghostly white color stands out against the drab browns, olive greens and pale tans of the dimly-lit forest of early summer. The name comes from its shape. The single flower resembles the bowl of a pipe. As the plant matures, the flower turns upward until it looks toward the sun instead of the ground. Some people have mistaken Indian pipe for a fungus and have even tried it as food!

Also in the Heath family are pinesap and pine drops. Pinesap is similar to Indian pipe. Principal difference is the number of flowers, but pinesap is never as ghostly white and may be pinkish or even red. As the name implies, it's usually found under conifers like pine.

Pine drops are beautiful and endangered and should be left undisturbed. They, too, are usually seen under conifers.

### Root parasites

The broomrape family includes common as well as rare parasitic angiosperms. The four kinds found in Wisconsin connect to the roots of host plants from which they take both food and water.

Called cancer root, it is common in some oak forests with red oak the most likely host. It also occurs on other oaks and even on witch hazel. The host is usually little affected because of its large size in comparison to the parasite. A large growth marks the spot where the parasite attaches to the oak root. Seeds spread by this parasite germinate in the presence of other oak roots and a new plant is created in the same fashion as with other seeds.

There is a "clustered" and a "one-flowered" broomrape. Both are very rare plants and should be left un-

Some of Wisconsin's most beautiful flowers are parasites or else live on decaying vegetation. Either way, they have no green of their own and don't need it.



Clumped broomrape



Dwarf Mistletoe



Dodder





### Wisconsin's Saprophytic Angiosperms

Dwarf mistletoe	<i>Arceuthobium pusillum</i>
Beech drops	<i>Epifagus</i>
Dodder	<i>Cuscuta</i>
Cancer root	<i>Conopholis americana</i>
Clumped broomrape	<i>Orobanche fosciculata</i>
Indian pipe	<i>Monotropa uniflora</i>
One-flowered broomrape	<i>Orobanche uniflora</i>
Pinesap	<i>Monotropa hypopithys</i>
Pine drops	<i>Pterospora</i>



The title is a play on words, but for the bald eagle, it may be all we can do. Perhaps our national motto is a prophecy.

# Pray for a bird of prey

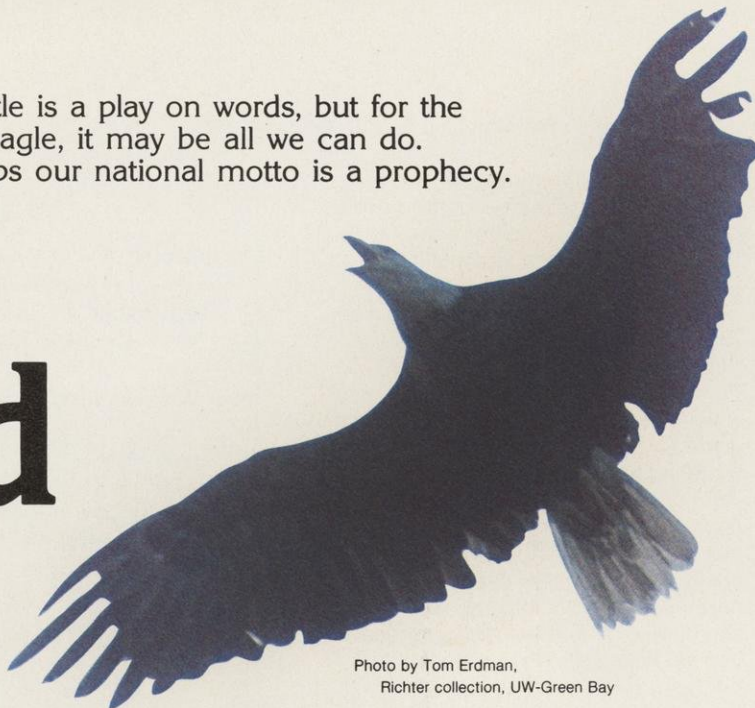


Photo by Tom Erdman,  
Richter collection, UW-Green Bay



**INGA BRYNILDSON,**  
*Communications Coordinator,  
DNR, Office of Endangered Species*

Everyone knows what an American Eagle looks like. Along with our historic motto, E Pluribus Unum, it appears on coins, paper money, flagpoles, seals and anything else that requires a symbol. It occupies places of honor and even decorates our bathrooms.

