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Wisconsin

NATURAL RESOURCES

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So small a bundle of large enthusiasms

"That whimsical fellow called Evolution, having enlarged the dinosaur until he tripped over his own toes, tried shrinking the chickadee until he was just too big to be snapped up by flycatchers as an insect, and just too little to be pursued by hawks and owls as meat. Then he regarded his handiwork and laughed. Everyone laughs at so small a bundle of large enthusiasms."

Aldo Leopold

MICHAEL MOSSMAN, DNR Bureau of Research, Madison

A small bundle of large enthusiasms — appropriate words for one of Wisconsin's most common and delightful winter birds, the black-capped chickadee. Only four and one-half inches long — much of it tail — the chickadee and its call always perk up winter.

During this season they subsist largely on insect eggs and pupae which overwinter in plant galls and bark crevices. They are curious and versatile foragers. "I suspect there is a commandment in chickdom," Leopold wrote, "Thou shalt investigate every loud noise!" When we start chopping in our woods, the chicks at once appear and stay until the felled tree or riven log has exposed new insect eggs or pupae for their delectation."

Chickadees come readily to bird feeders too, especially if you provide suet. When food is scarce, you may even entice them to feed from your hand!

Listen for the chickadee's clear, flute-like whistle some sunny January morning. It sounds like "pay-day," "fee-bee" or "sea-weed", the second note about a tone lower than the first.

Early in spring, chickadee pairs establish breeding territories and by late May a clutch of six to eight eggs will lie in a nest cavity lined with soft feathers, bits of fur, or plant down. (Chickadees have a small, relatively weak bill, so they must excavate nest-holes in soft, punky wood such as rotted white birch, where the tough bark holds the tree together while the wood inside decays.) Only the female warms the nest, but in about 12 days the eggs hatch and then the male helps feed the nestlings. Young birds fledge in June and for about three weeks tag about behind their parents, getting fed and learning to fend for themselves.

Although most chickadees probably live no more than a winter or two; it's a marvel that such a ridiculously small creature can survive Wisconsin winters at all. But survive they do, meeting daily challenges head-on in their own cheerful, efficient, chickadee way. Keep an eye and an ear alert for this tenacious little capped midget in the brittle cold days yet ahead. They're a vivid lesson that great abilities sometimes lie in the most unlikely packages. Would that we all could face winter with a chickadee's enthusiasm.

"Bits of Cheer" by artist Jonathan Wilde, Rt. 1, Box 141, Plainfield, WI. 54966. Courtesy Leigh Yawkey Woodson Art Museum, Wausau.

Contents

Clearing up a nonpoint	Jim Baumann & Laurie Mann	4
Science explains the snowflake	Jerry L. Mosser	11
Cave camping	Robert E. Dreis	14
The crow	Justin Isherwood	21
Otter odyssey	Charles C. Bradley	25
Epilogue of ecology	Dean A. Volenec	28

Features

Editorial	18
Brand-new this issue!	
The Catch-all news pages	centerfold

Special supplement

Focus on the Great Lakes: photo contest	31
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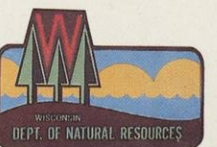
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Front cover:
Besides belly-slides and fish, even Aldo Leopold wasn't sure what otters like and don't like. For some speculation see the story by Charles Bradley on page 25. Watercolor by artist Don Cliff, 408 East 5th Ave., Brodhead, WI 53520.

Back cover:
"Cavern of Dreams," a late January thaw at Schlitz Audubon Center near Milwaukee. From the "Focus on the Great Lakes" photo contest. See page 31 for more. Photo by James R. Schaefer





Clearing up a nonpoint

"Water pollution comes from many sources—some easy to identify, some difficult. The 'easy' ones we call point sources, and we're well on the way to resolving them. The 'difficult' ones are non-point sources, and resolving the problems they present is a challenge as important as it is complex. If we are to do all we should in water pollution abatement, we must succeed in this effort"

*Tony Earl,
former DNR secretary*

JIM BAUMANN, DNR Nonpoint Source Engineer, Madison and LAURIE MANN, Water Quality Planner, Madison

As water flows across the land after a rain or melt, it picks up a lot of stuff that finally ends up in Wisconsin's 15,000 lakes and 27,000 miles of stream. The nature of this ubiquitous runoff is different for town, farm and forest. The quality of stuff picked up can range from benign to dangerous, the quantity from pounds to tons, depending on how the land is managed. Because it rains and snows on everyone, everywhere, and runoff contaminants come from the general land mass, not a particular pipe, such contaminants are characterized as "nonpoint source pollution."

They're so diffuse scientists have only recently found ways to accurately measure the different ingredients. Many techniques for keeping them out of lakes and streams, like contour plowing and strip cropping, have been around for a long time. Others are still being tried.

By some estimates, nonpoint sources account for fully 50% of all pollutants that infect Wisconsin's 330 watersheds.

Of the streams tested so far, only 32% rate excellent or good in water quality. About 55% are fair and 13% poor. Soil loss to erosion averages greater than five tons per acre in 19 of the state's 72 counties. In some places it's as high as 20 tons. Manure carried in runoff from farm fields sends unacceptably high levels of coliform bacteria, equivalent to raw sewage, into waters that flow through 425 Wisconsin townships. In cities, stream-choking sediment from large construction sites amounts to 150,000 pounds per acre per year. Runoff from a neighborhood street can contain road salt, pesticides, herbicides, lead, zinc, mercury and even carcinogenic compounds.

The cleanup of point source pollution has had wide support in Wisconsin and has been a priority program for 25 years. Since 1956, taxpayers have willingly spent more than a billion dollars to make sewage from Wisconsin municipalities harmless. Industry has spent a third of a billion on treating effluent. And the commitment will continue. By contrast, Wisconsin's nonpoint source cleanup will cost an estimated \$500-million. Because program phase-in is just starting, expenditures since 1978 have totaled only \$4.3-million. This amount is expected to grow as nonpoint comes into perspective among landowners and government officials and as point source dollar requirements taper off. Funding depends on biennial budget appropria-

tions by the State Legislature.

With a job to do that swamps the financial resources available, some sort of system had to be developed for spending what money there is. The philosophy of DNR's nonpoint source abatement program is that limited money is best spent where problems are critical, control practical and cooperation likely. These places get priority. John Konrad, chief of special studies for the program puts it this way:

"We think the best use of our limited financial resources and our limited technical and educational resources as well is to funnel them into critical areas. Deciding what's critical is not just a matter of water quality. Local cooperation is critical. Practicality is critical. It's critical to know whether in a particular watershed pollution control can really be achieved through land management."

Setting priorities begins with a screening of technical water quality data: number and size of lakes in the watershed, number of trout streams, degree of eutrophication and the biotic index. (The biotic index is derived from a stream's aquatic organisms. Big populations of bugs that thrive in clean water mean good to excellent water quality. A lot of critters that can thrive in polluted water mean poor quality.) Next, there's a kind of subjective evaluation: Is there a local agency that can manage the project well? Will landowners sign up for

◀ Uncontrolled runoff from barnyards and farm fields can carry manure, pesticides, herbicides, commercial fertilizer and precious soil into streams.

Terracing is one method of control. ▶
Photo by Dean Tvedt



cost sharing? To help answer these questions, DNR solicits advice from regional selection committees which meet annually to narrow the field to a few dozen watersheds. Committee members are local resource managers who know their area and its people. Next, the State Nonpoint Source Coordinating Committee culls the list even further. This committee is made up of regional planning commissions, the U.S. Department of Agriculture and other resource agencies. In the last step, DNR makes the final pick of the specific watershed.

NINE WATERSHEDS

Pilot projects to control nonpoint source pollution are underway on five Wisconsin watersheds and four more are in the planning stage with work set to begin next spring. Each watershed consists of about 100,000 acres.

The five now operating are Elk Creek and the Galena, Hay, Root and Lower Manitowoc Rivers. Being planned are projects on the Onion and Upper Willow Rivers, Green Lake, and Six Mile and Pheasant Branch Creeks. In February regional committees will again meet to select additional locations for cleanup.

DNR's role in these watersheds is limited to overall program administration. Actual management is performed locally by county boards, Soil and Water Conservation Districts, cities or villages.

These local management agencies have several tasks: develop specific objectives for their watershed, identify the places that need most work, choose the best management practices for controlling nonpoint problems, sign up landowners to participate and distribute the cost-share checks. Cost sharing amounts to about 50 to 70% for practices like barnyard diversions, terraces and sediment holding ponds. All of the \$4.3-million spent so far has gone to landowners or local communities.

Here is a rundown on what's happening in the five watersheds:

Elk Creek

Local interest and enthusiasm! They count. When watersheds are screened for suitability a lot of attention is paid to the track record for local initiative in solving nonpoint problems. Elk Creek scored high.

Nine years ago, the Elk Creek Rod and Gun Club started working with farmers to install fencing along streams. Interest and enthusiasm spread and eventually property owners along Bugle Lake got into the act. They formed the Bugle Lake Protection and Rehabilitation District in 1975.

Bugle Lake is one of the few that exist in the driftless portion of the state and its value as a recreational spot is high. But over the years tons of sediment washed off the slopes of the Elk

Creek Watershed to make the lake turbid, weedy, and (putting it politely) malodorous. As a temporary solution, state and federal inland lake protection funds financed a dredging project but unless sedimentation is curtailed, within another generation the lake will be recreationally unfit again. Long-term protection will come from contour strip cropping and grassed waterways to keep soil on the land and out of the lake. These practices will be cost-shared through the Wisconsin fund.

Elk Creek and other streams in the watershed will also benefit. High bacteria levels in these waters, especially Elk Creek, will diminish as more fences keep cattle out of the streams and more animal waste storage facilities are constructed. Both practices are eligible for cost-sharing.

Galena River

When it rains in the Galena Watershed, streams turn chocolate brown.

Farmland top soil — so valuable to the cash crop economy in Grant and Lafayette Counties — runs into the water at the astounding rate of up to 20 tons for every acre every year!

Not all of it winds up in surface waters, but enough. It has ruined smallmouth bass fishing in the Sinsinawa, Menominee, and Apple Rivers. The Galena itself still supports excellent smallmouth populations in the lower



Fenced cattle crossings save streambanks, prevent erosion, help keep manure out of the stream.



Strip cropping reduces runoff.

Photo by Dean Tvedt

RUNOFF CONTROL

	ELK CREEK	HAY RIVER	GALENA RIVER	ROOT RIVER	LOWER MANITOWOC
Contour Strip Cropping (acres)	8,802	3,994	30,376	490	1,810
Water Diversions (feet)	44,350	14,939	65,688	50,000	
Terraces (feet)		23,580	21,118,153	1,225,200	22,150
Waterways (acres)	85	184	671	182	76
Shaping and Seeding Critical Areas (acres)	5,217	34	97	188	222
Gulley Dams and Chutes (#)	109	8	116	111	38
Streambank Protection fencing & seeding (feet)	58,000	245,000	16,000	30,000	1,600
riprapping (feet)	20,413	4,143	39,300	13,650	400
cattle crossings (#)		63	6	10	
Barnyard Runoff Management (#)	256	99	117	44	104
Manure Storage Facilities (#)	256	99	115	23	170
Improved Street Sweeping (acres)				11,350	
Estimated State funds required*	\$1,600,000	\$600,000	\$4,800,000	\$2,800,000	\$945,000

*The local contribution will amount to an additional 30 to 50 %

NONPOINT SOURCE POLLUTION

Wisconsin's 330 watersheds were screened to determine the most critical areas of nonpoint source pollution.



- top 20 percent of critical watersheds
- watersheds selected to receive priority projects

reaches, and one objective of the watershed project is to keep the Galena productive.

What accounts for such tremendous soil loss? Steep, unglaciated terrain and changing land use. Eighty-five percent of the watershed is agricultural and a decade ago dairy farms dominated. Today, fields once in hay or pasture grow cash crops like corn. Cash crop cultivation year after year can be very destructive to top soil. The rate of erosion in the Galena frequently reaches levels five times the maximum allowable to maintain soil productivity.

In the spring of 1979 DNR sampled aquatic insects at 55 sites in the watershed. Using a technique developed by UW entomologist William Hilsenhoff, they found 34 of the sites had poor or very poor water quality. In 16 it was fair.

To raise these ratings to good or excellent, officials at the Grant and Lafayette Soil and Water Conservation Districts who manage the project will help farmers install terraces, barnyard diversions, and grassed waterways. But problems are so severe it may take 10 years and \$5,000,000 to solve them.

No one can say quantitatively how much streams here will improve in the coming decade, but DNR and local agencies are betting that smallmouth bass will once again abound throughout the Galena River Watershed.

Root River

Question: what has seven cities, four towns, three villages, four Soil and Water Conservation Districts, four counties, and poor water quality? Answer: the Root River Watershed.

Nonpoint pollution has no respect for political boundaries and the Root River Watershed is a case in point. How it goes will be a true test of interagency cooperation. The ability of the watershed's 22 units of government to work cooperatively will be essential to solving its water quality problems. All 22 are designated management agencies and each has responsibility for the cleanup. To their credit there's been no problem, no conflict or delay. Instead, an atmosphere of mutual trust and respect has prevailed, thanks to the able leadership

of the Racine County Soil and Water Conservation District which was elected lead agency by the other 21.

Most important to avoiding squabbles have been the get togethers where agencies meet to talk about key provisions of the project. While there's no shortage of water quality problems in the Root watershed, there's no shortage of cooperation either. Discussions are open, decisions mutual.

Monitoring over the last dozen years has repeatedly found conditions that are a threat to both human health and a balanced fishery. The amount of phosphorus, for example, is five times the recommended level. Nonpoint sources contributing to poor water quality include 17 subdivisions now under construction, 82 livestock operations, and 75% of the 85,000 acres of cropland.



A source of urban contaminants. Street sweeping helps when materials are picked up and disposed of properly.

The Hay River

Those who fish or swim the Hay River Watershed's streams might be surprised that it's part of a water quality improvement program. Big Beaver, Dority, Jones, Silver and Vance Creeks are all Class I or II trout streams; water quality is good, if not excellent. But the program aims to *protect* water quality as well as improve it. And though streams in the Hay Watershed are relatively clean now, increasing numbers of livestock operations and a shortage of good waste management suggest there may be problems in the future. Protecting high quality waters from potential degradation is a good investment.

In the Hay, this investment includes about \$600,000 of Wisconsin Fund money. Soil and Water Conservation Districts of Barron and Dunn Counties will work with farmers to install waste storage facilities, barnyard runoff controls, streambank fencing and ripraping. Cropland erosion control will also be cost-shared.

The Lower Manitowoc River

The dairy industry is critical to the economy here. It's also critical to water quality. Sixty percent of the land is used agriculturally — nearly all dairy farms.








Fifteen thousand cows in the watershed produce 350,000 tons of manure each year. When spread on the area's heavy clay soils, the runoff carries large quantities of phosphorus, bacteria, and organic material to watershed streams and eventually to Lake Michigan. The Manitowoc River's load of phosphorus is infamous. Measured amounts at the mouth have averaged 139,000 pounds each year, ever since 1976, and 85% is from nonpoint sources — mostly animal wastes.

Managing the watershed project are the Manitowoc County Soil and Water Conservation District and the Manitowoc County Board. They hope for a 50% reduction in phosphorus by cost-sharing manure storage and barnyard runoff control measures on as many as 170 dairy farms. These practices are expensive: if 75% of the dairy farmers sign

Hilsenhoff's pollution tolerance index

1=best water

5=worst water

<p>Least resistant arthropods. Require highly aerated, oxygenated water, above 6.5 p.p.m.</p>  <p>Stonefly</p>	 <p>Caddisfly</p>	 <p>Scuds</p>	 <p>Mayfly</p>	 <p>Adult riffle beetle</p>	 <p>Midges</p>	 <p>Sowbugs</p>	<p>Most resistant. Can live in organically "enriched" water with less than 1.0 p.p.m. oxygen.</p>
1	2	Worsening pollution →		3	4	5	



Planning for nonpoint pollution control. Many cost sharing▲
aids are available.

