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Wisconsin NATURAL RESOURCES

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Chuckler of the forest

George J. Knudsen, Chief Naturalist, DNR

As you hike the woods, listen for short, loud, resonant trills coming from high in the trees. These "chuckling" calls are made by cute little rascals with bug eyes, called gray treefrogs. They climb trees, and easily jump from branch to branch, and leaf to leaf, sticking to them by their adhesive, disc-tipped toes. They can even walk up window panes! In some wooded areas you will hear more than one.

When not snapping up insects and spiders, they rest on a branch, in a bark crevice, or back into a tree hole or other deep depression. They often get the urge to sing out, perhaps defying you to find them. Finding one is difficult; they are experts in the art of camouflage! On leaves, they are green; on tree trunks or rocks covered with grayish-green lichens they are gray with blackish, speckled patterns. Chameleon-like, they can change their color in a very short time! They will betray themselves, if you get too close, by leaping to another perch. Young treefrogs could sit on a nickel; mature ones are thumb-size.

In spring, they breed in shallow ponds and permanent woodland pools, and at this time they are unusually vocal. You can stalk them at the pond edge at dusk, or at night with a flashlight, but to see them you must move as slowly and noiselessly as possible.

Once seen, they are rather easily caught. If you catch one, notice especially its moist, somewhat warty skin and its long hind legs, the undersides of which are golden yellow. Handle it carefully, then release it by holding it close to a tree trunk, or a big leaf. It will jump to these platforms and stick to them as if glued down. If you hold one close to your face, it may wind up on your forehead, or your glasses. Children love 'em!

Photo by Don Blegen

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Special Supplement

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Front cover:
"Dancing Bears" by Artist Tom Uttech of Milwaukee. Uttech describes his work as "imaginative memories of places and experiences in the northwoods." For a story on Wisconsin bear and recent research see page 10.

Painting courtesy of the Wisconsin Arts Board, the Dane County Cultural Affairs Commission, Office of the Mayor of Madison and the Wisconsin Department of Administration.

Back cover:
Coot by Artist James E. Coe from the International Bird Art Exhibit at the Leigh Yawkey Woodson Art Museum in Wausau. For other bird art from the exhibit see *The Finest Feathers* on page 30.

Right:
Saw Whet Owls by Artist John A. Ruthven from the Leigh Yawkey Woodson Bird Art exhibit. See page 30.

Upcoming:
FOCUS ON THE GREAT LAKES

Top photos from a contest commemorating 1980 as the Year of the Coast will be featured in a special January-February supplement to the magazine. Winners will be selected from 8 x 10 color or black and white glossy prints that had been submitted by September 15. Wisconsin Coastal Management, UW-Extension and Sea Grant are sponsors. Contest Coordinator is Ellen Fisher, Environmental Resource Unit, 1815 University Avenue, Madison, WI 53706.

WISCONSIN
DEPT. OF NATURAL RESOURCES

The quietest symphony

A whisper from our ancient Indian past can still be heard in Wisconsin's wild rice beds this fall. Listen!

LARRY SPERLING, DNR Public Information, Madison

Rice beds meander in irregular patterns through the shallow, clean, lake waters. "Ricers" paddle out by canoe. The dense stands of pale green stalks are three to six feet high and the plants sway gently as the canoe glides toward them. Then, like a comb drawn through long, silky hair, the bow separates the rice stalks momentarily. They resettle as the stern passes.

To enter a wild rice stand is to immerse yourself in an ancient harvest tradition. Gathering has changed amazingly little over the centuries and ricers still wield the simple tools that are older

The beater bends stalks over the gunwale with one stick and shatters rice heads with the other. The grain falls into the canoe.

Courtesy of *Wild Rice,* sound-filmstrip program, Hawkill Associates, 125 E. Gilman St., Madison, WI 53703

A canoe trail through the rice beds.

than the recorded histories of both Chippewa and Menominee Indians. Menominee means "wild rice gatherers" and these people were revered as ricers par excellence among the Chippewa, Sauk, Fox, and Potawatomi.

There are philosophical lessons in the rice harvest. Water in the beds is shallow and the plants crowded. Getting through them isn't easy. The strong, steady ricer gathers much more grain than the fast, haphazard one. Like an Italian gondolier, the "poler" in the back of the canoe stands and thrusts a long, forked or duck-billed pole into the muddy bottom and slowly pushes the canoe through the rice bed. The best work up and down in long, straight paths. Crisscrossing is wasteful and after enough passes, the stalks bend away from the canoe and ripe grain falls into the water.

The person who harvests the rice or "beater" sits backwards in the bow facing the stern and using two smooth sticks, also called beaters, collects the grain by hand. The sticks can be no longer than 38 inches and are rounded on the ends. The beater reaches out with the left stick and bends the stalks over the canoe. A light, backhanded rap from the stick in the right hand shatters the seed heads and ripe grain rains to the bottom of the boat. The beater then reaches out with the right stick, draws in the rice heads and shatters them with the left.

It is the quietest symphony ever conducted. Like a maestro rhythmically waving batons, the beater alternately archs the sweeping sticks — left, swish, right; right, swish, left; left, swish, right. The sounds are those of silence: the tinkling rice, the light swish of the beaters, the soft plops of water droplets dripping from the pole and the quiet rustle of the canoe parting the tall stalks.

No motorboats are allowed in the rice beds.

As each sweep scatters the rice heads, a few grains land in the canoe and a few in the water on either side. In this way wild ricers fulfill the biblical prophesy that "He who sows sparingly will also reap sparingly and he who sows bountifully will also reap bountifully." Being a rather carefree ricer with a good flailing stick, I expect dense rice stands where I riced last year!