At the turn of the century, 100,000 American or bald eagles spanned the skies across the contiguous United States. Today, only 700 breeding pairs exist outside Alaska. Of the lower 48, only 10 states are fortunate enough to have more than 25 active nests — and Wisconsin is one.

Wisconsin hosts 151 bald eagle breeding pairs. These, combined with the eagles in Michigan and Minnesota account for 50% of the entire US mainland population. In winter, even more come down from Canada. Then they collect on roosts near open water, many at flowage spillways, and it is not uncommon for Wisconsin birdwatchers to see a dozen in a single panorama.

The adults are sturdy, brown-bodied birds that look like they've had their heads and tails dunked in white paint. Yellow eyes, beak and talons give a menacing appearance.

They are the largest predatory bird in Wisconsin — in all of North America second only in size to the endangered California condor. Their wings sweep

Fish are a lifetime diet and can be slow poison when contaminated with chemicals. These nestlings are five weeks old.

Photo by Ron Eckstein



open a full seven feet across a yard-long body.

But for all this size, the bird is really a featherweight — eight to twelve pounds because of hollow bones and the 7,000 stiff, vaned feathers it uses to get airborne.

Bald eagles are exclusive to North America. Two races make up the population, southern and northern. Curiously, it's difficult to pinpoint just which is which. Some say the distinction is merely geographical, but north-south wintering and breeding ranges leave plenty of gray areas. Size is another distinction. Southern bald eagles are much smaller than northern. But here again, size gradually increases as you go north, so it is difficult to say where southern ends and the northern race begins. Wisconsin's are definitely northern.

Snow may still be on the ground in March when bald eagles here begin to lay eggs. It used to be commonplace for them to nest on cliffs and trees along the Great Lakes, but because of heavy pesticide contamination, active nests are now more often found near northern, inland lakes.

When bald eagles are about five years old, they choose a lifetime mate — serious business when you consider they can live to be 50! Although mates may not nest every year, they typically return to the traditional breeding territory to add to their nest or "eyrie." One record, two-ton eyrie in St. Petersburg, Florida, measured 20 feet deep by 9½

## Wisconsin's war eagle

Old Abe was a bald eagle from Chippewa County who made it big as a military mascot during the Civil War. Old Abe took his post with Company C out of Eau Claire in the early 1860's. From his wooden perch, complete with a star-spangled dropping shield, Old Abe saw the battalion through 42 battles and skirmishes. It was said that many Confederate soldiers tried to capture and destroy the "Yankee Buzzard."

After completing his war duty, Old Abe took up residence in a basement room of the State Capitol, coming out for an occasional public appearance. Ill health weakened him after fire broke out near his cage in 1881. He died that spring at age 21. Bald eagles "Old Woody" and "Young Abe," tried to fill his wings during the World Wars, but neither gained the notoriety of Old Abe, "probably the most noted mascot of American history."

## What DNR does for eagles

- Bans harmful chemicals in its water pollution program.
- Flies many miles each year to search for new nests and count young.
- Helps with annual federally financed surveys.
- Keeps tabs on all eagle deaths and injuries in Wisconsin. Rehabilitates those that can recover.
- Maps "territories" around nests. Routes roads and recreation trails away from them to minimize disturbance.
- Aids eagle banding.
- Builds artificial nests when traditional ones fall from trees.

feet across and was inhabited for more than 35 seasons.

In Wisconsin, eggs are laid in late March or April, and incubate 34 or 35 days. Baby eagles are awkward, wooly and three inches long when hatched. By fledging time, they measure 36 inches and sleek flight feathers replace the fuzz. Immature eagles are solid brown, lacking the white and yellow accents of adults. Not until age four or five, will they acquire the distinguishing white head which gave them the name "bald."