Muddy water drains off a new subdivision after rain.▶
Attention at the construction site can prevent this, help
keep streams clean.




Erosion can destroy a field. ▼





onto the project, a 50/50 cost-split between the farmer and the state would mean a total of nearly \$1,000,000 drawn from the Wisconsin Fund.

Fortunately, the Lower Manitowoc River is one of 13 projects selected nationally for the federal Rural Clean Water Program. Wisconsin Fund money will be used to pay one-third of the total cost and federal money will finance the remaining two-thirds. 



These three pictures show barnyard waste control at the UW-Ashland Experimental farm. The paved barnyard is drained by a waterway. The first pond receives the runoff. Solids settle out and water filters through a sand and gravel barrier to the second pond. From there it is pumped onto farm fields in dry periods.

Science explains the Snowflake



If you've ever looked closely at snowflakes, you'll probably agree they are among nature's most exquisite works of art. And science knows why.

JERRY L. MOSSER, Natural Sciences Editor, UW—Extension

Next time you're fighting it, moving it or playing on it, pause for a moment and study a snowflake. You'll see nature using water as a medium to show off her artistry in unmatched variety and intricacy as she forms ice crystals that make up snowflakes.

Probably all the snow crystal types that nature produces can be seen in Wisconsin during a typical winter, according to UW-Madison meteorologist Charles E. Anderson.

Any list of snow crystal types has to start with the classic "snowflake," the six-pointed star. This is the most common type of snow crystal. The variation in branching patterns of star crystals is probably responsible for the saying "no two snowflakes are alike."

But snow crystals come in other shapes that are not so widely known. One is the six-sided plate, sometimes "sectored" like a pie cut into six pieces. Plates, sectored plates and stars are usually lumped together in the general category of six-sided flat crystals.

Nature also produces three-dimensional snow crystals in the shapes of needles, columns and cups (sometimes called scrolls). Except for needles, these

shapes also have six-sided symmetry.

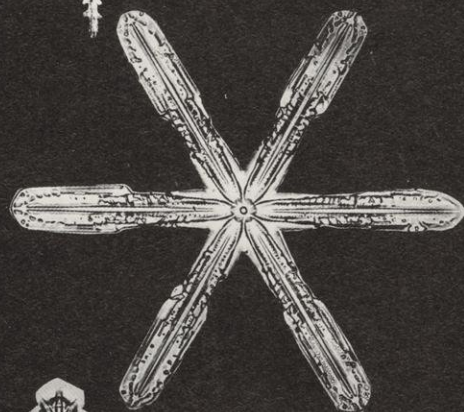
You'll have to look at many snowflakes before you find perfect examples of these crystal forms. As snow falls from the sky, the individual crystals bump into each other, sometimes breaking into asymmetric pieces, sometimes sticking together. Most of the snowflakes that reach the ground contain many individual snow crystals.



Sometimes, growing crystals encounter a variety of conditions as they fall through a thick cloud or circle about in a turbulent air. Crystals of mixed form are the result. Common mixed forms are plates with points extending from each of the six corners, stars with small plates at the end of the points, and columns with stars or plates at each end.

According to Anderson, much of what is known about snow crystals and the factors that govern their forms is the result of careful research by the late Japanese physicist Ukichiro Nakaya of Hakaudo University. From the 30's to the 50's, Nakaya spent over 20 years studying snow crystals. After observing, counting, measuring weighing and photographing natural snow crystals, he decided to make his own in the laboratory. He wanted to know what conditions led to each kind of crystal.

His investigations were as artful as the crystals he studied. Meteorologists now know that, in clouds, a bit of dust or a small mineral crystal serves as a nucleus for a snow crystal to begin forming around. But Nakaya didn't know this and searched for a long time for a way to initiate crystal formation. He discovered, finally, that rabbit hair worked well. Tiny bumps on the hair



served as nuclei, and the hair itself kept growing crystals suspended so he could observe and photograph them.

Nakaya found that air temperature and the amount of water vapor present determined the shape of a developing crystal. (Water vapor, not liquid water, is the starting material for snow crystals.)

He found that star-shaped crystals formed at around 5 degrees when the water vapor concentration was appropriate. But plates and sector plates developed when the temperature was either raised or lowered a few degrees or if the water vapor level was lowered.

With a certain amount of water vapor present, cup-shaped crystals formed around 18 degrees, but needles formed at slightly higher temperatures. Columns developed over a wide temperature range but only when relatively little water was present in the air.

Nakaya managed to reproduce in the laboratory all the types of natural crystals he observed. He was even able to change conditions as he watched a crystal grow to produce combination types, such as columns with end plates or stars.

Knowing the conditions that produced the different types of crystals in the laboratory, Nakaya could look at crystals in falling snow and estimate the conditions in the clouds where the crystals formed. Other scientists, studying actual cloud conditions during snow-



storms, have since found that what Nakaya observed in the laboratory is what happens in a cloud.

Interpreting Nakaya's observations, Anderson says the connection between temperature, water vapor concentration and snow crystal shape is energy. A water molecule goes to the spot on a growing crystal where it can give up the most energy and, as a result, end up in the most stable situation. The amount of energy a molecule has to give up depends on the temperature and the number of molecules around.

And, according to Anderson, the explanation of nature's preference for six-sided snow crystals is also straightforward (at least for a chemist or physicist). Snow crystals owe their hexagonal symmetry to the shape of water molecules and the way their atoms pack together when they freeze.

Scientists are satisfied that they can explain what controls the shape of snow

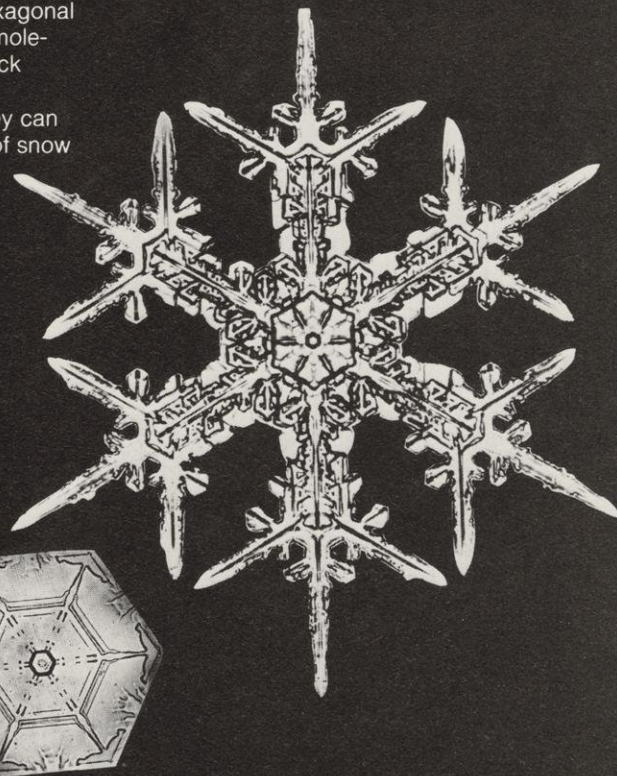
crystals in terms of energy, atoms and molecules. But one mystery remains: Why does water form so many crystal shapes in the first place? No other substance is known to crystallize in so many ways.

Nature knew what she was doing when she selected water as the medium for snowflakes.

Anderson says you can make your own observations of snowflakes at home. Your method can be as simple as looking at them as they fall on a dark coat sleeve or mitten. But you can see more by looking through a hand lens or small microscope at snowflakes that have fallen on a chilled, black-painted board.

It's also possible to preserve images of snow crystals for later study. For this, you'll need clean glass microscope slides (or other pieces of glass) and a spray can of clear lacquer (or plastic).

Chill the glass and the can of spray in the freezer. Then, when it's snowing, quickly take them outside. Holding the glass on a piece of cardboard or wood so your hands won't warm it, spray it with lacquer and let a few snowflakes fall on it. Protect your "exposed" slides from more snow, but leave them outside to dry for at least an hour. Examine



Snow crystals



Sector plate



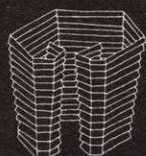
Star



Plate



Column



Cup or scroll

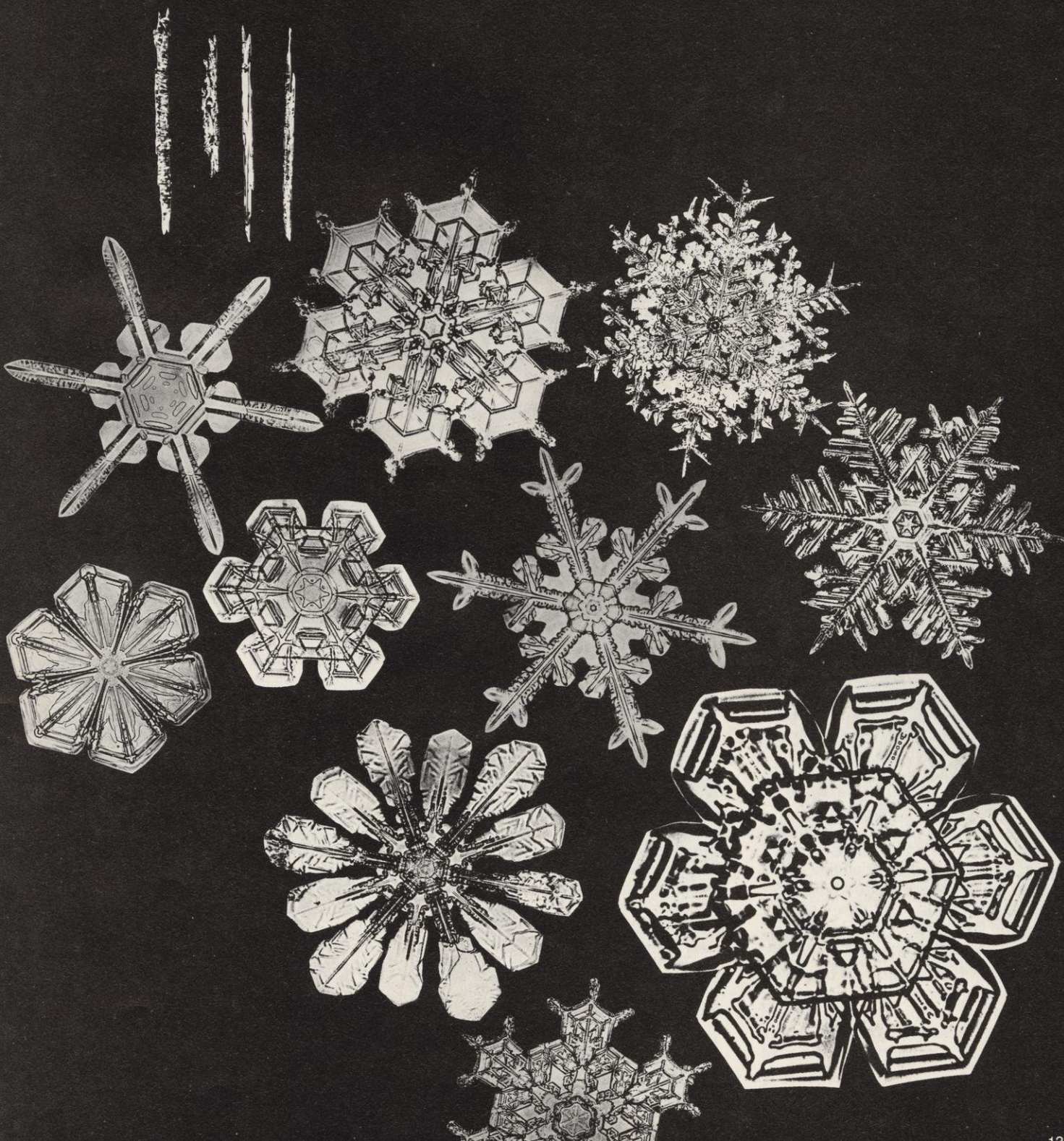


Column with end plates

them with a hand lens or microscope after they're dry.

If you use 35mm glass projector slides in place of microscope slides, you can project the images after you've preserved them.

Snow crystals and preserved images can be photographed through a microscope or with standard close-up equipment. Most snow crystals measure between one-sixty-fourth and one-fourth inch.



**ROBERT E. DREIS, DNR Staff
Specialist, Spooner**

"Turn out your lights, everyone, and don't talk," suggested my son Paul, the environmental engineer who was also our guide. We did so and experienced the absolute void of total darkness and total silence. It was eerie! We were deep inside the earth on a cave-exploring expedition. Our intention was to camp overnight far underground. At the time my thoughts chiefly centered on the hope that my son Paul knew his way out of this cave because I certainly didn't.

Our venture had a Jules Verne "Voyage-to-the-Center-of-the-Earth" flavor. It was a family affair which had been planned for some time. My two older sons, Phil and Paul, were the spelunkers (the cave explorers) and had rendezvoused with Pete and me in these beautiful hills of southwestern Wisconsin. Pete and I were the neophytes and we had promised to keep this particular location secret.

At any rate, on a hot sticky afternoon in June we struggled through lush forest, thick with undergrowth, to the cave entrance. I warned the others about skirting a poison ivy patch and grumbled about nettle stings. When we finally reached it my pulse quickened. The valley was secluded and the hole in the side of the precipitous hillside seemed ominous. Someone had spray-painted the word "danger" on the rock face. Deep within me I was not sure whether I would react with claustrophobia — that gripping fear which seizes some people when they find themselves in tightly enclosed places.

Paul gave us a short lecture on cave exploring and also some rules. I have since learned that this information is part of his common sense safety procedure. For instance, no matter how hot or cold, wet or dry, windy or calm the outside weather may be, inside this cave the temperature is always between 48 and 56 degrees Fahrenheit. Also it is always dark and damp. Thus we each had a waterproof ground cloth, a warm sleeping bag, a gasoline stove, water, food, coveralls, two flashlights or lanterns (one for back-up) and candles. In many caves such formations as sink holes, chimneys and other angled drops require the use of specialized boots and ropes for rappelling up or down. I have saved the final piece of gear for last because I want to stress how important it is: a safety helmet or "hardhat" is an

absolute must! I cannot count the times I smashed my head into a sharp protruding rock. Without the headgear, I could have suffered some painful head bumps or worse.

Many of these caves are known and some have been mined for lead and zinc. But there are many, many small and large caverns that are practically unknown or forgotten (by all except a select group of cave explorers). Some have not yet been discovered simply because they have no opening to the surface. They are not "big" when compared to Mammoth Cave in Kentucky or the Carlsbad Caverns in New Mexico. But what they lack in size they make up for in wildness and the aura of mystery and danger that surrounds an unknown and undeveloped cave. Paul and Phil know of at least 30 caves and they say their orderly and

the "round room" and he cheerfully announced that this place was to be our campsite. The space was about 12 feet high and about 15 feet in diameter. Various crannies and nooks provided spots for sleeping bags. It was at this time that Paul told us to turn out the lights and experience the sensation of total darkness and total quiet. "Nowhere else but in a cave can you feel this," Paul remarked in a hushed voice.

How far into the earth was the campsite? Paul told us we had travelled into the hillside about one-fourth mile, but "straight up" daylight was only about 70 feet away. We relaxed in our round room and cooked easily prepared meals on our sputtering stoves. It was quite a social event, considering the circumstances.

The dinner discussions centered around how caves are formed. They

Cave camping

Overnight underground in a Wisconsin cave can be an exciting kind of spelunker picnic. But there are some rules.

common sense approach — plus a "know-how" in the art and science of spelunking is what is needed. That can be quite some know-how!

In truth, getting lost is a distinct possibility for the uninitiated. The cave we were about to penetrate is supposed to have between two and three miles of twisting, turning and interconnecting passageways.