The grains are covered with a tough hull that narrows to a long bristly beard on one end. As the rice hits the water, the heavy end of the seed tips down and the bearded end acts like a rudder driving the seed towards the soft bottom and firmly embedding next season's crop in the protective muds. A good ricer can duplicate this feat in the bottom of the canoe. As the ripe rice piles up, the heavy grain end settles down and the barbed end points straight up in the air like quills on a porcupine. Ricers can estimate the amount of collected rice by counting the number of "porkies" in the canoe.

There are more than 60 synonyms in

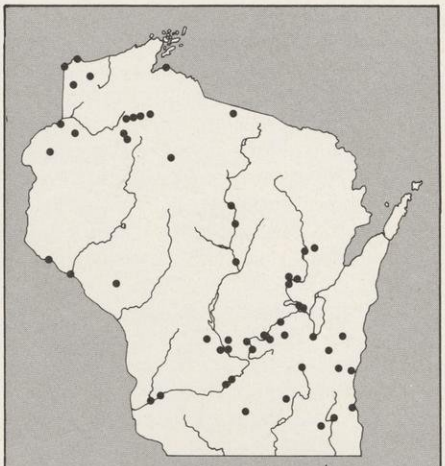
Chippewa Indians gathering wild rice into a canoe. Courtesy of the State Historical Society of Wisconsin.

America for wild rice. Among the popular names, the Menominee and Chippewa called it "Manó min" which means "good berry" or "good fruit." The English called it "wild oats" and "Indian rice." In French it's "folle avoine," wild or crazy oats. The Sioux called it "psin." A strain of wild rice grows in Japan and the Japanese call it "chimaki-gusa" which translates as "thousand-rolling-grass."

The term "wild rice" is actually a little misleading. The four strains of wild rice found around the world are all members of a family of aquatic grasses called Zizania. The two varieties commonly found in the upper midwest, *Zizania aquatica* and *Z. palustris* provide most of the marketable wild rice. Both varieties have been reported from Manitoba sweeping southeastward through the Great Lakes area and along coastal regions of the Northeast, Atlantic seaboard and the Gulf of Mexico. *Z. texana* in the Southwest and *Z. latifolia* in Asia are used as vegetables and fodder but not often harvested for rice.

Although the species has a wide range, it's also pretty finicky. Rice grows best in shallow water but it can't compete for sunlight with perennial aquatic weeds and bottom vegetation. That's why you normally find it growing just deeper than cattails and sedges. Floating algae or debris can also block light and inhibit growth. Likewise, deep, turbid waters over soft, muddy lake beds can uproot the young rice plants. Despite these sensitive requirements, history records stands in the mouth of the Fox River that were too dense to traverse by canoe. Even the Menomonee River bordering Mitchell Park in Milwaukee supported large rice stands some 200 years ago.

The rice seeds which drop in the fall lie dormant on the bottom until spring. To germinate they must stay cold and wet all winter. There's some evidence that sulfates in the water — natural or man-made — can prevent germination. Seeds sprout in late spring. Anchored by deep vertical roots and shallow horizontal ones, the plant sends up a thin spike which reaches the water surface in early June. Depending on fertility and water depth, final rice stalks



Wild rice beds in Wisconsin

may vary in height from two to 10 feet. Several long, slender leaves on the stalk make it look like a true marsh grass.

Young rice plants need fairly calm, but not stagnant water. Bad weather can break them and if it's rough in late summer just before harvest the loosely-held seeds are shaken off before they can be gathered. Since rice is an annual which totally relies on this year's seed for next year's production, crop failures sometimes happen. There are stories of periodic famines among Indians who relied on rice from one area for their fall and winter diet.

As the plant grows through the summer the top of the stalk develops a foot-long, pale green fruit head. This matures into a greenish-yellow husk which tightly holds the rice kernels. By harvest time the ripened head takes on a purplish-green tinge around the bearded kernels. The male flowers hang on slender stems below the spike. When mature, they look like wispy oats gingerly hanging from the stalk.

In mid-August, two to three weeks before harvest, many tribes would send their women into the rice fields to tie up or "shock" the rice. Using long curved sticks, they gathered several stalks together and bound them with 10 to 12 feet of "bast," a string made from the green inner bark of basswood. The stalks were tied from the bottom up to the base of the husks, then the heads were often bent over and lashed to the lower stalks. Albert E. Jenks, in a fascinating turn-of-the century thesis on the wild rice gatherers of the upper lakes, describes the fields of shocked rice: "The bunches are made with great uniformity and regularity. A row is tied on both sides of the canoe, . . . the fields at this period are very attractive. The graceful bunches and regular rows, either straight or following the outer limits of the beds, are extremely pleasing to see."

Shocking was done in the "milk" stage. Then the young, tender kernels exude a milky liquid when squeezed and at that time stalks can be handled easily without the grain shattering.

There were several good reasons for shocking. Easier to harvest because several rice heads were gathered together, shocks were steadier in the wind and poor weather was less likely to shatter the grain during harvest. Each Indian had a unique method of shaping the shock and thus could establish a ricing territory for the harvest. This, however, was not always done. Many Indian tribes harvested rice as a community and didn't believe in territories.

The harvest lasted about a month. Lafayette Connor, an 80 year old ricer and Indian historian who lives in Webster, Wisconsin remembers:

"The Indians knew when the rice was ready by trial and error. Of course, some traditional ricing grounds were more productive than others. Families would take their ponies, small wagons, tents and birchbark canoes and move onto the shores of the ricing grounds for the whole season. Often two families would harvest together. Every member of the family from grandchild to grandparent worked on the rice harvest because a family might need 200 pounds of finished rice to last through the winter."

Wild rice has to be processed before it can be eaten. "Green" wild rice fresh from the beds can lose 50 to 75% of its weight when water, hulls and debris are removed during processing.