Being predatory, the bald eagle roosts high on the food chain. Fish make up more than 80% of the diet — suckers, northern pike and bullheads are staples. Eagles also prey on small mammals and birds and consume a surprising amount of carrion including road kills and belly-up fish.

But this bill of fare can be a deathtrap. Pesticides collect in the fatty tissue of fish and animals and bald eagles can get a mouthful of contaminants with their meal. DDT, DDD, DDE or PCB's are all a threat — an alphabetical arsenal suspected of causing eagles to lay thin-shelled eggs that break before embryos develop.

Of nine eagle eggs sampled in Wisconsin in 1970, only four showed any signs of development. It is not uncommon for healthy eagles to lay three eggs. But today, a nesting pair is lucky to bring even one eaglet to maturity. Nationwide, only 40% of the remaining bald eagle nesting pairs can still bear offspring. Wisconsin's eagles have a higher success rate than most — in 1977, 100 nesting pairs yielded 120 offspring. This compares with 98 young produced that year in Florida, and only 76 for 100 active nests in Maine.

The most recently discovered threat is lead shot. New laws restrict

hunting waterfowl with it because of lead poisoning. Eventually, these may solve the problem for eagles, too. But until then, a duck that has died of lead poisoning will also poison the eagle that eats it.

Then there's urban encroachment. Nesting and roosting sites are often disturbed by development, and utility lines sometimes electrocute eagles.

As if these hazards weren't enough, there's a more overt danger — shooting. Between 1917 and 1952, an estimated 128,000 bald eagles were killed for bounty in Alaska. Although, since 1940 it has been illegal and is now punishable by up to a year in jail and a \$5,000 fine, shooting still accounts for 50% of eagle deaths annually. Indiscriminate shooting is common in western ranching states where eagles are untruly viewed as a threat to livestock.

In Wisconsin, the bald eagle has been listed as "endangered" by DNR for the past seven years. This is a tighter classification than the federal one which says the bird is only "threatened" here. An endangered species is worse off than a threatened one. The difference reflects our deep concern about Wisconsin's drastic drop in eagle numbers despite the fact that we still have more than

## Citizen eagle action

In addition to DNR and federal agencies, many Wisconsin citizens work to protect bald eagles.

**Audubon Society:** Members annually band and census eagles. The Society offers a certificate to landowners who agree to protect eagle nests on their property.

**Eagle Valley Environmentalists (EVE):** A non-profit organization dedicated to preserving bald eagles. Formed in 1972, it has to its credit 1,400-acre Eagle Valley, a traditional

eagle roost on the east bank of the Mississippi River one mile south of Glen Haven and control of the Anheuser-Busch Ferry Bluff Eagle Sanctuary in Sauk County. EVE sponsors "Bald Eagle Days," an annual gathering to stimulate public awareness of the bird.

**Wisconsin Society for Ornithology (WSO):** Members work voluntarily throughout the year recording bald eagle observations.

most places. The US threatened category also applies in Michigan, Minnesota, Washington and Oregon. For the rest of the 48 states, the word is indisputably "endangered." To offer some protection, it is now illegal to barter, purchase, sell, transport, import, export, shoot or possess any part of a bald eagle.

Somehow ecological history has given a certain irony to our use of this bird as a national symbol. The bald eagle was chosen 200 years ago when many spanned the sky. Our motto on the banner that it clutches, *E Pluribus*

*Unum*, means "Out of Many, One."

It could prove a strange and deadly prophecy should those words someday be true of a last remaining bald eagle.

*Right:*

An immature bald eagle that had been injured. DNR has a rehabilitation program.

Photo by Tom Erdman, Richter collection, UW-Green Bay

*Bottom left:*

A 10 week old bald eagle nearly ready to leave the nest. When it fledges in about 14 days its wingspan will be wider than its parents'.







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