This knowledge made the adventure all the more fascinating. We stepped from bright, warm sunlight almost immediately into a never-never world of darkness, cold, damp and silence. We each had a pack which we wore in front because frequent squatting, crawling and other maneuvers would have made progress impossible had we been *back*packing. At times we used a bucket brigade system as one member led the way through a crawl space, dragged his pack through, assisted the next person with his gear and that person helped the one behind him until all members gathered at the next widening.

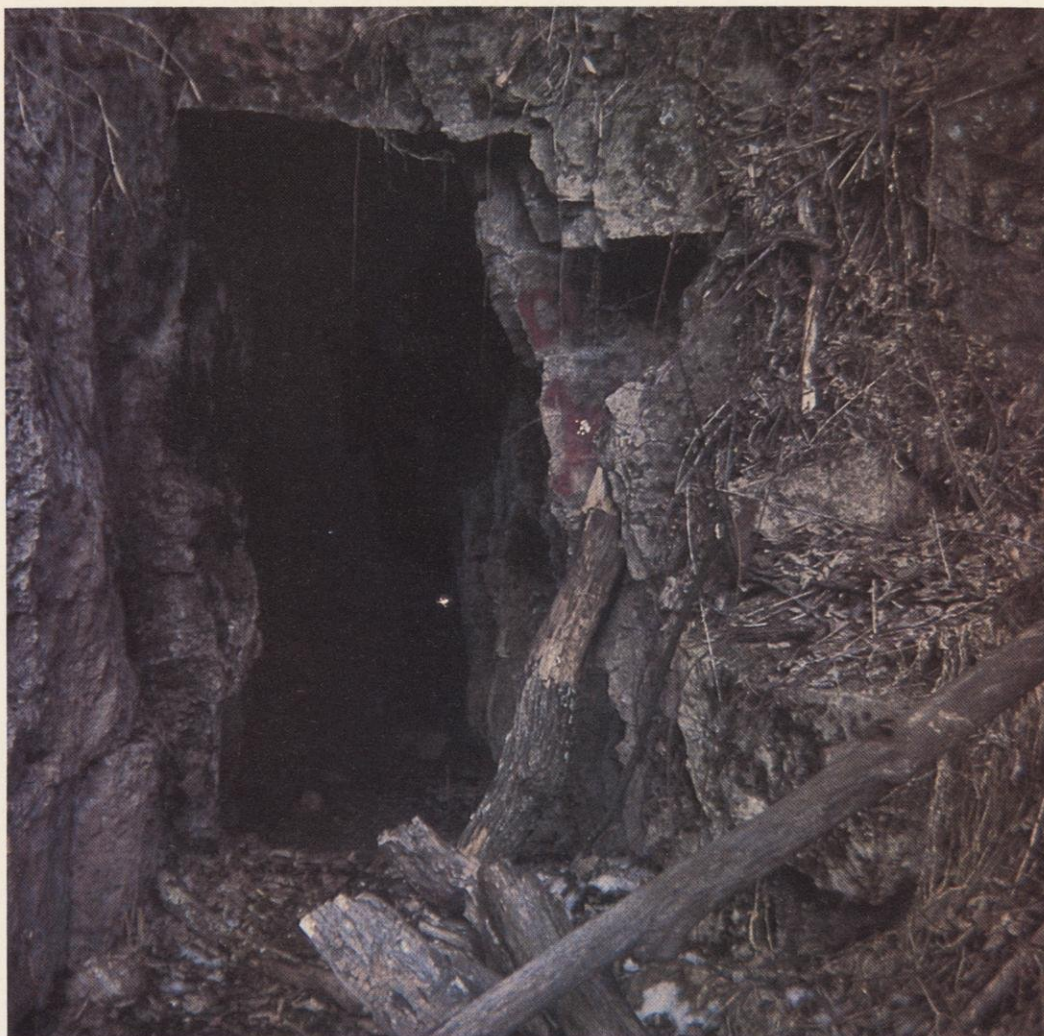
As we progressed, other passageways opened to us but without much hesitation Phil and Paul seemed to know which one to take. After what seemed an eternity we reached what Paul called

begin something like this

About 12,000 years ago when what is now Wisconsin was locked in a series of ice sheets, the southwestern part of the state escaped being covered by the various lobes of advancing and retreating glaciation. This area of non-glaciated land is known geologically as the driftless area of Wisconsin.

Within the regions covered by the immense ice sheets of northeastern North America and northwestern Europe, the driftless area of Wisconsin is the only terrain of substantial size which escaped being covered by the ice. Therefore in this enclave, the work of weathering had continued, perhaps for thousands of years before the Glacial Period, and created a topography of the utmost beauty. The "western upland," as the driftless area is called in Wisconsin, is characterized by many rocks, cliffs, crags and pinnacles. There are large hills, chimneys and towers. And there are the caves, created mainly by the solvent action of the underground water, aided by abundant joints and

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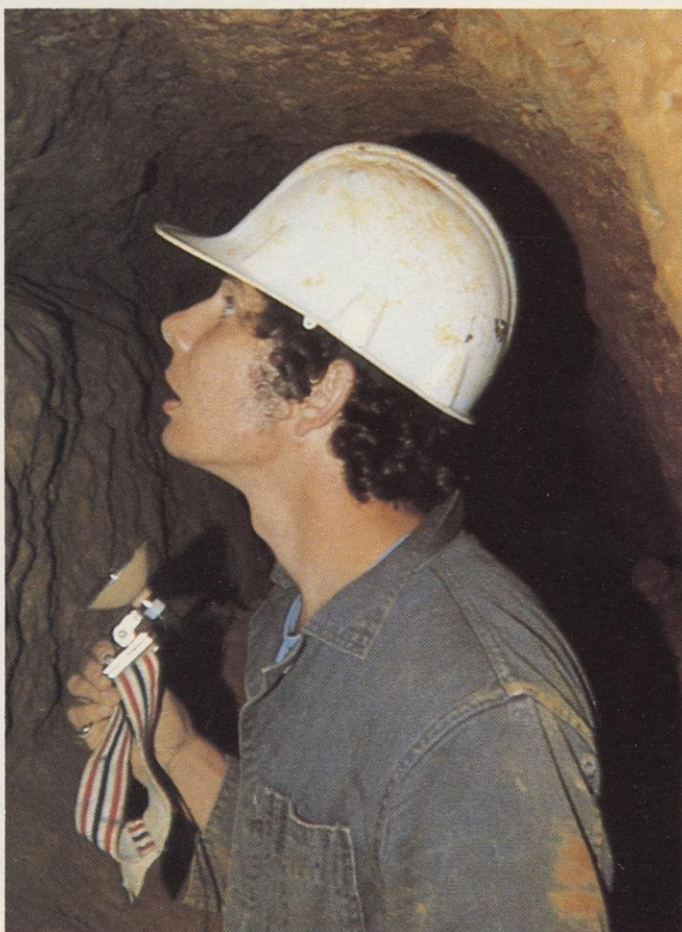
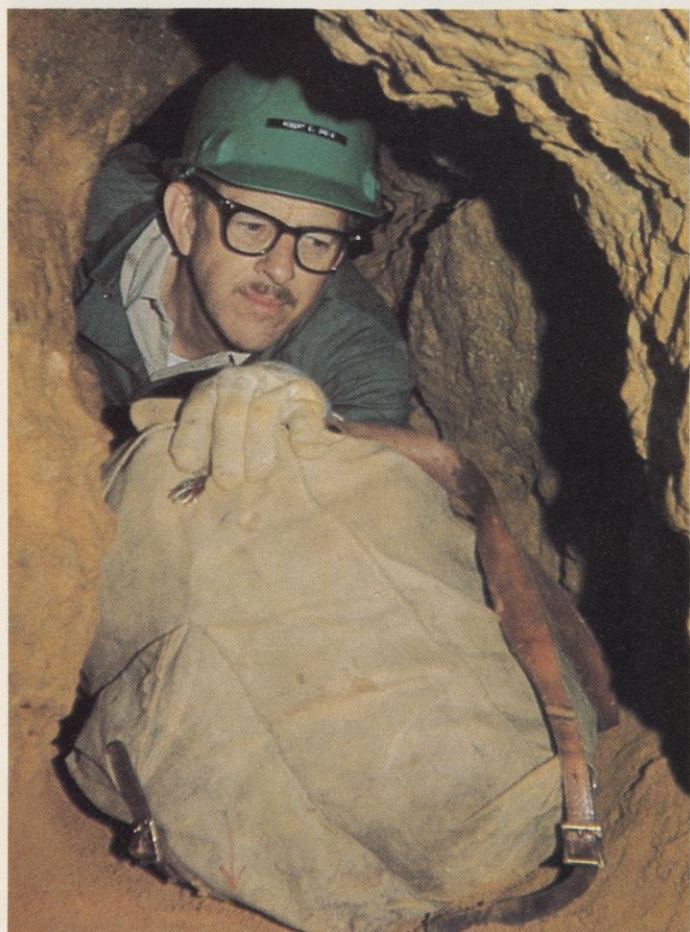


The cave entrance.

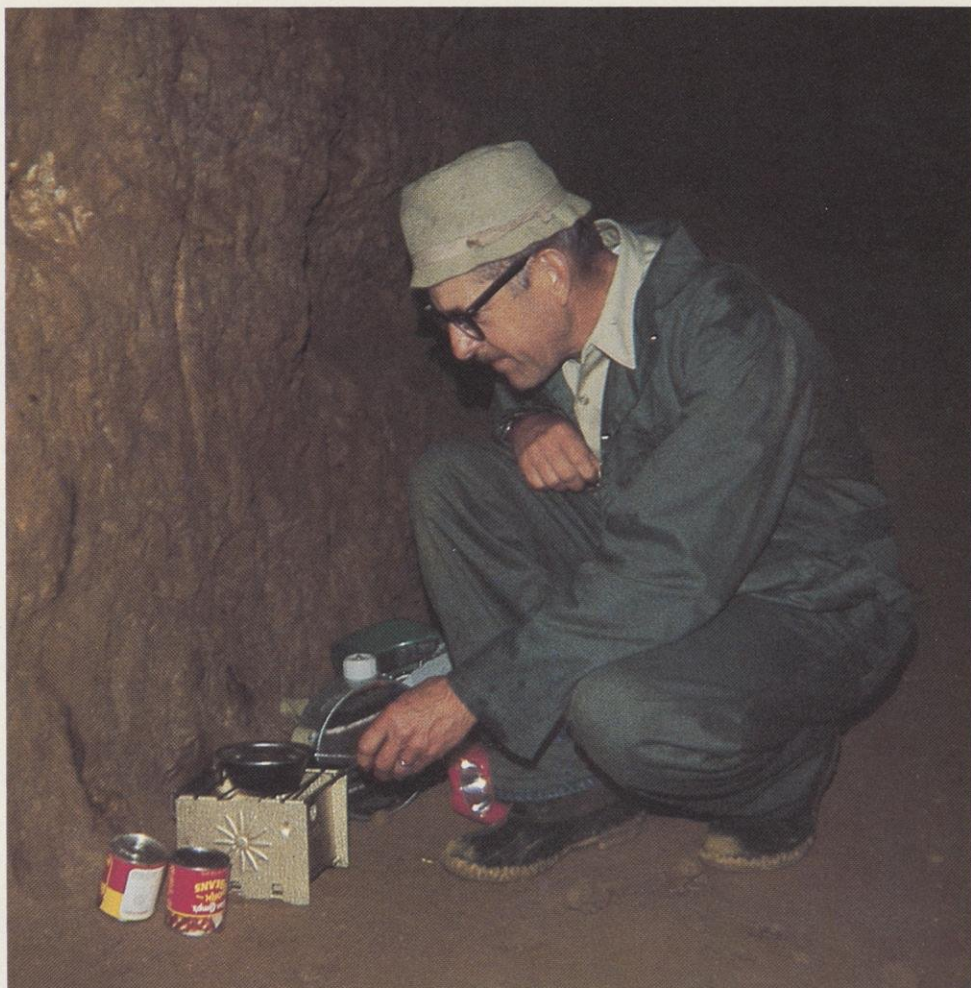
Photos by Phil and Paul Dreis

▼ We had to push our gear through the tight spots.

▼ Paul Dreis, our guide.

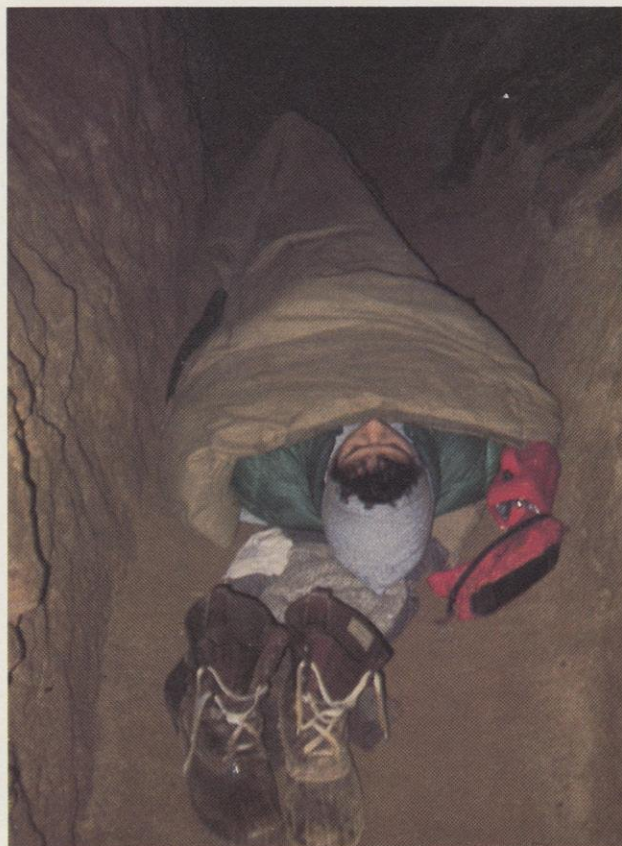


Cooking supper.



▼ Bob Dreis ready for a night's rest.

▼ Sacked in.



cracks in the underlying rock strata. The water which soaked into the ground did not dissolve much of the hard quartz but took away a good deal of the intermixed limestone.

Afterwards we went exploring. Without the weight of our gear, the crawling, stooping and other physical contortions were much easier. I learned that on this foray, we would always take the passageway to the left, so that when we decided to return, we would turn around and always take the passageway to the right. And it worked. I stumbled over my packsack before I realized that we had returned to camp again.

Sack time. Pete and I decided to leave a candle burning all "night." We heard Paul and Phil snicker and one of them whispered, just loud enough for us to catch, "The greenhorns need a night-light." Pete and I put the light out and I am glad we did for the sensation of being in one's sleeping bag in total darkness is worth experiencing. I opened my eyes, and in the blackness I could not tell whether they were open or not. I did detect a sound, however. It took me some time to realize what it was — the very occasional drip of moisture from the cave ceiling.

Much, much later when I flicked on my flashlight and looked at my watch, I was surprised to read that it was seven

o'clock in the morning! The night had passed. My creaking old bones told me they weren't used to such a hard sleeping couch, but even so I felt remarkably refreshed. The others were stirring too and soon we had the candles lit and the little stoves going. I love that sound and the smell of breakfast cooking. Nothing beats the taste and feeling of the first cup of coffee!

The table topic at breakfast was what to do in a cave emergency — like getting lost. Do not yell, for the sound of human voices does not carry. To prove the point, Paul had Pete and I go some distance down a passage and very, very quickly the sound of the stoves and of their voices died away. Do pound on the rock wall with a rock. This kind of noise vibration carries a long way. It was explained that caves "breathe," due to changes in the outside atmospheric pressure and possibly to temperature differences. It must be true, for we certainly had no trouble breathing nor was there any apparent shortage of oxygen for our cooking stoves. Always carry all of your camp wastes, including any feces, out of the cave with you. The reasons for all this are obvious. And count on getting very dirty. Because you will.

When we finally emerged into the bright sunlight and into that lovely little valley, I found that emotionally I was sorry the adventure had ended. Perhaps at that moment another spelunker was born. I do know that when the snow

covers the hills and dales of western Wisconsin, the four of us will again gather with packs and cross-country skis for a winter meeting in this, or some other cave. In its own way I hope it will be as unique an experience as the one I have just related.