At the end of each day Indians dried or "cured" the rice for 24 hours. Some tribes merely spread it in a thin layer on a blanket and sun-dried it. Others built

A homemade winnowing machine separates the grain from the chaff.

racks and carefully used a low, smoky fire. This quick drying prevented mold and spoilage. Once dry, the rice was essentially preserved and remaining steps in the processing could be taken immediately or many years later.

Connor tells a story which illustrates the lasting power of wild rice. "In 1922 I was visiting some friends when lightning struck their old chimney. When we were repairing the breaks I found an old pint jar of rice that had been stored near the chimney for over seven years. The rice was still good but, sitting that near the chimney, had lost all its taste. Kept dark and dry, wild rice will last for years. I have some rice that's over 20 years old."

Once thoroughly dried, the rice was heated or "parched" to help separate hulls from the grain. About four to six pounds were heated at one time in an iron kettle over a slow fire. Constantly turned for about an hour with a small paddle to prevent scorching, the parching rice smelled like green tea. An iron ricing kettle was a prized Indian possession.

Next, the rice was threshed. Warm rice from the parching kettle was poured into buckskin-lined holes or buckets sunk just below the ground surface. Originally, Indians wore soft leather moccasins and gently worked the rice with their feet. Using specially designed wooden poles to straddle the ricing hole and bear most of their weight, they very gently kneaded the warm rice under foot to loosen the hulls from the valuable grain. This gentle, rhythmic kneading motion resembled a dance, and the threshing stage was often called "dancing" or "jigging" the rice. Traditionally, men were delegated the job of jigging while women and children gathered, parched, winnowed and stored the processed kernels.

Once threshed, several methods were used to winnow the rice or separate the grain from the chaff. One common practice was to find a moderately windy spot and slowly sprinkle handfuls over a blanket. The heavier rice dropped and the hulls blew away. Some tribes sprinkled the rice in front of handmade fans. A few used a birchbark winnowing tray about three feet long, two feet wide and seven to eight inches deep. The tray, or "scotchanoggan" as Connor called it, had a sloping lip at one end. By carefully shaking and flipping the rice in the air, the grain and chaff were separated.

Once processed and cleaned, the rice was either stored in buckskin bags and cached in tree holes or boxed in birchbark, covered and buried in the ground. Indians didn't fear theft from neighbors, but hid the rice from enemies who might attack or raid the camp.

Grains of wild rice. Photos by author.

Modern processing is considerably faster but a lot less glamorous. In Wisconsin it's still a cottage industry and each operation is a little different. But basically the rice is parched in a steel drum which has a gas jet beneath it. It's stirred by rotating paddles inside the drum. Usually the threshing machine rubs the rice kernels between a revolving piece of flexible material and the sides of another drum. Finally, the rice is winnowed with an old-fashioned oats winnower or similar homemade contraption. Modern ricers who bring their grain to a processor can expect to pay about a dollar for every pound of finished product.

The modern commercial harvest is automated. As with cranberries, university and food industry research has developed a system of gates and irrigation ditches which allow rice farmers to flood the beds during growing season, drain them in late summer and harvest the crop on dry land. Food scientists are developing wild rice hybrids which ripen uniformly and can be harvested in a week instead of four. More than half of the wild rice sold is raised and harvested by commercial growers.

But not in Wisconsin! On public water here, state law prohibits wild rice harvesting with any machinery or mechanized device other than two wooden beaters and a boat propelled by muscle power. Sizes for both are specified.

Dates for the ricing season on many waters in northern and western Wisconsin are set annually by DNR to insure that harvest occurs at the peak of ripeness and that all ricers have an equal opportunity to take part. On regulated waters rice may only be harvested from 9 a.m. to 4 p.m.

However, on Indian reservations, private flowages and ponds, and nonregulated public waters wild rice may be harvested any time, year-round. Ricers 16 to 65 years old must have a $1 license but only one per family is required. Separate, higher fees for wild rice dealers are based on the amount handled.

Aside from the peaceful harvest, and the tradition-filled processing, the proof of the ricing experience is in the eating. The nutlike, crunchy texture and slightly smoky taste uniquely complement wild fowl and game. In my own mind, the best Thanksgiving bird features wild rice stuffing cooked in a flavorful broth and mixed with sauteed morels, celery, onions, and chestnuts.

There are many Indian recipes. Green rice was mixed with boiling water and topped with maple sugar or blueberries for an oatmeal-like breakfast cereal. Rice was used to thicken soups and stews, or added to a corn and fish chowder, called "tassimanonny". For a special treat, some tribes fermented wild rice over winter and ate it in spring. Indian gourmets also supped on a concoction of smoked fish roe and rice.

Some recorded recipes might leave modern tastebuds a little cold. Jenks recounts Indian feasts of wild rice and stewed dogmeat as well as a mixture of boiled wild rice, rabbit dung, and pounded partridge.

Although wild rice today is considered a luxury by many, it's really a nutritious bargain. One cup of dry wild rice yields four cups of cooked rice high in protein, B vitamins, phosphorus and potassium.

Indian lore is rich in ricing stories. One bright September night, under the Manominike-gisiss, the "moon of the gathering of wild rice," the Chippewa told how the Bear Spirit gave Big Thunder corn and fire in exchange for wild rice. In the Menominee tradition the Great Spirit promised that the tribe would always have rice. That's why the Menominee never sow it. "If the Great Spirit wants us to have wild rice it will grow itself!"