Additional thoughts shook out of a very dirty pack

1. Most caves in Wisconsin, and perhaps elsewhere in America, have entrances which are on private land. Get permission before entering.
2. Never explore a cave alone.
3. Look up a local spelunker or better yet join a club and learn cave exploring before you attempt it. There are technical aspects that rival mountain climbing.
4. Not everyone can be a cave camper. Claustrophobia is no joke. Find out whether or not you are psychologically fit to spend long hours in dark, confined quarters.
5. Expect the company of bats. Please do not harass them when they are hibernating.
6. Be sure someone knows what cave you plan to explore and when you plan to emerge.
7. Simple foods, such as canned stew are suggested. Since you carry in all your water anyway, it does not make any difference whether it is in the can of stew or in the canteen.
8. Do not plan to spend more than one "night" in a cave unless you are on some kind of technical expedition and you are conditioned to it.
9. I will not discuss stalagmites and the like. They are a subject all of their own. Just do not break any off to take home as a souvenir.
10. People who have never done any cave camping tend to look at one who does as someone who has returned from the dead.
11. Have fun!

Tony Earl resigns



One measure of a boss' success is how employees react when the boss cleans off the desk for the last time and departs.

There can be a sigh of relief, or there can be sadness. In the case of Natural Resources Secretary Anthony Earl the reaction of DNR field employees was one of sadness.

They have lost a true field general, a man who walked tall and at ease in their trenches, and yet smoothly oversaw the day-to-day chores at DNR's Madison headquarters.

In his five-year tenure as chief of one of the most-criticized state government agencies, Earl probably achieved more than any of his predecessors, considering the turbulence going on when he took the job and the complexity of problems he faced.

With DNR scorned in all corners of the state, Earl took the secretary's post on Dec. 15, 1975. With Earl at the helm, there came:

Decentralization of DNR personnel and DNR decision-making; realignment of area DNR offices; new

emphasis on water and air cleanup; a push for greater public accessibility to the department and the state's recreational facilities.

The great strides in outdoor recreation; the "hunter's choice" deer-hunting system; hunting education and hunter ethics programs; the trout and waterfowl stamp to raise money for habitat improvement; creation of an office of endangered and non-game species; wetlands mapping.

Landowners wildlife management programs; development of new recreational trails; new forestry practices of multiple use planning and management; more conservation wardens.

The policy decision to avoid confrontations with Indians over fishing and hunting rights, to seek compromises instead of fights.

The Wisconsin Fund for pollution abatement; solid waste grants to local governments; landfill planning; failing septic system grants; non-point pollution programs and more.

With the same honesty and openness typical of his administration, Earl speaks of a much shorter list of setbacks and unfinished business. Items like:

Failure to obtain strong wetlands legislation.

Diminished support for steel shot for waterfowl hunting.

Continuation of the Outdoor Recreation Action Program for funding recreational developments.

Unsuccessful attempts to create an environmental fund for pollution control problems.

Meeting the recreational needs of urban residents.

Development of toxic and hazardous waste control laws and program funding.

Groundwater protection.

Acid Rain.

In a letter to his employees, Earl said the five years he led the department have passed too quickly.

"Good things never seem to last long enough," he said, "But my time with you has left a lasting impression on me; has left a great sense of satisfaction and pride; has left an appreciation of each of you people as deeply dedicated

Continued page 20

Carroll D. "Buzz" Besadny appointed



The Natural Resources Board has selected Carroll D. "Buzz" Besadny as DNR secretary. The appointment tops a 29-year career of service by Besadny to Wisconsin's natural resources.

Besadny joined the Wisconsin Conservation Department in October 1950 as a part-time clerk. His career as a wildlife researcher began in June 1952. Undergraduate training in botany and zoology and a master's in wildlife management from the UW-Madison complement Besadny's 13 years as a wildlife researcher and program planner. In 1965, he was promoted to administrative assistant in the Division of Research and Planning.

From July 1967 through March 1971, Besadny supervised a team of research biologists investigating water resources, recreation and environmental protection projects as well as fish, game and forestry matters.

Besadny then headed the Bureau of Environmental Impact for five years. While in this position he helped develop the Wisconsin Environmental Policy Act (WEPA) and was appointed by Gov. Patrick Lucey to head the

committee that established WEPA rules for all state agencies.

Although most of his career has been spent in resource management, Besadny said he has kept abreast of environmental protection and enforcement matters because the three areas can't be separated.

"Reporters have asked me about splitting the agency (into resource management and environmental protection). I told them it is one agency, and we have to work closely toward the same goals and objectives. Resource management and environmental protection are too closely related to deal with in two separate agencies," Besadny said.

One of his major environmental concerns is the possible shift of the Wisconsin Fund from general revenue funds to bonding. But he conceded that it may be the best way to go in the long run.

Besadny also stressed the importance of the ORAP 2000 land acquisition program. He said that failure to pass legislation would affect money for local governments as well as department programs. But, he added, he is optimistic about the future of the program.

He referred to toxic and hazardous waste disposal as a problem "staring us in the face."

"We will have to come to grips with alternative disposal methods: incineration, recycling, neutralizing. It is incumbent that industry take the lead in finding alternative methods of disposal with assistance from government, research institutions and the general public."

In a meeting with Gov. Lee Sherman Dreyfus following his appointment, Besadny said the two agreed that some unit of state government must work with the governor to impress upon the federal government that Wisconsin has to be involved in any decision on disposal of nuclear wastes in the state.

And nuclear waste disposal relates to the issue of groundwater degradation. Besadny said the state's economic health is tied directly to its environmental health.

"People don't see the relationship. But this state depends on clean ground water for industry, agriculture

Continued page 20

Opinion from around the state

"Tony Earl never hesitated to leave his lofty DNR executive perch to venture into the especially hostile northern regions of the state to meet adversaries face to face to discuss DNR's controversial whys and wherefores. The result—more insight and better understanding of vital DNR purposes and why they sometimes clash with freedoms perceived by ordinary people.

Most certainly, Tony Earl didn't resolve every basic dispute between his powerful agency and people who get their dander up over rules and regulations. But Tony Earl as an articulate and accessible administrator in one of the toughest kinds of jobs, made communication mean something. He has shown how top bureaucratic officials should function in dealing with thorny public issues.

CHANNEL 15, Madison Editorial

Enough writers have said how Tony has done a tremendous job of reorganizing and upgrading the DNR in his five years on the job, so I won't go into any details on that. I think it should suffice to say that any man who can run what is popularly believed to be the most hated agency in the state for five years and still have lots of people say good things about him, had to be doing something right.

I think Tony Earl did plenty of things right, and I think the DNR is better for having had him and will be very sorry to see him go.

As for myself, well Tony, you know that trout pond I'm always hollering about. How come it isn't fixed yet? and that lake I can't catch any walleyes in; how come you haven't fixed it yet? And I haven't shot a buck for two years — how come? And . . .

WILL MAINES, Minocqua-Lakeland Times

Two qualities of leadership mark his tenure: Fairness and willingness to listen and learn. In a period when resource use and nonuse have polarized the public, Earl has guided our DNR with skill and firmness.

As one professional who has not always seen eye to eye with our DNR policies, I can say that our Department of Natural Resources is one of the best in the country.

Earl's tenure has been no small part of the progressive stance of the agency he has so ably guided. It is with regret that we witness his departure.

ROBERT McCABE, professor, Department Wildlife Ecology, University of Wisconsin-Madison

Tony Earl, having sat in the hot seat as department secretary for the last five years, has brought a degree of professionalism and competency to DNR that has earned him, and the entire department, the respect that has been hard to attain because of the DNR's dominant position in government.

His resignation was not unexpected. But he will be able to look back on his tenure and be proud.

MILWAUKEE SENTINEL

Continued page 20

Earl continued . . .

to maintaining and protecting natural gifts that make Wisconsin special.

"You have shown me so many times that you not only know enough to care about these gifts, but care enough to act to protect them. I'm most grateful."

Earl ended with a phrase he has used before in speaking to employees:

"I'm from the DNR. . . and I'm damned proud of it."
He couldn't have said it better.

By Dave Carlson, reprinted from the Eau Claire Leader Telegram

Besadny continued . . .

and food processing. If water is degraded, it will affect the economic well-being of the state," he said.

Besadny plans to continue his personal contacts with DNR field staff, as well as maintaining high public visibility in explaining department programs and decisions. He said he intends to do a lot of listening before making major decisions and will work closely with the Legislature.

He described department staff as an "extremely dedicated group of people that will make my job easier."

Besadny will be talking with district and bureau directors concerning any possible future changes, but said the department has excellent goals and objectives and sees no reason to make changes now.

"Our goals and objectives are related to the mission we all helped Tony put together," he said.

In addition to training in public administration, Besadny holds executive positions with the International Association of Fish and Wildlife Agencies and maintains memberships in several natural resource organizations. He has held executive posts with the Wisconsin Society for Ornithology and the Wilderness Society.

Besadny has also served as: editor of "The Passenger Pigeon," the official publication of the Wisconsin Society for Ornithology; technical consultant to the Wisconsin Agricultural Stabilization and Conservation Service; advisor to the U.S. Department of Agriculture's wildlife board; and DNR liaison to many projects.

Opinion continued . . .

Is there someone out there who thinks Anthony Earl is not the most wonderful human being under God's blue sky, the most competent bureaucrat in the universe, or maybe even the fourth member of the Holy Trinity in disguise?

Usually skeptical, anti-bureaucratic newspapers have praised Earl like they had praised no other administrator within memory.

It's impossible for anyone to be as good as Anthony Earl has been made to look. But he's darn good, and if there was a Wisconsin bureaucrat's Hall of Fame, Earl would be a charter member.

His accomplishments in what was once a low-morale, lightning rod agency have been listed ad nauseum. Let it suffice to say that Earl — a former Wausau city attorney, Assembly majority leader and head of the Department of Administration — has been eminently successful since he entered the employ of the state in 1969.

He's been a high achiever in a tainted trade, and he went about it decently.

In the often-seedy world of politics and state government, Anthony Earl has been an anomaly. And that's the reason for all the praise.

FRANK RYAN — United Press International

The new head of the Department of Natural Resources is a hunter, camper, fisherman, canoeist, bird lover — and a man well aware of the environmental hazards of both present and future.

Carroll D. Besadny, 51, son of a Kewaunee cabinet-maker, was picked to the DNR post from a field of 67 candidates.

He has wide, get-your-hands-dirty experience in a variety of DNR jobs. His list of outdoor interests will help him with the state's hunters and fishermen.

Important as that rapport is, Besadny has also made it clear that he understands the vital environmental problems facing the state.

Besadny's qualifications are obvious. His philosophy shows a wide streak of common sense. His long term ties with the DNR ought to be helpful in maintaining department morale. He has already discussed his views with Republican Gov. Lee Dreyfus which shows he knows the political realities.

We hope Besadny is given a reasonable chance to show what he can do in one of the state's most visible, and most important, jobs.

GREEN BAY PRESS GAZETTE

Besadny will have a lot going for him when he succeeds Anthony Earl as DNR secretary. Having worked his way up through the DNR from its lowest job over the past 29 years, the new boss thoroughly understands the vast, complex agency. That should mean continuity in program and goals.

Moreover, we are impressed by Besadny's balance. While he is himself a hunter and has spent the last four years managing the DNR's fish, wildlife, park and forest programs, he also is strongly rooted in research and environmental protection. He rightly believes that "the economic health of the state is tied very tightly to its environmental health." We trust that means he'll keep after the polluters.

It is necessary for a DNR chief — inevitably working in a hostile political environment both within government and around the state — to confront that hostility, neutralize it as much as possible and then move the DNR toward its goals.

That, in our view, is the toughest challenge facing a DNR secretary. And on that, Besadny has our very best wish for success.

MILWAUKEE JOURNAL

Catch-all

Gobble gobble

Spring Green — Three grouse in hand are worth a turkey in the bush.

Those are the bywords for DNR personnel working with Missouri to reestablish the wild turkey in southwestern Wisconsin.

Last winter, DNR's Dodgeville Area wildlife staff released 40 wild-trapped Missouri birds in northern Iowa County. The release sites, located on private land in the Towns of Arena and Pulaski, were selected because of their rugged topography best suited for turkey habitat. About 20 birds were stocked in each township.

Besides rugged topography, prime turkey habitat features mixed stands of oak/hickory, trout streams, and scattered corn and alfalfa fields. The Eastern Wild Turkey feeds primarily on acorns. During severe winters, especially when there's deep, fluffy snow, the birds eat waste grain and organisms found in trout



Greg Mathews
Public Information - Madison

streams.

Birds were flown into the Tri-County Airport at Lone Rock and then transported to the ranger station for marking with colored wing tags — red on the males and yellow on the females — and a general health check-up.

"Citizen reports of sightings indicate the turkeys are surviving and reproducing," says Tom Meier, wildlife manager here and field project leader.

The next step involved live-



Turkey release in southwest Wisconsin

Photo by Greg Mathews

trapping three coulee region ruffed grouse for each Missouri turkey. It costs about \$500 to trap a wild turkey — based on actual trapping, manpower (salaries), equipment, mileage and flight time — and \$500 for three ruffed grouse.

More than 60% of the live-trapping occurred on private land.

"The future of the wild turkey program and the attendant grouse trapping depends on the cooperation of

local people," emphasizes Meier.

Turkeys historically ranged in Wisconsin south of a line from La Crosse to Green Bay. Settlement, forest clearing and disease brought by domestic fowl all helped wipe them out.

Stocking in Vernon County in 1976 and 1978, and Buffalo County in 1978 has been so successful, there are tentative plans for a limited hunting season in 1983.

Housing project fills up

Green Bay — DNR's housing project for double-crested cormorants in lower Green Bay has increased populations there almost ten-fold since 1977 and now the same thing is being tried at Crex Meadows in Burnett County.

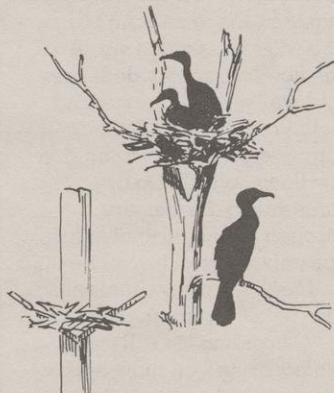
The cormorants are large, black, fish-eating birds which are an endangered species in Wisconsin. One reason for their shaky status is the shortage of flooded, dead timber near big water, which cormorants prefer for nesting. Another problem is that these nest sites are frequently damaged by erosion, ice action and windstorms.

On the lower Bay, for instance, the late-summer population of cormorants fell to 82 in 1977 after the trees on

their last known nesting island were blown down in a windstorm.

In early 1978 DNR crews, assisted by local conservation clubs and businesses, set up 15 power poles bearing 45 artificial nest structures. They produced 60 to 80 young. At the end of the 1978 breeding season, 220 cormorants were counted in the area, indicating that the successful nesting colony had attracted stray nonbreeding birds from elsewhere in the Bay.

In 1979, more nest platforms were constructed and 175 to 200 young were produced, bringing the total population to about 600. This year, still more nests were built, structures were set up on a second island, and 225 to 250 young



were fledged. Although the birds get harder to count accurately as their numbers increase, a census last summer indicated 700 to 800 cormorants on the lower Bay.

Last August, at Crex Meadows a severe windstorm ripped down trees and destroyed 37 cormorant and great blue heron nests.

This winter 15 poles with

three or four nesting platforms each will replace the trees. There'll be room for 45 to 60 nests.

The poles should last for approximately 30 years and it's hoped results will be similar to those on Green Bay.

Editor's note:

This is the first issue of Catch-all. It will be a regular feature and the name means everything. These four pages will be devoted to news, education, environment, ecology, hunting, fishing, odds, ends, important events and whatever catches the editor's fancy. And that's about all. DNR's public information people from around the state will contribute. Readers are invited to do the same. Send items to Catch-all, DNR Magazine, Box 7921, Madison, WI 53707.

J. Wolfred Taylor

Restoring a dead flowage

Oconto Falls—Plans still need final approval from the Natural Resources Board, but it appears that management work on the much-abused Machickanee Flowage in southern Oconto County will begin in 1981.

The 465-acre flowage was formed by construction of a power dam on the Oconto River in the late 1940's. It's a pleasant-looking body of water, with wooded shorelines and some attractive cottages and homes.

Unfortunately, it has also served as an unintended settling basin for pollutants from the Scott Paper Company pulp mill in Oconto Falls, just a few miles upstream.

For a time in the 1970's, the Oconto River was the most polluted stream in Wisconsin with ammonia loadings greater than those in the lower Fox River, and organic pollutant discharges equal to those from the Fox's 12 paper plants and half-dozen large municipal sewage treatment plants. About two million yards of sediment, much of it man-made, now cover the bottom of the flowage.

State and federal water pollution cases against Scott were settled in January, 1979. As part of the settlement, Scott paid a million dollars in damages, of which the DNR was given \$600,000 by the court to remedy adverse effects of the pollution.

As it turns out, the principal remaining adverse effect is the sediment in the flowage. The rest of the river has recovered remarkably since the pulp mill closed in February, 1978. A good fishery for smallmouth bass, as well as for trout, salmon, walleye and northern pike is developing in the river.

But on the flowage, the fishery is still dominated by rough fish — about 77,000 carp, bullheads and suckers which make up 91% of the total fish in the Machickanee.

DNR employees who have been working on the flowage say the shortage of game and pan fish is largely due to the sediment, which covers natural sand and gravel spawning areas. As it is, the sediment suppresses not only a variety of fish species, but also aquatic

plants and insects needed for a balanced ecosystem.

If the sediment is the problem, why not just dredge it out? Because there's simply too much of it. Two million cubic yards of wet sediment is 54 million cubic feet — enough, for instance, to fill Lombardi Stadium four times. If the material were dried out to a volume of 500,000 cubic yards, it would be equal to the amount of solid waste generated by all of Oconto County in about eight years. It's estimated that dredging and disposal of the material would cost a minimum of \$20 million.

What's worse, the sediment is itself polluted with heavy metals such as copper, iron, chromium and arsenic.

Fortunately, these metals have been found to be chemically stable in the flowage. They have not contaminated the existing fish or the surrounding groundwater and left alone, they're safe. If moved, federal solid waste regulations could classify them as toxic waste. Disposal then would be two or three times as expensive.

Since the sediment is safe and almost impossible to move, DNR is proposing a partial drawdown of the flowage during the summer of 1981, to give the sediment a chance to dry out and contract. At the end of the summer, the remaining rough fish will be poisoned out. After the flowage is reflooded, bass and walleyes will be stocked, both in 1981 and 1982. Improvement of fish habitat in the flowage will also be undertaken if necessary, through the placement of fish spawning boxes, gravel beds and reefs. Public access will also be constructed.

According to DNR managers, biologists and engineers who have worked on the restoration project, the flowage is a classic polluted "sow's ear." A "silk purse" fishery it will never be, but it could become a decent walleye and bass producer. At any rate, the combination of the flowage and the much-improved river will greatly strengthen the resource base of southern Oconto County.

Timber wolves return



Spooner—The eastern timber wolf may have reestablished a self-sustaining population in northwestern Wisconsin. DNR Researcher Dick Thiel says a study started last year has found at least three wolf packs in remote parts of Douglas County.

"Statewide, we probably have a wolf population of 19 to 23 individuals," Thiel said. "Approximately 12 to 14 are in Lincoln County and nine to 12 are in Douglas County. Our preliminary searches have not found wolves in any other parts of the state."

The last of Wisconsin's native timber wolves disappeared in the late 1950's. Researchers believe those currently found in the state are immigrants from Minnesota.

In Wisconsin, the wolf is an endangered species.

Astroturf nursery

Milwaukee — Astroturf may be good for football—and for Lake Michigan lake trout too.

Starting last November fish managers "sandwiched" trout eggs between two pieces of Astroturf and sank them in the lake. Twenty sets of mats with 2,000 eggs each were planted. It's hoped that the artificial environment will improve chances for the 40,000 eggs to hatch and survive.

Another 40,000 eggs will be incubated at Sea Grant's Great Lake's Laboratory in Milwaukee for release in February. In all, a total of 80,000 additional eggs will be planted by this research.

At present Lake Michigan's lake trout population is

maintained by stocking. There is little, if any, natural reproduction. Part of the problem is finding suitable spawning habitat. Astroturf may be one answer.

Homing bear

Park Falls—Three bear shot in Price County during the 1980 hunting season showed strong "homing" tendencies.

The three had been trapped and tagged by DNR biologists earlier in the year following nuisance complaints from area residents. The bear were then transported to new locations and released. All three, including one which had been moved 43 miles, were shot near the point where they had first been captured.

Septic \$\$

Madison — More and more home and small business owners in Wisconsin are becoming eligible for state funds to replace or improve failing septic systems. The program has already provided more than \$1.6 million to the owners of nearly 980 septic systems.

To make property owners eligible for this Wisconsin Fund money, counties must assume program administration. Some 25 have already done so. Property owners should contact their county zoning or code administrators for possible inclusion on a grant application. The following counties have qualified so far: Calumet, Clark, Columbia, Crawford, Dane, Fond du Lac, Grant, Iowa, Iron,

Jackson, Marathon, Monroe, Oneida, Pepin, Pierce, Portage, Richland, St. Croix, Sauk, Sawyer, Vernon, Vilas, Washington, Waukesha and Winnebago.



Diane Brinson
Public Information - Madison

Thunder Lake and cranberries

Three Lakes — A one-year water quality study of Thunder Lake in Oneida County is expected to answer property owner concerns about nearby cranberry growing. They fear the operation affects lake levels and contributes to winter fish kills.

The study began last spring after public hearings and meetings revealed insufficient data on the lake's water quality. Attorneys representing property owners, cranberry growers, the Attorney General and DNR all agreed it should be conducted.

Contracted to Northern Lake Services of Crandon, the study monitors the lake biweekly. Lake levels, groundwater levels and groundwater quality at 13 strategically located wells are recorded. A sanitary survey of all seasonal and permanent residences on the lake, plus a full year study of the cranberry growing operation are included. The cranberry study will look at the effect of springtime release of winter flood waters, pesticide use, flooding for frost protection, and harvest operations.



Collecting sediment taken from an irrigation ditch at a cranberry operation adjacent to Thunder Lake in Oneida County. The sample will be tested for heavy metals.

Photo by Don Bragg

Larry Maltbey, district water pollution biologist at Rhinelander, says once the Thunder Lake Study is complete DNR will interpret data and draw conclusions. The legal stipulation says all parties must concur with interpretation of the data.

Car-deer crashes cost \$22-million



Madison — Losses caused by car-deer collisions in Wisconsin from 1976 through 1978 amounted to \$22-million according to a recent DNR report. The figure is based on 949 returns from a survey of accident victims in Dane, Dodge and Columbia counties. About 18,000 deer per year are killed on Wisconsin highways.

Accident reports show that most deer-vehicle accidents happen in early November during the rut. Another peak is in late November during the gun-deer season. In all months, the highest rate of accidents occurred from one to two hours after sunset.

The report indicated that repellents, signs, fencing and reflectors have been ineffective

in reducing accidents. Defensive driving and continued use of the quota system to keep deer numbers down where traffic is heavy are cited as the best solutions to the problem.

Olympic rink free to school kids

Madison — Young ice skaters in K-12 school instructional programs can now get into the Olympic Ice Rink at West Allis free of charge. The fee waiver, authorized by the Natural Resources Board, is designed to introduce youth to competitive skating and to develop appreciation of the sport as a lifetime activity.

Schools wishing to participate in the free program must furnish instructors and obtain a permit from DNR's Bureau of Parks.

Tree marking marathon

Rock Dam — To most folks in this tiny Clark County community the low, white-frame building at the crossroads is the Rock Dam Sportsman's Club. Some people use it as the town hall. But for DNR foresters it's "Popple Camp." Fourteen of them bunked down there last fall as part of a tree marking marathon. Result will be that when chain saws bite into aspen on the Clark County forest this spring, thousands of high quality oaks will be left to mature into saw and veneer logs.

That will take about 30 years and in between it'll mean a rich resource for wildlife, according to Mike Lanquist, Black River Falls Area forester.

The Clark County Forest has about 40,000 acres of mature aspen and without marking most would have to be clearcut. While clearcutting is a valid forestry tool no one is anxious to use it on all 40,000 acres. That would take the immature oaks too, but now that it's marked loggers will skip them. Oak that remains after the aspen cut will double or triple its growth because of added sunlight. By the year 2000 there'll be 8,000 to 10,000 board feet.

A forester can mark about seven acres a day. About 10,000 acres of the Clark County



Forest needs immediate trimming. "With only the three local foresters doing it we could have marked year-round and not got the job done," said Gordon Christians, DNR forester at Neillsville. But DNR brought in 11 extra hands. They headquartered in "Popple Camp" and finished things up in plenty of time for sale of the aspen this spring.

Bong building

Kenosha — Development of the DNR's first urban recreation area is now underway.

Bruce Chevis, superintendent of the Bong Recreation Area in Kenosha County said construction has already begun on the headquarters. Management plans now being developed are scheduled for implementation in the fall of 1981.

Bong was created by the State Legislature in 1975 to provide a wide range of outdoor activities, some traditional, others never before tried on state land. Plans call for specialized use areas for dog trials, model airplane flying, snowmobiling, horseback riding, group camping and hunting.

Operational procedures to minimize potential conflict between various uses are being worked out. Hunting alternatives may include limited areas, limited hours and special bag limits.

With a managed hunt, DNR hopes to provide a "quality" experience at Bong. Less crowded conditions and possible greater stocking could improve success and enjoyment. The improved waterfowl area will not only attract ducks but duck hunters as well.

Rabies law

Madison — A new law on rabies control is now being enforced in Wisconsin. Failure to vaccinate your dog can bring a fine of from \$50 to \$100. The law limits possession and sale of certain wild animals, revises liability for damage caused by dogs, changes license requirements and fees, and establishes new penalties for violations.

All dogs must be vaccinated by a veterinarian by age five months and re-vaccinated within one year. Continued re-vaccination is required at specified intervals.

A metal vaccination tag must be worn on the dog's collar at all times except during show competition or while hunting.

Dogs suspected of having bitten a person may be quarantined.

Blowdown picked up

Eau Claire—It's been a busy year for Henry Anderson. He's the Department of Natural Resources Area Forester here. This year his job's been tough.

It started July 15, when winds of more than 120 miles per hour swept through Pierce, Dunn, Chippewa, and Eau Claire counties flattening barns and houses. Department of Natural Resources wardens, fire control, and fish-stocking crews responded swiftly to maintain order and to water cattle on farms that lacked power. Environmental specialists sanitized water tanks to provide drinking water in cities.

For a week crews worked steadily to control the emergency.

Since then, Anderson and his men have been pushing to keep up with the timber damage that occurred during the big storm. The loss was staggering. "Approximately 150,000 acres were damaged, including 66 million board feet of saw timber and 235,000 cords of roundwood," Anderson said. "Estimated value of damaged timber is just over \$5 million."

Normally, foresters in the four-county area work with about 6,000 acres of woodland yearly. But time is vital this year if the downed wood is to be

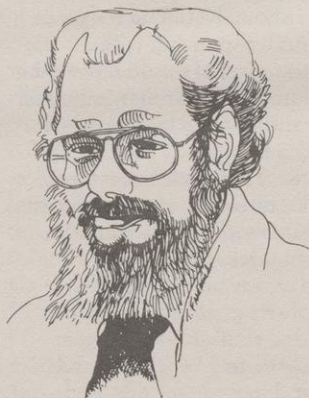
salvaged before it rots.

"The main thing is to provide assistance to all landowners," Anderson said.

By autumn about 15,000 acres were examined by foresters and some 7-million board feet of saw timber set up for sale. In addition 17,000 cords of pine pulpwood were sold. Some 500,000 board feet of saw timber were harvested by one owner.

To do the salvage job four new special project foresters joined regular crews at Durand, Menomonie, Eau Claire, and Chippewa Falls.

It's hoped much of the \$5-million loss will be recouped.



Dave Weitz
Public Information - Eau Claire



Linda Bochert



James Huntoon

Top jobs filled

Madison — New DNR Secretary C. D. "Buzz" Besadny has appointed Linda Bochert as executive assistant, replacing Mike Ley who has become deputy secretary of the Department of Development.

Bochert formerly headed the Division of Enforcement in the Wisconsin Department of Justice. Previously, she was assistant to the Administrator of the DNR Division of Enforcement.

At Justice, Bochert had primary responsibilities in water pollution abatement legal actions. At DNR she established a number of environmental enforcement policies and procedures and

handled presentations to the Natural Resources Board.

Besadny also appointed James R. Huntoon as administrator of the Division of Resource Management, the position Besadny held before becoming secretary. Huntoon, who was director of the DNR Office of Lands has also served as director of the Bureau of Environmental Impact and as assistant to the administrator of the Division of Enforcement.

He has a B.S. in wildlife management from the University of Wisconsin and was a wildlife manager in southern Wisconsin for nine years. He began with the old Wisconsin Conservation Department in 1959.



Biennial fish rules

Madison—To save money, starting in 1981, the DNR Fishing Regulation Pamphlet will be updated every two years rather than annually. James T. Addis, director of the Bureau of Fish Management says savings will amount to more than \$20,000.

In announcing the change, Addis cited rising paper costs of 13% annually and printing costs of 8%. Price tag on printing the 1981-82 pamphlet was about \$68,000.

Otter Lake aeration

Stanley — Folks are on their way to better fishing on Otter Lake, the 661-acre impoundment nine miles north of here. It's the result of teamwork between DNR, Chippewa County, the Town of Colburn and \$55,000 from the Outdoor Recreation Act Program (ORAP) for an aeration system.

Fishermen, sportsman's clubs, and civic groups helped too.

Otter Lake was formed in 1969, when a 14-foot dam was constructed by Chippewa County. Largemouth bass, walleye, and northern pike were stocked but didn't survive well.

The lake is shallow and in winter dissolved oxygen levels dropped. Fish died.

Chippewa County had constructed a campground and

day-use area at Otter Lake with ORAP funds but the park was little-used.

Chemical treatment, complete restocking, and an aeration system were the answer.

The lake was treated and last summer, 149,000 largemouth bass fry; 1,300,000 walleye fry; 60,000 largemouth bass fingerlings, and 635 pounds of fathead minnows, as well as some northern pike, were placed in the lake.

The restocking is a success, according to Douglas Erickson, Assistant Eau Claire Area Fish Manager.

Key to the Otter Lake fishery, though, is the aeration equipment which should prevent a recurrence of winter die-off.

Wood fuel big

Madison — Wisconsin residents are now burning wood at the rate of 1.6 million cords per year and may be saving as much as \$264-million in the process. Those figures come from DNR Chief Forester Milton Reinke who compared the cost of heating with wood to the cost of oil.

The 1.6-million cords is based on a 1979 survey of 1600 households. The last previous survey was made in 1967, long before OPEC price rises and at that time only 275,000 cords were burned in Wisconsin. The new survey found that 51% of those burning wood use it as a primary heat source, 33% as a secondary source and 16% for esthetics.



The crow

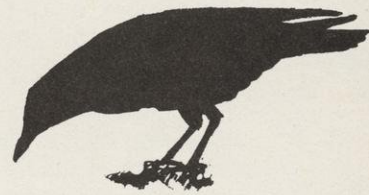


Illustration by artist Virgil Beck

"Herein is just a rambling tale of two species, crows and adolescent boys, and I have come to think there is a serious oversight in not cataloguing such teenage items as a fully separate departure from the rest of homo."