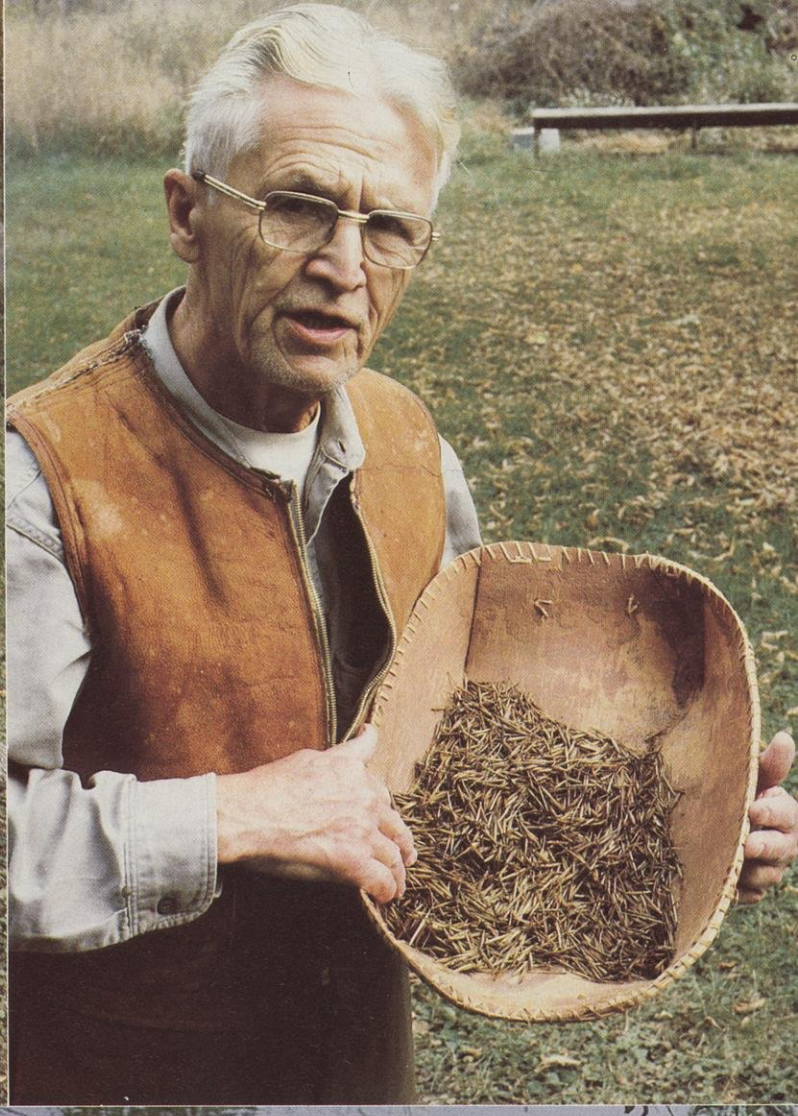
The promise has been fulfilled. Wild rice is a native American food you can enjoy year after year. And in Wisconsin, the gathering is still heavy with mystique from the ancient lore—before you can dry or winnow, parch or dance, there is the quiet symphony of the harvest. Some say it is the whisper of the Great Spirit Himself. Listen!

Right: Indian Historian LaFayette Connor "jigging" or "dancing" rice in the traditional manner. Jigging loosens the hulls from the grain.

Far right: Birchbark winnowing tray or "scotchanoggan." Contents are flipped into the air and wind separates the grain from the chaff.

Bottom right: The author with a day's harvest.
Photo by Luanne Bauer

Indians often shocked the stalks before harvest. Distinctive shapes sometimes laid claim to portions of the rice beds and identified the owner. Illustrations by Jim McEvoy



Bear in mind

When pondering bear facts, it's best to study the research. Among other things, it discloses that Wisconsin populations are safe and bear are brainy.

BRUCE E. KOHN, Project Leader, Forest Wildlife Research Group

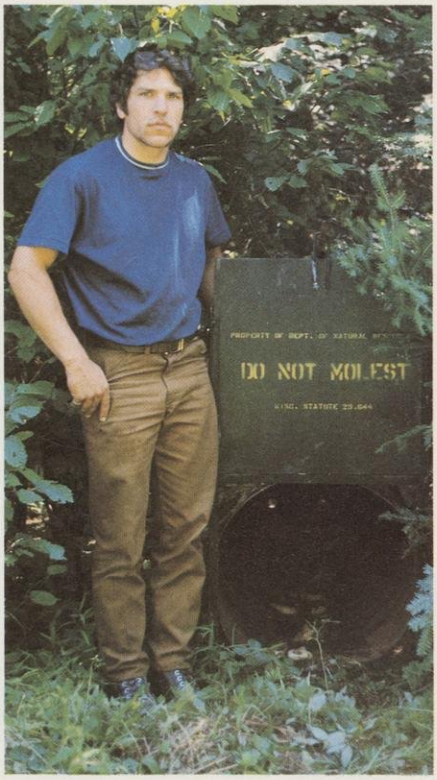
Bear and bear hunting were very controversial subjects during the 1970's. Some people wanted all bear hunting stopped because they thought it was endangering the population. Others wanted all bear shot because they thought them to be dangerous nuisances.

Early in that period both DNR and the people interested in bear decided that it was time to take another look at the status of the Wisconsin population. From 1972 through 1977 questionnaires were sent to bear hunters to find out where they hunted, how they hunted, and what they saw. A system was set up in 1973 for collecting teeth from bear shot by hunters to determine the age structure of the population. And in 1975, we started trapping and marking bear on a 387 square-mile study area in Iron County.

What did we find out? First of all, 312

(continued page 12)

We were surprised to find that bear as large as 343 pounds could turn around inside the 55-gallon barrels. This one weighed 303 pounds.

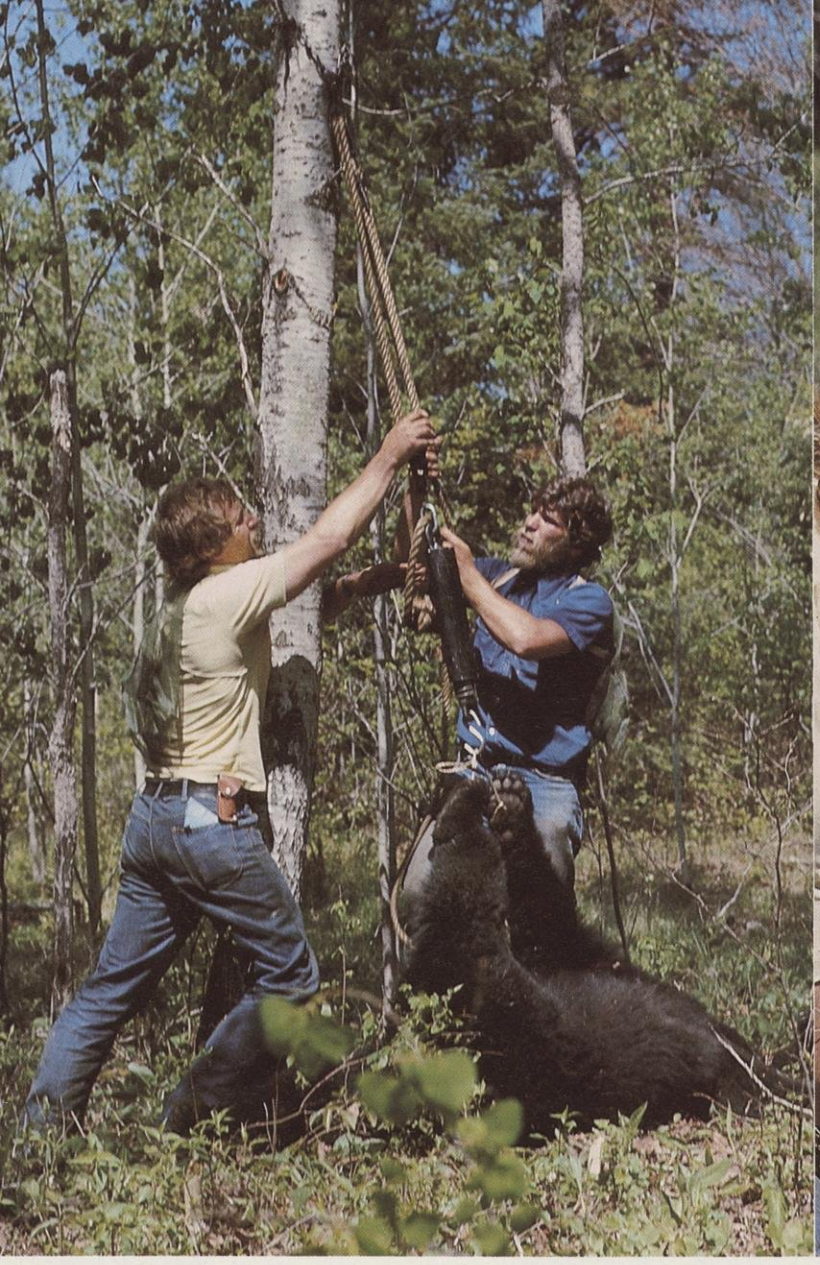


Ned Norton standing beside a bear trap made from two 55-gallon barrels welded end-to-end. Although small, these traps proved to be very effective and safe for bear.

The smallest bear caught during the study. This cub weighed only 3 pounds on May 17, 1976 and was from a litter of four .

Photos by author

We used foot snares to catch bear too wary to be caught in barrel traps. This is a 380-pound male in a foot snare.



At almost 300 pounds, this tranquilized bear was a midget compared to the largest bear trapped—a mammoth 485-pounder!

Norton and Kohn pull a small premolar to estimate a bear's age. The oldest was 24 years, the average around four or five. Photos by C.O. Harris

HARVEST RATES OF EAR-TAGGED BEAR

Year	Adults handled	Adults shot
1975	71	17 (24%)
1976	95	23 (24%)
1977	88	18 (21%)
1978	94	15 (16%)
1979	70	9 (13%)
All years	418	82 (20%)

Knudsen marked 165 bear between 1958 and 1962. Of these, 29 (18%) were shot the same year they were handled.

Recovery of marked bear gave an estimate of 220 to 290 on the 387 square mile study area.

individual bear were captured 836 times in the five summers of trapping. Most of these were caught in traps that had a sliding door and were made from two 55-gallon barrels welded end-to-end.

"You won't catch anything but cubs in traps that small!" was a common comment when people first saw them.

And initially we wondered whether they were right. But Lynn Rogers who showed us the basic design promised they'd work. Lynn had worked on bear for many years in Minnesota. We were really convinced the first summer when a 343-pound animal managed to turn all the way around inside our 55-gallon barrels! And in May, 1978 we caught a bear that weighed 485 pounds and was 10 inches longer than the trap!

The traps worked well, but they weren't perfect. Some bear were too wary to enter and had to be caught in foot snares. Although most animals were very docile in the traps, some got excited and escaped by biting and tearing holes through the side of the barrels. And many got smarter and smarter as trapping progressed. We had to redesign the trip mechanism three times because bear learned how to get the bait without tripping the door. Later we were forced to lengthen the traps by one-half barrel when the bear learned they could let the door fall on their backs, eat the bait and then back out. And some just liked to roll and throw the traps around. One bear threw a 130-pound trap 39 feet through the air!

Animals were tranquilized, ear-tagged, and weighed the first time they were caught each summer. We pulled a small tooth to determine age and also recorded many physical measurements. When a bear was recaptured, we merely read the ear-tag to find out who it was and released it untranquilized. One was captured 20 times during the five summers, and another was captured 17 times in just 80 days and gained 70 pounds eating our bait!

Hunters who bagged an ear-tagged animal and reported where and when they shot it and how much it weighed were given a brief history on their bear and a $5 reward. From this information we were able to calculate that there were from 220 to 290 bear on the 387 square-mile study area. That's a very good population, especially in this part of the state which is one of the most heavily hunted in Wisconsin.