JUSTIN ISHERWOOD, Farmer, Rt. 1, Plover

January, three minutes after sunrise and 22 degrees below zero. A crow is pulling on the shoulder muscle of a cottontail rabbit, car-killed, two feet from the concrete jawbone of the Interstate. A two tone Buick passes, white sidewalls, 55 miles per hour, the wheels fractionally suspended over the straight and salted northbound. The heater on, and the radio, and 10,000 years since the last glaciation.

January practices winter as no other month. Daylight comes to it with a groaning, audible reluctance. A timid dawn, fragile as a canescent teacup, susceptible to the misplaced whispers that would plunge us into some unreasoning dark. January harbors a broad suspicion that the cold itself bears responsibility for the shorter days of winter, cold being the true gravity and

the one fast hinge of an unplumb planet.

The lines of winter are precise. Foliage does not blur the discipline between sky and earth. The fractured shape of trees appear tentative and indelible, a composition in black and white, a primitive emotion, no room for interpretation.

In January's cold kingdom a creature cannot move without being tattled on. Every burrow and hiding place is revealed and no breath goes unseen. Every raindrop desirous of earth must expose its crystal soul and jeweled wings. January knows no secret and will keep none.

Well might we propose the world is itself the contemplation and script of winter. And as long as asking is contagious, might not we ask whether or not a cold chapter was omitted from the Genesis Journal. In the somber reverent dark was January, January the tool, January the edge; January sifting the gray dawn from the black night. Was it not January's heavy hand and blue pencil, in an editorial spite, which corrected major errors of syntax, eliminated whole paragraphs and slew the rampant chill-blooded verbs? And was it January's maul and long-armed swing that drove the wedge to cleave the dark, and scatter the obsidian chips of divided day, woman's dark eye and crow wing?

I have seen crows beside the road; I have never seen a dead crow beside the road. I have seen dead meadow larks, dead sparrows, porcupines and pheasants. Seen expired grouse, tire bitten dogs and squirrels, mice and hawks; mushed, pattied, splashed and scattered; but never a crow. I have seen Buicks busted. Buicks slipped unceremoniously off the road from their 55 mph primacy to land crinkled among jack pine and rocks.

Crows are not offended by winter. They have seen worse. Whether in their brain or in their beak or in their tea-dark eye, they carry the memory of worse winters. Why are the expensive feather jackets, the sleeping bags and vests all goose down? Better for warmth and surviving were they crow down. The crow was bred by the ice. Ice appointed the crow its black color, the functional hue of solar heater and woodstove. And it was the ice too that chose the crow's icicle shape and gave it a cold morning cough for a call. In a million years and a third-of-a-dozen glaciations the crow learned to shunt the blood circulation away from its feet, which are really only a twist of cuticle. Of course man can perform the same hypothermizing trick but with imprecision that leaves spoilage and never again the chance to be a carnivore with toes.

Continued next page...

"If a great corn field is at hand the flock will descend like the Armada."

Illustration by artist Carroll Rudy, Box 218, Chilton, WI 53014



It was ice, heaped two miles high, that taught the crow its migratory tendency. Crows abandon North Dakota and Saskatchewan, vacate western Minnesota and Manitoba, and come to Wisconsin, Illinois and Iowa, blackly suspicious that the ice has come again. The crow is neither gambler nor coward. It is not afraid of the automobile nor of the ice. It simply takes no chances and thus is seldom found dead. Primitive people wondered out loud if the crow ever died. I am no primitive; I know crows die; it's just the lack of evidence I find to be moderately troubling.

Crows obey a compelling instinct, a strict commandment demanding their vacancy when interdicted by something bigger whether it be ice or Buick. Crows therefore have no native country; they belong everywhere. They and their relations: magpies, ravens, bluejays and whiskey jacks, find comfort in the more disagreeable accommodations. As a matter of general principle they forsake warfare among themselves, though are not above occasional pilferage.

The crow is motivated by kitchen reasons. Winter near always catches a farmer or two in the township with his corn yet afield. So regular is the situation, some could think the crow itself

switches the toggle convening winter, in cahoots with the universal bitterness. Crows praise farmers in a hurry who spill corn and soybeans, and they praise cement roads that catch, then tenderize foolish puppies.

Crows share a characteristic of the wolf and the caribou. During summer they maintain an extended family group, something like a pack. In attendance are bachelor uncles and widowed grandmothers who share in food gathering, sentry duty and baby-sitting.

With winter and the migration we might expect discord. If like the crow our own species were required to suddenly congeal, such a bloody business would arise as to erase the species altogether. But not so the crow. Roosting flocks coalesce, coagulate and commune early in December. The flock swells to a predetermined and traditional size by early January. The rationale is unclear, for at times the camp forages together and at times not. If a great corn field is at hand they will descend like the Armada; if not, they will work in teams of free booters or by themselves along the fence rows and fields. They are to be seen in the trees waiting for breakfast to happen, seldom disappointed. Towards evening they group together and fly cross country in a rather blatant and sovereign display: like Stukas over Poland.

Crows prefer evergreens for roostage.

The wind has less effect in white pine than in oak and elm. But crows don't merely roost, they encamp, all but setting up tents and picnic benches.

The crow camp is like that of the great teepee tribes and as active. When they come to the roost we would expect them to sit quietly and watch the sunset but crows acknowledge cold as the motive force and not the sun, so in irreverence play games of tag or pom-pom-pull-away. And like the Indian camps they have a system of scouts and patrols, a language and an early warning system.

A .22 caliber hunter knows very well the great language and culture that is the crow nation. Long before the hunter arrives at the roost, scouts have spotted him with an "awe, awe, awe." A lifetime can be spent developing the fluent tongue of the crow. Other languages are easy by comparison. The basic dialect is "awe," sharp accent on the aw, trailing off to a hard vowel stop. Linked together with variable umlauts, hyphens, accents and suffixes the word "awe" means: come here, go there, here's food, it's only a kid with a hoe, it's a northern liberal, it's a hunter, let's get out of here, I'm tired, I'm not tired, help me, go away, mind your own business. To make a convincing rendition of a crow among our own stalked species is difficult, to convince a native is impossible.

Crows, like other higher forms of life, have beautiful babies. Their bodies are inconsequential but their throats of glorious red-orange are incomparable and there seems little other reason for this than glory itself. Opera singers should have such luck.

The crow nest is mainly of sticks padded with leaves and located in high branches where it appears top heavy and subject to adverse climatology. Crows, as aforementioned, do not bow their heads to shamans, forecasters or meteorology.

Crows' one great enemy is the owl. Any owl will do. The war between them is based on philosophy. Crows think of night hunting as despicable, disgusting, dishonest and otherwise unfriendly. Crows believe in sleep.

A plastic owl decoy will not fail to bring on a marauding band of crows to heckle and blaspheme that stiff countenance. An imitation crow will persuade an owl from the woodlot to attack and claw the intruder with such horsepower that the stand it's on goes to emotional pieces. Cold war seems no great new invention.

A question has to be answered; are crows edible? The problem of determining whether a crow is a culinary object is complicated by the fact a crow must be brought before the knife and fork. It is safe to say a crow cannot be killed with a .22 caliber rifle. The bullet

will not go far enough. It always seems to bounce off those black cast iron feathers, or pass harmlessly through. Some say the body of a crow is in reality the size of a wren, the remainder given to insulation and bluff.

An uncle once ate a crow. He said crow is inedible, the flesh blue, going on black and tasting of pine resin and Buick tires.

The county once paid a bounty of 5 cents for the scalp of any crow brought to the desk of the county clerk or his appointee. In the mid-fifties it seemed a money-making proposition to farmboys whose fathers had other ideas for nickels. The economics appeared easy. Some fields were full of crows, particularly the one in current vogue with the manure spreader. Crows at five cents a piece and .22 caliber bullets at a penny each had the ring of financial solvency. If there wasn't money in that cost-profit ratio then J. Paul Getty never lived.

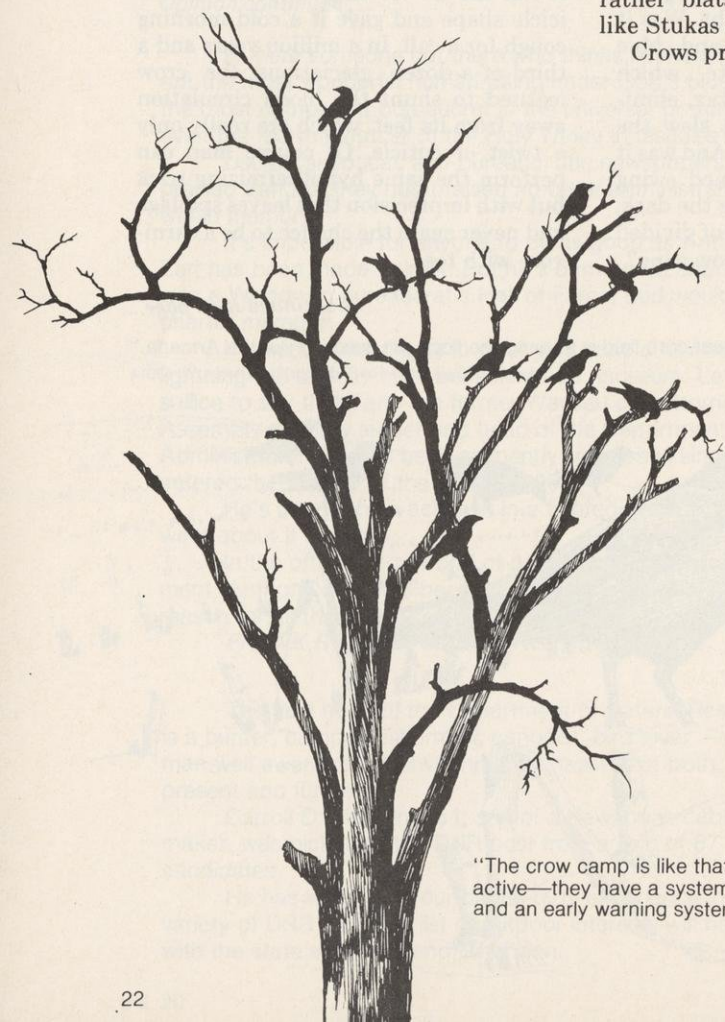
J. Paul Getty never lived. Or if he did, he didn't get rich killing crows. First you tried long shots. Steadying the barrel on the windowsill of the barn, trusting to loft, windage and a good dose of farmboy luck. The method had worked on milk bottles and insulators (not that I'd sign

a confession). After a box of shells was emptied and the crows hadn't moved or seemed even to take polite notice, loft, windage and luck were written off as methods of economic progress.

Next came the famous Indian tactic of sneakage. Sneakage attempted to surreptitiously approach the aforementioned crows. Technical nomenclature was belly-walking. It wasn't until the armed farmkid was halfway across pasture that it became visually apparent the crows have pulled a Doppler shift, i.e. nonchalantly moved to the far side of the field. Any continued sneakage must theretofore be conducted across the fertile preponderances left in the wake of every cowbarn. 'Tis at this juncture

that most farmboys question the very reason for financial independence.

Final resort was the "gunny sack" routine. Gunny sacks look amazingly akin to manure, especially when laid over the prostrate body of a would be hunter and his implement. For the ruse to have credence at all, the crow-killer must come early and lay still. Understand it was January, maybe February, and the ground was frozen two to six feet deep while winter beneath extended 500 miles to either side. When the crows showed up about mid-morning, the hunter, if he any longer cared what crows tasted like or wondered at their worth in world financial capitals, could neither squeeze the trigger nor focus on



"The crow camp is like that of the great teepee tribes and as active—they have a system of scouts and patrols, a language and an early warning system." Illustration by artist Carroll Rudy



"I have never seen a dead crow beside the road. Crows are neither gamblers nor cowards—they simply take no chances."

Illustration by artist Scott Zoellick, 4405 Cherokee, Brookfield, WI 53005

sights and crow simultaneously. Which totaled three strikes and tribe corvus fanned another would-be assailant. Most farmboys quit with the three strikes, a few walked home after only two swings at the crow; nobody opted for a fourth pitch.

I once owned a pet crow, though there was attendant to the relationship the notion that it owned me as much as I owned it. The reason this crow got caught involved its erring judgement about a powerline which accident sliced the bird's flight bone.

At first the relationship was tentative. The crow had a tendency to stab vigorously at eyes in some crow-gone conclusion that eyes were invented solely for culinary pursuits. The bird never did regain flight but walked rather elegantly about the farmyard intimidating cats and taking no truck from the theretofore majestic farmdog. The only major consequence of the crowed household was the sudden increase in the number of paddled cats and the awe, awe, awe heard on occasion above the otherwise omnipresent sound of a two cylinder John Deere sans muffler. The crow came to be known as "Awful" and met its end at the hand of a neighbor kid.

The relationship between Mankind and the Crow has been mutually congratulatory. The crow, while untamable, has nevertheless tagged along, preferring wheat and corn fields to virgin prairie and hard tenderizing concrete to

deer trails. *Corvus brachyrhynchos* is a master of opportunity. Some think the crow is the only bird to truly learn and they have come to survive, if not dominate winter. I have seen them soaring like hawks, evolving before my eyes the nerve to detect stall and give an airspeed correction. I have watched them waddle at the roadside, ignoring fender and Peterbilt, sure in their belief the shoulder portion is designed for their trafficking. They plod behind plows to gullet white grubs. I've watched them spear frogs at the pond and turn all but inside out to avoid a gun-toting kid in a pickle patch, where the implement should be a hoe.

Crows observe the sunset with the detachment of fourth cousins at a funeral. They would not fret should the sun by some cold collision fail to rise

again. Their countenance seems part of the far dark side of genesis. And I have watched them watch me. Of watchers seeded by order and professionalism, crows get listed at the top.

Crows do not have the exotic plumage of the song bird, nor do they have the song, though they are allotted such formal attire that I believe they hold life itself to be an occasion. I defer to their judgement. ☞



Illustration by artist Scott Zoellick

Otter odyssey

The animals finally came by.
Had Aldo Leopold prepared the way? These are some speculations.

CHARLES C. BRADLEY,
Leopold Memorial Reserve

"You know, here is a funny thing. I have had this piece of wild land bordering the Wisconsin River for five years, but I have yet to find any evidence of otter. I wonder why?" It was October, 1941 and in 1941 who but Aldo Leopold would have asked such a question?

I was on a weekend break from army training at Camp Grant and armed with bow and arrows had gone up to see Leopold at his Shack in sand country. He was alone there which created an unusual opportunity for a visit. The above question emerged as we sat enjoying a nippy evening in front of a good oak fire. Other than the fact that I didn't shoot a deer, the otter question is the only detail I can remember clearly from that visit. I think it stuck in my mind in part because it recalled a tale I had heard about this man Leopold, who in an earlier day had been asked, "Why don't we have any kingfishers in the University Arboretum? We have the lake and the fish." After a bit of on-the-ground study his response was, "There are no dead snags overhanging the lake for a kingfisher to use as a fishing perch. Why don't you get some old snags and prop them up on the lake shore?" It was done and the kingfishers moved in.

Leopold took a great deal of pleasure in trying to discover what features constituted key prerequisites before a particular species would move in and settle down. Often these are small simple things like the fishing perch for the kingfishers, or a bare landing field where a woodcock can display his legs to his lady love between courtship skydances, or the "red lanterns" of autumn's blackberry bushes as a warm sunny site for a loafing grouse. One of his studies showed that quail in Wisconsin had good cover but were limited by food shortage, while in Illinois the limiting factor was cover.

Raising birds and releasing them in hunting areas has long been part of Wisconsin's pheasant management



Otter Slide

Photo by Nina L. Bradley

program. I think it may have been in the vicinity of Riley that hunters began to discover that no matter where the pheasants were released they tended to end up in a hunting area managed by Aldo Leopold. He told about this with a twinkle in his eye not so much because he had engineered a hunting coup but because the presence of the pheasants proved his hunch about the needs of pheasants was correct. He had provided the needs and they had responded.

Leopold spent the last evening of his life with his daughter and wife watching hundreds of geese flock into a landing field he had prepared by scything down a patch of waist-high marsh grass.