And, we found that 20% of the adult ear-tagged bears were shot annually which is a safe harvest level considering the number of cubs produced each year. Interestingly enough, when George Knudsen trapped and marked bear in Wisconsin from 1958 through 1962, he found that 18% of the marked animals were shot each year. That was before the advent of the special September season when most bear were shot by deer hunters. So, we aren't shooting any more bear now than we were then; we simply harvest them at a different time of year.

In addition to assisting on the trapline, Ned Norton and Gordon Bertagnoli, graduate students at the University of Wisconsin-Stevens Point, collected scats to find out what bear were eating. Through laboratory analyses they found that grass, sedge, and aspen catkins were important spring and early summer foods. Fruits and nuts were important when they became available. This information reinforces the need for DNR's program to maintain aspen and openings in the northwoods. Of course bear eat meat whenever they find it, but evidently they aren't very good predators.

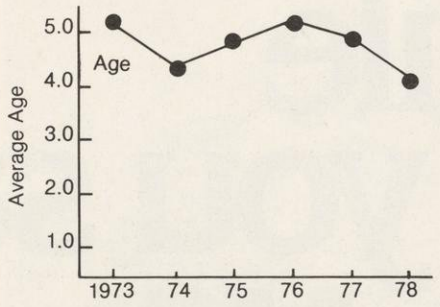
Ages of bear taken by hunters also provides useful information. Of 2,216 animals aged, the oldest was 24 and three others were 21 years old. The average age for females was 5.3 years as compared to 4.3 for males. Reason is that females don't travel as much as males and therefore aren't as vulnerable to hunters. It's also true that a lot of sportsmen pass up females with cubs.

Ages also showed that there were more than enough four-year-old and older females to produce the cubs needed to maintain the population. This was important to know because most females don't breed until they are three and then breed only every other year. Surprisingly, we didn't find any age differences between heavily and lightly hunted counties. Evidently, hunting effort is proportional to the number of bear in different regions of the state.

Finally, we were able to develop a new technique to monitor Wisconsin's bear population. Basically, this involves setting up bait stations in selected areas and seeing what percent are visited during a seven-day period. This won't tell exactly how many we have in Wisconsin, but it will show whether numbers are increasing or decreasing. This trend toward increase or decrease is important to know in order to set regulations consistent with the bear population.

So, we learned an awful lot about Wisconsin's bears in the past few years and we know that our current hunting regulations are not threatening the population. We will continue to monitor the population by analyzing harvest figures and bear ages, and by conducting the bait-station surveys. This information will aid in setting new hunting regulations if and when they are needed. In summary, Wisconsin's bear population is in good shape today. Tight monitoring will help make sure it stays that way.

AGE DATA



ADDITIONAL INFORMATION

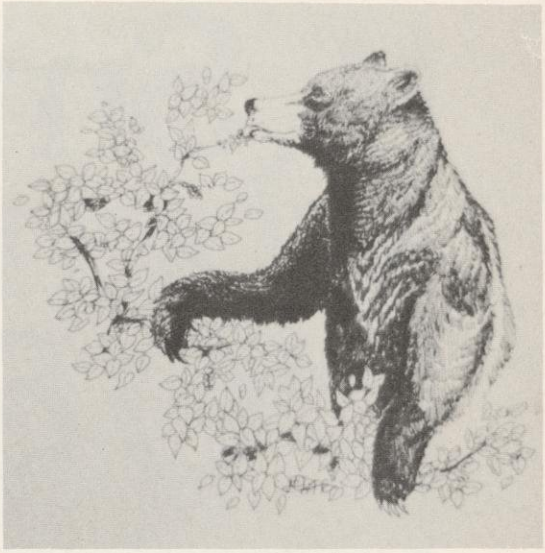
From 1973 to 1978 2,216 bear were aged.

Oldest was 24. Three others were 21.

Average Age for females: 5.3 — Males: 4.3.

56% of females were old enough to produce cubs. This is more than enough to replace those shot.

Heavily and lightly hunted counties showed no age difference.



Illustrations by Don Cliff, Boscobel

Smile when you say "O & M"

Operations and Maintenance can sound like a dull plod, but spiced with teamwork, a trio of dedicated young engineers, and a new approach, O & M brings on smiles and dollars and clean water we never expected.

DIANE BRINSON, DNR Information Specialist

"We're from the DNR and we're here to help you."

Ron Kazmierczak smiles when he says that, but he means every word. The fact is, he's one of a three member team with credentials that spell "help" letter by letter. The three have saved Wisconsin millions of dollars and cleaned miles of water.

They exist because of the late Al Schoen, former assistant director in the Lake Michigan District. Schoen convinced the Natural Resources Board that improved operations and maintenance (O & M) of sewage treatment plants could help end pollution and save money too. The board pushed and came up with funds to try his idea.

So ever since October, 1978, Kazmierczak and his partner, Tom Tewes have been showing sewage treatment plant operators how to get the most out of their equipment. Engineer Bob Behrens joined the team early this year.

In the belief that an ounce of prevention is worth a pound of cure, these troubleshooters have been able to convince operators to look for breakdowns before they happen. They teach procedures, show how to improvise and help zero in

Leonard Busch, operator of the sewage treatment plant at Bonduel talks about O & M with Kazmierczak.

on inexpensive replacement parts. Results are that communities have put off spending more than $4-million on new treatment plants, are polluting 62% less than before and have cut pollution discharge permit violations by 88%.

These numbers are important to communities approaching the 1983 cleanup deadline for state waters. People today realize more and more how costly it is to pull the plug or flush the toilet. Sewage treatment is not glamorous, it's expensive. The U.S. Environmental Protection Agency reports that the average customer now pays $1.05 per 1,000 gallons of water as compared to 64 cents before 1979. If a family of three, for example, uses 16,000 gallons per quarter, the sewer bill has gone from $10 to $17.

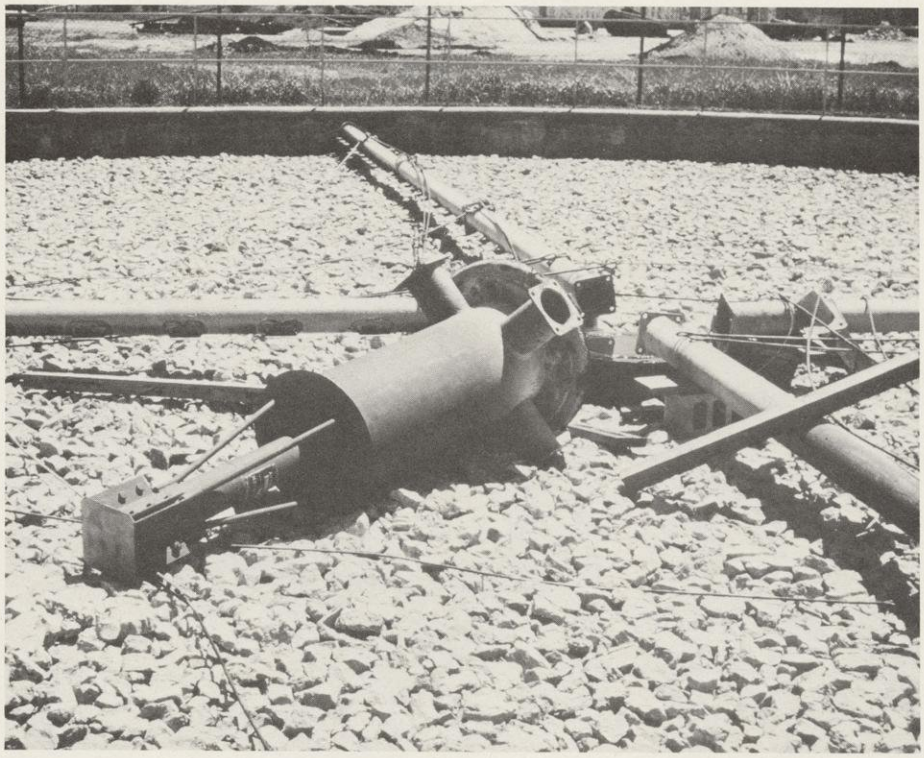
"People are screaming about water pollution and having to pay high sewer charges, but they won't pay for qualified people to operate their treatment plant," said Kazmierczak.

The whole thing can be a vicious circle with bad effluent swirling around the middle. Because some communities traditionally place sewage treatment at the bottom of the budget, they pay as little as possible for operators and repairs. Result: many plants die an early death and local residents pay through the nose for violations and equipment replacement. It takes more than a new plant with all the latest technology to make sewage harmless. "If you don't teach the operator how and when to push the button, a new plant won't work any better than the old one," said Kazmierczak. EPA studies indicate poor operation and maintenance (O & M) is a main reason why more than half the new major treatment plants fail to meet effluent limits.

The trio is most popular when it saves money. Once, by extending a pipe to change a plant's operation they helped a city avoid a $1.1-million remodeling project. In another community of 5,800, the team helped save a projected $3-million in construction costs. Industrial wastes from a small engine manufacturer and a feed processor were shocking the treatment system and clear water added to the overload. Tewes and Kazmierczak advised the city to draft and enforce a sewer use ordinance that alleviated the problem. They also suggested pump replacements and pipe modifications.

DNR's O & M team works the same as many self-help organizations — the community is encouraged to ask for help. A plant operator or local official usually hears about the team from a DNR water quality engineer who's dealt with the plant on some pollution problem.

Tom Tewes says one of the biggest mistakes he and Kazmierczak made at first was expecting plant operators to welcome them with open arms. Not only did they resent DNR telling them how to run the plant, in some cases they wanted new plants. The team learned the hard way they'd have to get caught up in local politics. While the operator might be hoping for a shiny new system, the mayor might be trying to hold down costs.



This trickling filter is out of commission because of a broken part. The O & M team improvised to get it operating again pending delivery of the replacement. A trickling filter removes nutrients from effluent.

Photos by Tom Tewes and Ron Kazmierczak

So the team geared up to work not only with operators, but also elected officials and others in 14 localities: Bonduel, Francis Creek, Pound, Tigerton, Neenah-Menasha, Marinette, New London, Suring, Whitelaw, Bear Creek, Casco, Manawa, the Outagamie County Airport and the Ridgeway Country Club. They found as many different problems as plants, but the number one problem was that many operators lacked proper training.

Tewes named three major operator problems: inadequate staffing, inability to apply technical knowledge to plant operation, and misunderstanding of sewage treatment systems. Because the process is complex, an operator has to know chemistry, biology, engineering and mechanics. The same basic skills are necessary whether the plant is big or little. And because technology is ever-changing and operators come and go, the learning process is continuous.

One of the team's success stories involves an operator who didn't have proper certification. The team got him into a technical school. Once certified, he completely turned the plant around. Tewes says he's now an exceptional operator, and the plant hasn't violated a discharge permit since the O & M team left in July, 1979.

In another community of 520 people, the plant's new operator had no training. Because of this, effluent testing was inadequate. Part of the system was out of balance and excessive chlorine being used. But the operator asked for help. After intense basic training, he was able to correct improper procedures and repair faulty equipment. Tewes and Kazmierczak are now confident his plant will not exceed pollution limits.