With the kingfisher story embedded in my mind I could not help wondering "What in the world is that man going to install to attract otters?"

Six years later in 1947 after the war was over we had another visit and I asked him if the otters had ever lifted their boycott on the Shack. His eyes lighted up, "We've just had our first otter pass through." Something interrupted the conversation and I never got to ask him if he had performed some magic manipulation of the landscape which favored otter visits. The question was still unasked when he died a year later.

In 1971 I married Aldo's daughter, Nina, and in 1976 retired from Montana State University. We moved to the Shack area, now expanded and functioning as the Leopold Memorial Reserve under the auspices of the L. R. Head Foundation. Our job was to start a program of ecological study as a continuing function of the Reserve.

Last winter the appearance of otter tracks on the Reserve sent Nina back to her father's journals where she apparently found the 1947 reference. It was the only one on otters. Interestingly, Aldo had given the name "Otter Pool" to a pond near the Shack. It has no connection to the referenced otter sighting. In fact the pool's name seems to have predated the sighting. Was it an expression of hope?

It is likely that otters have criss-crossed the Reserve many times since Aldo's death. In fact Reserve Manager Frank Terbilcox says he has seen them several times. But lack of a written record for that period made last winter's tracks an exciting milestone for us.

On February 16 while ski touring, Nina and I found tracks of three otters on some ponds in the central part of the Reserve. The otters had emerged from a hole in the ice at the west end of Chapman Lake, made a half mile loop up the marsh and gone back down the hole. They traveled by running and sliding, taking many short detours to toboggan down some handy bank. The next morning a friend and I picked up the three otters' trail where the animals had emerged from a beaver hole at the east end of the lake, but we immediately



Photos by Greg Scott

lost them again in the trampled maze of the beaver's logging operations.

The coincidence of the otter tracks with those of beaver tempts speculation. Was it simply that the beaver had provided the otters with a convenient aperture in the ice or was it more sinister? The season was too early for the otters to have dined on beaver kits, but otter are reputed to occasionally gang up on an adult beaver and kill it for food. There was no blood or fur on the

snow. My mind's eye abhors a blank so I picture a big beaver, wary but stubborn. Facing him are three otters, dangerous but tentative. They eye the beaver speculatively and then move on.

Circling north past the Shack to the frozen and snow covered surface of the Wisconsin River we intersected the triple trail once more and followed it for two and one-half miles up river. Never before have animal tracks given me such

an intimate feeling of having watched the critters make them. They rollicked up river in a pattern of three or four lopes followed by a 10-20 foot "belly whopper." The nearby river bank provided them with many excuses for side trips to check out toboggan runs. About every half-mile or so they made a point of wallowing (or wrestling?) in the snow and leaving scats. I suppose these were message centers but I have only wild guesses as to the content of the

messages or the intended recipients. Conceivably the messages were, "To whom it may concern." In which case I am delighted to be on the list and am free to read the message, "Having a great time, wish you were here."

Nina joined us for the last leg of the journey up river to the west end of the Reserve where the tracks disappeared forever down a hole in the ice. (We know it was forever because it froze over and remained frozen until the river broke up in March.)

As I looked down the hole that day in February, the dark water rippling swiftly past the opening in the ice induced a coincident flow of dark questions through my mind. Could otters by any chance get caught in a squeeze between their need for food and their need for air? That hole was the only spot of open water we had seen in the two and one-half miles of otter trail and beyond. Down the hole was food but under that deep and highly reflective snow cover they would be in total blackness. How would they find food? Does scent work under water? How far can they travel without air? Three hundred or 400 yards? Where would they get their next breath? Do they, like seals, maintain breathing holes in the ice, bridged over and hidden by the snow? I should think air pockets beneath the ice might be an untrustworthy source. With a rapidly accumulating oxygen debt could they make an emergency opening from beneath six inches of ice? It seems unlikely.

I can't avoid a taut feeling in my gizzard as I try to evaluate the margin of safety for those fun-loving characters in their search for food and air in that fast running world of cold and blackness. I also have a more cheerful second thought — that knowing what they know and I don't know about making a living under river ice, they might as easily die laughing if they knew about me and my taut feelings.

Nina and I had one other otter visitation last winter and I describe it here because it broadened our vision of otter tobogganing and provided us with some



Photo by Dorothy Ferguson

indirect evidence on the frequency of otter visitations here.

On March 26 we ran across fresh otter tracks on a pond near our study center. Tracing them backward and forward we were able to get a clear picture of its itinerary, if not its motives. Judging from the body track width (nine inches) and style, it was a big, male loner who had very little use for walking, trotting or loping. He tobogganed 90% of his 1½ mile overland loop. He even tobogganed long, uphill slopes by sliding on his belly while kicking with his hind legs. For a 30-foot stretch on one of his up-slope slides he was working against an eight degree gradient.

He came on land via a network of flooding Wisconsin River sloughs. With one key exception his entire trek gave every indication of purpose and knowledge of local geography, presumably because he had been here before. He took a bee-line toward the pond where we first found his tracks. Traveling across country, mainly by kick-gliding, he traversed the flood plain, crossed the road, then kick-glided a long, rough passage uphill through plowed corn stubble toward a pass at the top of the ridge. There he detoured to make a glorious unbroken 150-foot slide down a stretch of old logging road on the other side of the ridge, where he resumed his original direction across an alfalfa field, and through an oak woods to the pond.

Here with a short-sprint and four supplemental kicks he slid almost all the way across the pond and went down a hole in the ice. Did he dig the hole? I think so. It had not been there a few days before and his were the only tracks around it. I also think he had planned this as a mid-journey break which included a bluegill dinner, before heading back toward the river via the Study Center.

The first thing that really puzzles me was that after demonstrating his obvious addiction to open field or frozen pond travel he avoided the Study Center pond which was right on his way. Instead he paralleled the pond, kick-gliding through a prickly ash thicket so dense I almost gave up

following. This brought him directly to our garden fence.

I think the fence and the scent of humans and dog was something new on his mental map of the Reserve. If so, he would not have known about our pond either, since we had dug it at the time we built the Center three years earlier. Thus we can speculate that it had been over three years since this otter had passed here. It also suggests a possible answer to Leopold's original question. Perhaps Aldo's first five years at the Shack just happened to fall in a fairly normal gap between otter visits.

True or not, our otter's track recoiled from the garden fence and made a wide detour around our living area, but not so wide as to miss one more long fast slide down the morainal bank on which we live. Then his track led us back to the network of flooding sloughs and to that portion of his world from which we are excluded.

In all that tracking we found nothing other than, perhaps, the fun of tobogganing to suggest the purpose of the otter excursions across the Reserve. Thirty years ago Aldo Leopold wondered why the otters *didn't* visit the Shack area. Today, at risk of inviting the too-familiar George Leigh-Mallory answer "Because it's there," Nina and I have a counter question, "Why *did* they visit?"

Epilogue of ecology

The outdoors has improved a lot. But some things never change.

DEAN A. VOLENEC, DNR Warden, Ellsworth

Let's go back to the hills of south-west Wisconsin a few years ago; to a

gravel road that twists and turns as it gently follows a path of least resistance through the picturesque terrain. The road crosses dirty, muddy, rivers, clear, clean, spring branches, and large ugly dry runs. Beside one of the bridges spanning a dry run we see a large accumulation of discarded human debris: cans, bottles, and papers account for most, although scattered

about are pieces of machinery, worn out refrigerators, numerous old tires, and even a dead, decaying farm animal.

At one time flash floods and spring runoff flushed the debris out of sight and out of mind. But the big increase in use of short-lived appliances and fast food containers has monumented the stuff which now defies nature and is speedily

growing into a repulsive heap.

It is a beautiful warm fall day. A regular local dump customer stops to deposit his usual contribution. He looks over the smelly heap, reaches in his pocket, pulls out a wooden matchstick, lights it on the leg of his overall and soon the heap is smoking, blazing, and crackling. He gets into his pickup truck and drives away. It is only a short time before the fire reaches the dry grass that surrounds the dump. One dry blade touching another enables the fire to creep toward the nearby hillside. Here dead leaves and brush encourage the

fire to travel faster. By evening the entire hillside is burning. The gravel road is now busy with traffic as people, seeing the smoke on the horizon, travel for miles to watch the burn. They talk of the weather, their aches and pains, and their crops. No one is greatly concerned about trying to put out the fire. It will stop when it runs out of fuel . . .

The next bridge we cross is a culvert. It carries a stream of clear cold spring water under the road. We approach the end of the culvert carefully, knowing if we are fortunate we may catch a glimpse of a brook trout as it feeds in the open water at the entrance to the culvert. Always alert to all intrusions they dart into the culvert at the least sound or movement. Protected by the culvert they know they are safe from the blue heron, the kingfisher or man.

As we look toward the hill from the culvert we see an aluminum cup hanging on a rusty steel post. We know this marks a bubbling spring. The path to the spring is well worn. It tells us the sounds, smell, and taste of the spring is enjoyed by many . . .

Visible a short distance below the spring is a cheese factory. Local farmers haul their milk to the factory in cans. After emptying the milk, they fill the cans with a liquid called whey. They use the whey to feed pigs. The whey is stored in a large wooden tank outside the cheese factory. The tank is old and continually drips. An innertube from a car tire is attached to the outlet pipe of the whey tank. The cans are filled by directing the innertube into the cans and opening a valve on the tank. The valve is not closed as the tube is moved from one can to another. This results in a great deal of spilled whey around the area.

The tank has no top and many times overflows onto the ground. The spill has created a smelly, scum-filled ditch leading to the clear little spring branch. The spring is now choked with algae and fungus, nature's method of trying to rid the clear water of foreign elements. From this point down, the stream is dead. The odor is almost unbearable and close examination shows the only

existing life in the stream consists of a few sludge worms . . .

A few years have passed and now, today we again drive down the same road. The gravel is blacktop. The ugly, smelly, eyesore that was once a roadside dump has been leveled and covered with rich topsoil. Nature is fast weaving a cover of green carpet over the area.

If it were not for a Department of Natural Resources sign saying, "\$200 FINE FOR DUMPING OF DEBRIS," a stranger would never know this was once a rat-infested blemish on nature's complexion.

The surrounding hillsides show no sign of recent fire. Gullies that erode during years of unhindered runoff are beginning to heal. Healthy seedlings are abundant; seedlings that will now have a good chance to mature into adult trees. Occasionally we see a large red sign that says, "NO BURNING WITHOUT A PERMIT." It is signed by the Department of Natural Resources.

Has it really been 10 years since we stopped to drink from the spring? The same rusty steel post still marks the spot. A sneak approach to the culvert reveals a large number of healthy brook trout. As we frightened them into the protective cover of the culvert we note a distinct size difference. This is good because it tells us the little stream is healthy enough to produce a new hatch of fish each year.

The banks of the stream have been fenced. Plantings of shrubbery, supported by nature's contribution of low cover has stabilized erosion.

The polluting wooden whey storage tank is now gone and with it the smelly unsightly ditch that carried the waste to the stream. The once sick fungus-choked stream is now healthy. It is supporting an abundant growth of watercress. Watercress provides a breathing, living environment for the fresh water shrimp and protective cover for newly hatched brook trout.

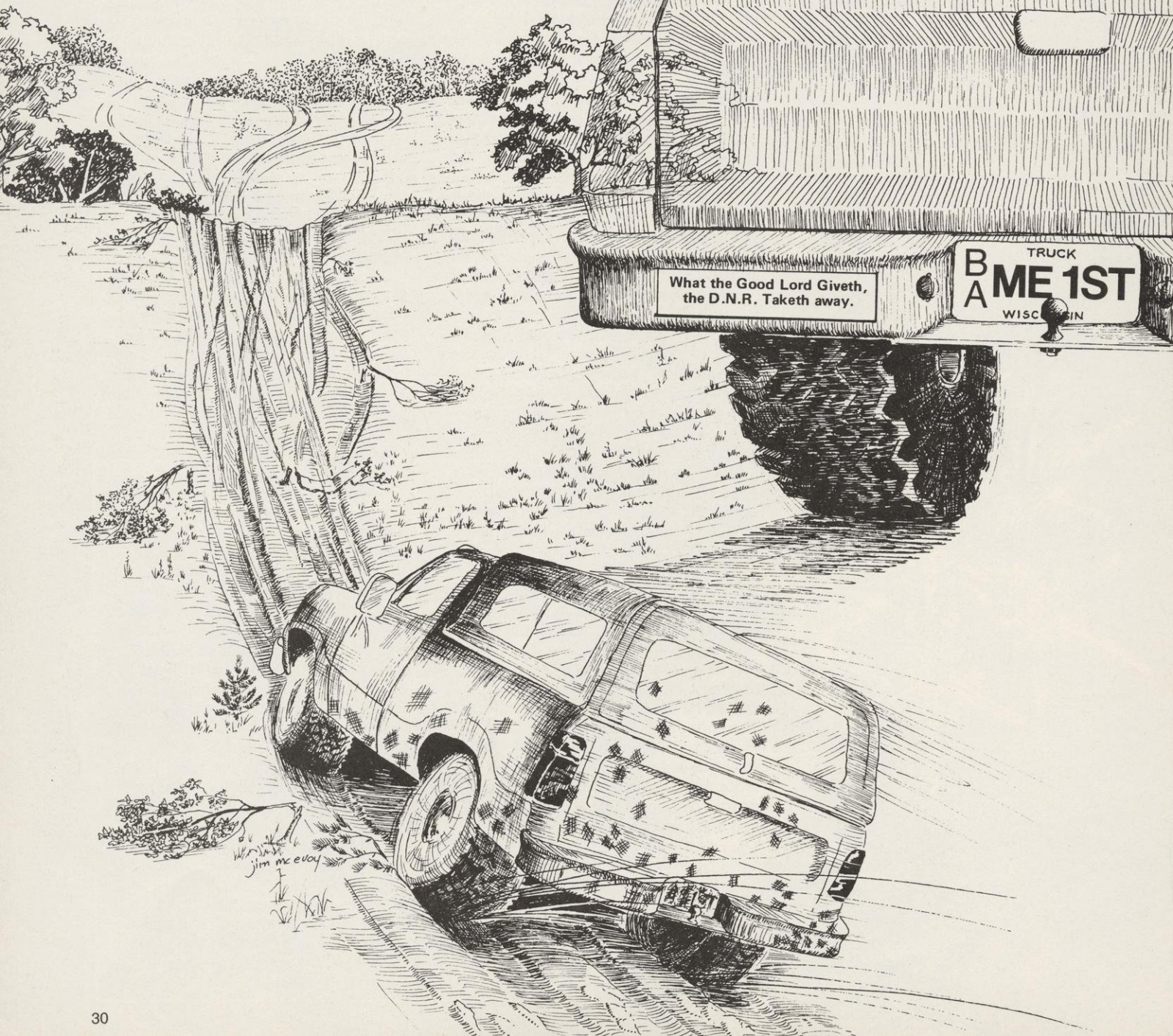
We are thoroughly absorbed in the sight and hardly notice the redwing blackbird scolding us. It is perched on a large attractive wooden sign that says, "PUBLIC FISHING GROUNDS." It also is signed by the Department of Natural Resources.

As we drive on down the road we note a four-wheel-drive pickup coming out of a farm field road. In large bold



letters across the front it says, "Power Wagon." The doors, windows, top, and sides are covered with dirt and mud. A quick glance shows it has been used to try to climb a hill just off the road. The hill has been chewed to ribbons by the four hungry, powerful wheels. Time after time they have struggled desperately as they tried to pull the heavy load up and over the crest of the hill. This has resulted in a hill that is now vulnerable to water runoff and will be deeply scarred forever.

As the pickup turns down the road in front of us we note a large fluorescent sticker across the back bumper. It says, "WHAT THE GOOD LORD GIVETH, THE D.N.R. TAKETH AWAY."



Like waves lapping the shore, people are irresistibly drawn to where water meets land. It is along this rugged, fragile scenic place called the coast that human activity impinges on Wisconsin's Great Lakes. Some uses conflict, but with proper planning many of the things for which we use the coast can co-exist peacefully. To call public attention to this interplay along Wisconsin's 820 miles of shoreline, 1980 was highlighted as the Year of the Coast. These pictures and the photo contest they came from were part of it.

Cover Photo: Split Rock Lighthouse, Two Harbors, Schroeder, Minnesota. C. Allen Wortley, 46, Madison. Runner up, over 40 age group.

Focus on the Great Lakes





Upper—Fishing harbor dock and buildings, Whitefish Point, Michigan. C. Allen Wortley, 46, Madison. First prize, over 40 age group.
Lower—"Day of Rest—Port of Milwaukee," Dean R. Kot, 25, Milwaukee. Runner up, 20-40 age group.



Three years old

Wisconsin's Coastal Management Program is only three years old, still new, yet it has already helped busy port cities like Superior and Milwaukee balance competing pressures and demands.

"People need the economic resources and advantages of a port," says Ellen Fisher, UW-Extension Coastal Management Specialist, "but they don't want the complexion and personality of the land and the coast to change."

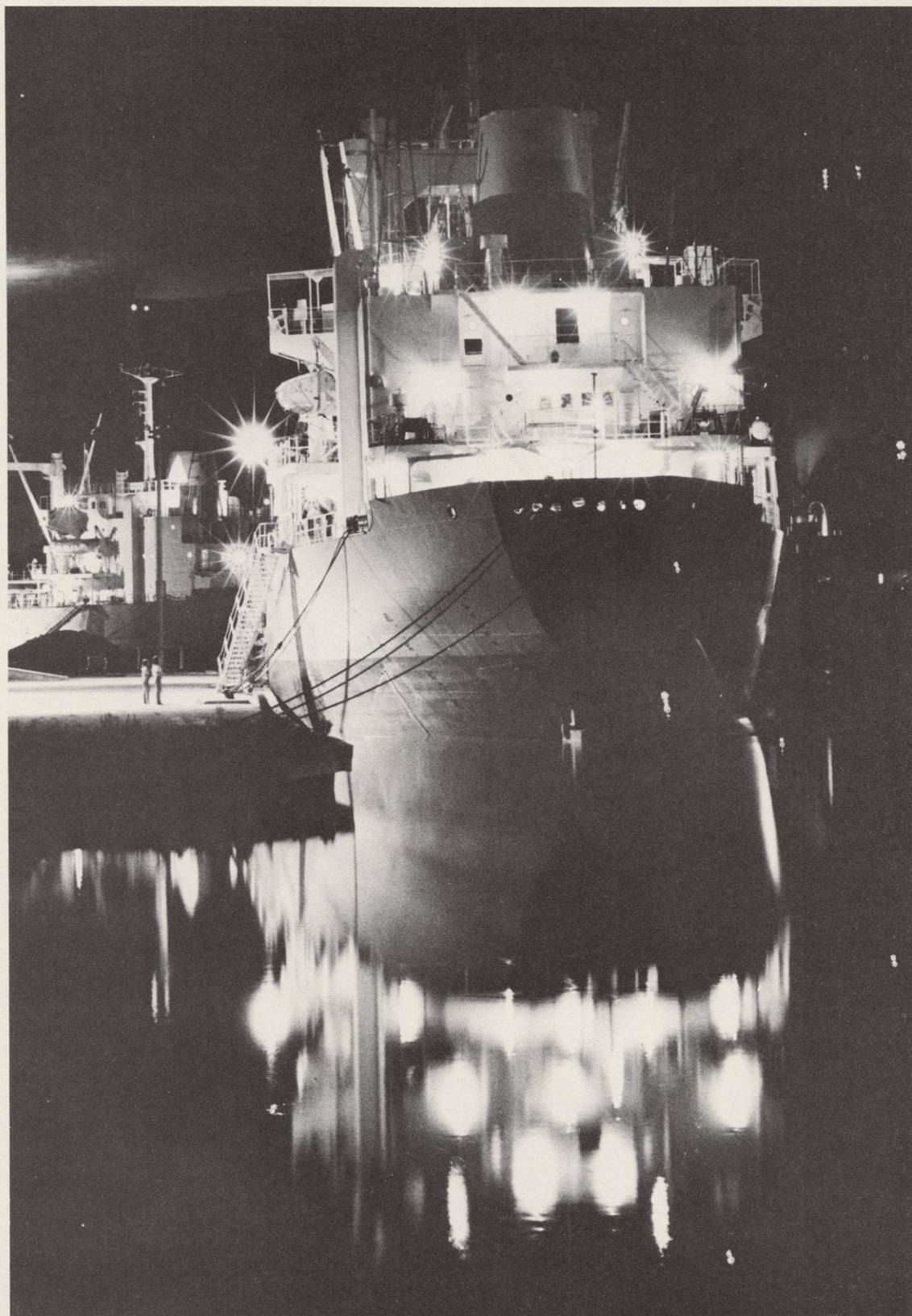
Increasing use of Superior's port for storing, transferring and transporting coal was crowding out boating, fishing, waterfowl hunting and other recreation in nearby areas. An \$80,000 grant from Coastal Management will help develop parks, boat ramps and fishing piers at two sites further away from the crush of shipping activities.

With careful planning, says Superior Port Director Jim McCarville, wetlands and wildlife can live side-by-side with commercial fishing and Great Lakes transportation.

"Our harbor plan notes the best areas for commerce, navigation, and environmental protection," says McCarville. "We have a wide and diverse harbor, with plenty of space to accommodate competing uses."

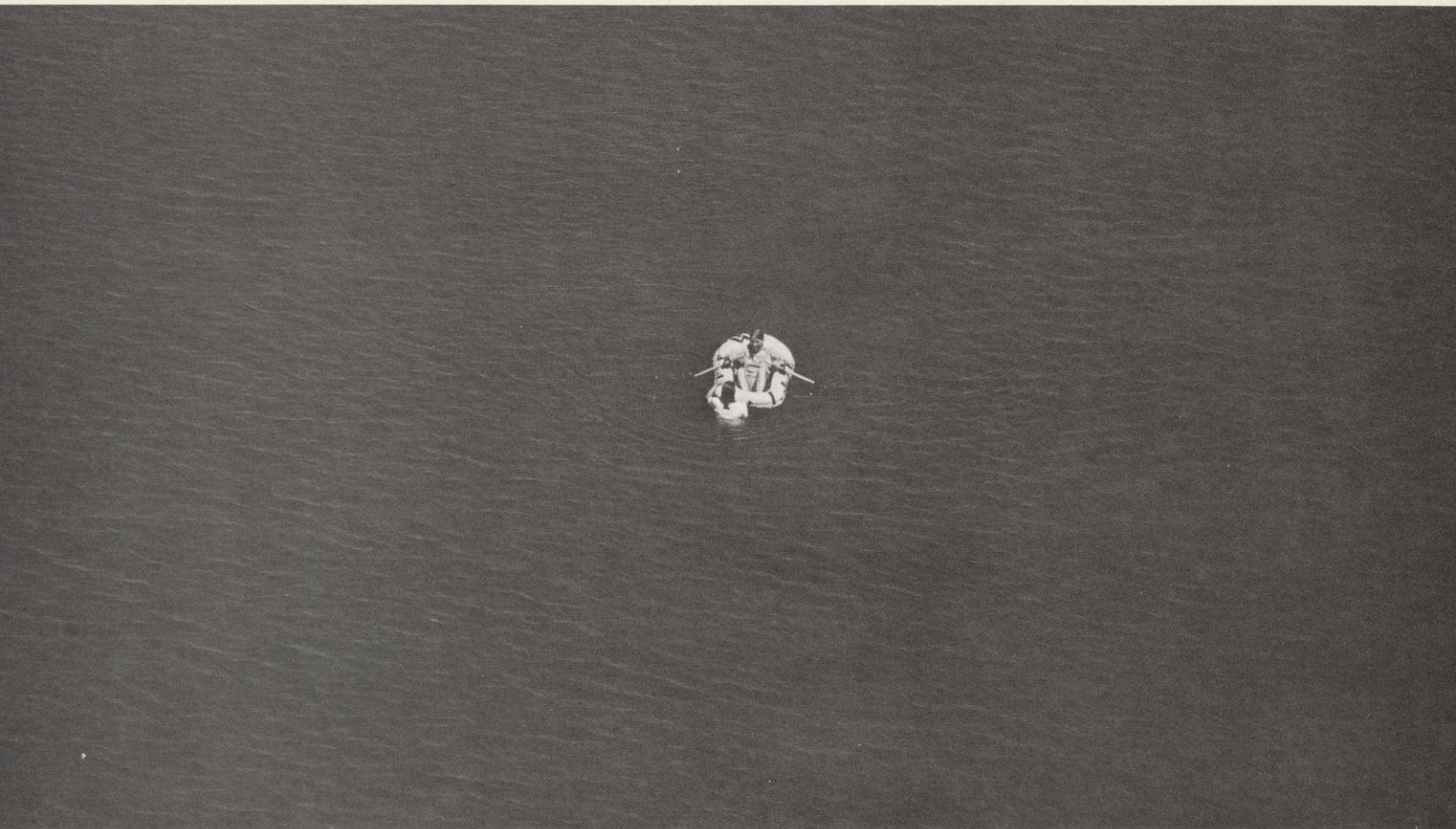
Sometimes, despite studies and plans, ecological and economic concerns clash and the environment must take top priority. For instance, Corps of Engineers feasibility studies on winter navigation left many questions unanswered. How much would it cost, and would it pay off? Who would benefit, and who would be harmed? What was the increased potential for oil and toxic chemical spills? Would channel straightening and harbor dredging release dangerous chemicals? When these issues weren't adequately addressed, Wisconsin declined support.

Toxic contaminants—such as PCBs in the Sheboygan and Milwaukee harbors, or arsenic in the Marinette harbor—are hard issues. Evidence suggests these toxics may shift within the sediment, move out into the lakes and be taken up by fish or into community water intakes. A \$95,000 grant from Coastal Management is financing a continuing study by DNR to find out how much of such toxic material is present in Great Lakes fish, sediments, and industrial discharges. The study will identify the most contaminated area, recommend sport and commercial fishermen away from them, and recommend ways to prevent further build-up.



"Reflections," mouth of the Fox River at Green Bay. Mike Roemer, 16, Green Bay. First prize, under 20 age group.

Continued...



Upper—"Space," Green Bay. Mike Brisson, 31, Green Bay. Honorable Mention.

Lower—"Refreshing," Newport State Park. Mike Brisson, 31, Green Bay. First prize, 20-40 age group.



Nine inches

There are nine inches of Great Lakes shoreline for each Wisconsin resident. Even when we don't all try to use our share on the same weekend, facilities are often overcrowded. Only 15% of our coast is publicly-owned and available to everyone. Increasing recreational demands of the 80's are expected to jam things up even more. Boating, fishing, hiking, camping, sightseeing—all are expected to double or triple by 1990.

When Gov. Dreyfus proclaimed 1980 Wisconsin's Year of the Coast, he directed the Coastal Management Council, a citizen advisory group, to look into upgrading public access. Their study is investigating what's available, its condition and what can be done to meet the demands of the next decade.

Meantime, Coastal Management continues to help communities with other access projects—a shoreline nature trail in Green Bay (\$46,000) and improvements to one in Shorewood (\$3,600), lakeshore development and coastal management assistance in Washburn (\$8,000) and Sister Bay (\$10,000), and a

land ownership study along Lake Superior (\$6,000).

In the brief century and a half since settlement, most of what the glaciers left behind in Wisconsin has been molded and shaped by the human hand. Only about 150 natural areas—coastal forests, bluffs, dunes, fens, bogs, beaches and marshes—remain along Great Lakes shore . . . and less than 20 are protected from development and disturbance.

The largest remaining stretch of natural landscape lies along the west coast of Green Bay. At one time more than 9,600 acres of marsh graced this shoreline, but over 60% have been dredged and filled. Even so, the remaining west shore marshes contain 90% of all the wetlands on Wisconsin's Great Lakes coast. With help from Coastal Management funds, continuing studies and projects will help slow the loss and preserve natural areas on both sides of Green Bay.

A \$21,000 grant to UW-Milwaukee will be used to investigate effects of water level changes, wave action, nutrient additions and human disturbance on the Rowley Bay/Mink River wetlands near the tip of Door

County. A \$19,000 grant to the Brown County Park Commission will develop a management plan for the Barkhausen Game Preserve near Green Bay.

Other projects are on Lake Superior. The Northwest Regional Planning Commission will get \$49,000 to develop a plan for Fish Creek Slough in Ashland and Bayfield Counties. UW-Superior will undertake a similar project in the Allouez Bay Wetlands near Superior.

Continued...

1980-'81 Coastal Management Grants

Rural Shorelands	\$106,055
Water Quality	\$ 94,900
Natural Areas, Fish and Game	\$357,300
Urban Waterfronts	\$ 20,160
Energy	\$238,250
Harbors	\$ 57,620
Shoreline Hazards	\$169,973
Public Access	\$ 74,532

Lower—"Sunrise Gulls," Long Tail Bay/Green Bay. Mike Brisson, 31, Green Bay. Honorable Mention.





Upper—"Summer Clouds," Ephraim, Wis./Green Bay. Mike Brisson, 31, Green Bay. Honorable Mention.

City waterfronts

Nowhere do competing uses for Great Lakes shoreline clash more than along city waterfronts. Wisconsin's ports are busy, vital jumping-off points.

"Sixty-five percent of the people working here are directly or indirectly related to the port," says Superior Port Director Jim McCarville. "That's a significant figure.

But ports meet more than economic needs; they're also "home" to thousands of people. An important job of Coastal Management is to help balance dollars and cents port development with environmental, cultural, historic, recreation, and aesthetic requirements. The challenge facing all of Wisconsin's port cities is much the same: How is it possible to preserve and enhance the waterfront, yet still meet economic and recreational demands?

Coastal Management is helping port cities answer that question. At Superior, about \$110,000 of Coastal Management funds helped plan for community recreation and environmental areas right along with sensible growth for the port. Similar help has gone to Bayfield, Kewaunee, Sister Bay, and harbors along Green Bay.

The delicate strip where water meets shore is a resource to be used, yet preserved, for all. Although 1980, The Year of the Coast has disappeared into time, the coast itself continues. If we care for it well, its delicate magic will be there to use and enjoy for many generations yet to come.

The contest

This photo contest, "Focus on the Great Lakes" drew some 200 entries from more than 50 photographers of all ages in Wisconsin, Michigan, and Minnesota. Plaques were awarded for first prize and runner-up in each of three age groups—20 and under, 21 to 40 and over 40 years old. In addition, 19 received honorable mention. The photos will be published and exhibited statewide.

Wisconsin Coastal Management sponsored the contest in cooperation with University of Wisconsin Seagrant and UW-Extension. Ellen Fisher directed it. Judges were Tom McInville and Mary Allen, UW-Extension photography instructors, and Chris Kohler, graphic designer, UW-Seagrant. Allen H. Miller is the Coastal Management Program Manager. Mel Albers is Coastal Management/DNR liaison.



Upper—"Early Morning at the Docks," Bayfield/Lake Superior. Konnie Hunter, Bayfield. Honorable Mention.
Lower—Sunset over Milwaukee Skyline. Karen Kroeger, 39, New Berlin. Honorable Mention.

Continued...





Upper—Leaves along the shore. Allen F. Hillery, 29, Merrill. Honorable Mention.

Lower—"Sunrise on the Beach," Terry Andrae State Park, Sheboygan. Christopher Ertman, 20, Madison. Runner up, under 20 age group.





More Great Lakes

Year after year of wind and wave, freezing and thawing, carved sea caves and natural arches into the red sandstone along Lake Superior. This cave on Squaw Bay in the Apostle Islands National Lakeshore is one of several on the Bayfield Peninsula. Our next issue will feature a special 16-page supplement on Wisconsin's Great Lakes Basin. Don't miss it! Photo by Roy Given, National Park Service.



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