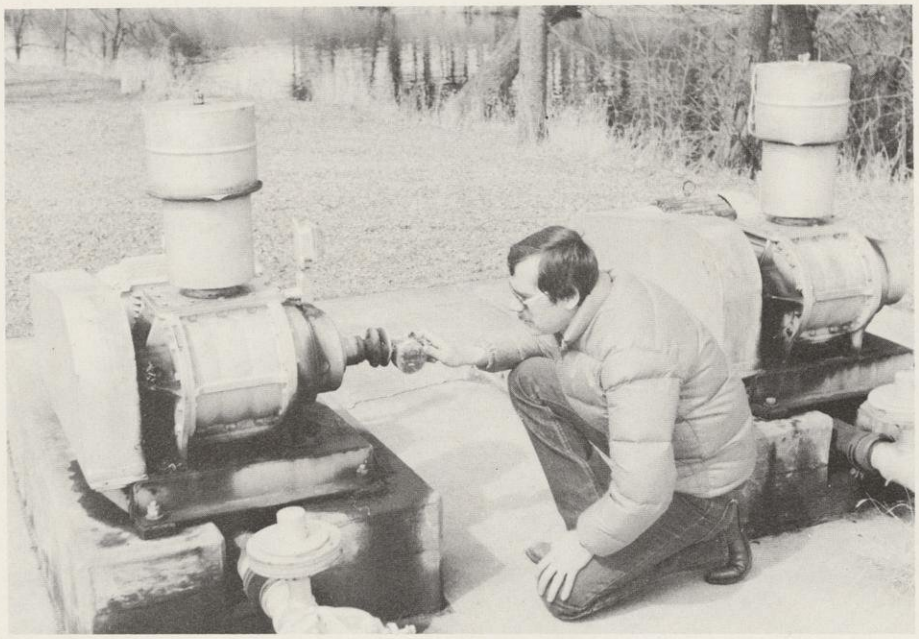
Part of the O & M team technique is to design a daily report for the operator to fill out. Tailored for each unit of the plant, the report is an on-the-job training device that helps form good habits. It asks questions like these:

Is dissolved oxygen in the effluent less than two parts per million?

Is the sludge blanket in the settling tank (clarifier) more than two feet thick?

Is the chlorine residual more than .5 parts per million?

If the answer to these or any other question is "yes" the report asks what corrective action has been taken. Once the report habit is formed, a quick scan



O & M team member Tom Tewes sets controls on an automatic sampler.

Ron Kazmierczak adjusts the strip chart on a recorder that keeps track of acidity from the plant at Manawa.

can tell the O & M team whether a plant is running right.

But every story doesn't have a happy ending. At one plant serving a community of 300, operating procedures were in total disarray. Routine maintenance was neglected. Clear water entered sewers and overloaded the treatment plant. Industrial discharge from a plating firm caused frequent shocks to the system. The operator was uncooperative, but promised to implement team suggestions. It didn't happen. Kazmierczak returned one evening to find the entire plant shut down and raw sewage flowing into a nearby stream. This occurred frequently when heavy rain or snowmelt water filled the sewers. Even the minimal requirement of notifying DNR was not fulfilled.

Now the community will have to hook into a new plant in a neighboring city this year or early in 1981. It's possible this expense might have been spared with proper operation. More important, the environment would have been spared some humiliation. And it's possible that because a hookup order existed, nobody cared. Except the team. Here's what they said: "If routine maintenance had been performed and adequate records kept, it is likely this facility could still be serving the village adequately. Unfortunately, the lack of recordkeeping and care has hastened its demise."

In most communities though, there's a good working relationship. At first it's a matter of public relations; convincing operators that the three young engineers from the DNR know what they're doing and really want to help, not just lay on the heavy hand of regulation. Once that barrier is passed, things loosen up and there's friendly banter and talk of fishing and family. The team is straightforward in the advice they give and take time to explain why their ideas work. They offer to tutor an unconfident plant operator who wants their help and who might lose his job if he doesn't pass the certification exam.

In other instances the team will improvise to get a piece of laid up equipment operating rather than have it lie idle while waiting for a replacement part. And they've found that sometimes manuals prepared by plant designers promise more than the plant can ever deliver.

Tewes and Kazmierczak have also found that they too make mistakes. One community had been okay at meeting current discharge limits but the team worried that it wouldn't be able to handle stricter rules set for the future. When the team tried a new procedure, the plant ended up violating its permit. Tewes and Kazmierczak had created a new problem. Needless to say, the community wasn't held responsible and the problem was corrected.

Most of the time though, the team's work comes up roses. Daily operating costs drop in plants they review. Equipment is repaired and machines begin to function at peak efficiency to save energy. Testing and sampling errors are corrected. In a couple of cases unnecessarily high levels of chlorine were being added to effluent before discharge. A cutback saved money and made life easier for fish in receiving waters.

The team doesn't always agree on the solution to a plant's problems, but the team approach is essential. If they can't hash out a compromise, they try different ideas for a while until the best method becomes evident. With each member able to call on a different kind of expertise, problems unravel fast. The Legislative Audit Bureau has concluded that the team approach to operation and maintenance is a valid concept and the team itself believes that focusing all effort exclusively on O & M makes them better at their jobs. Natural Resources Board Vice-Chairman John Brogan has recommended to DNR Secretary Tony Earl that the O & M team concept be extended statewide.

Earl points out that district water quality engineers now are assigned O & M along with their other duties, but don't usually get to it unless there's a problem at a particular plant.

"We need to convince local officials of the importance of protecting their investments through good operations and maintenance. They can't expect to pay operators the minimum wage to run sophisticated equipment," said Earl. "There's been precious little emphasis on running treatment plants well. We've put too much faith in brick and mortar."

Behrens, Tewes and Kazmierczak agree. They smile when the boss says things like that. And you will too if one of these days a team member shows up in your town and saves a million dollars.

Wreck at Maiden Rock

The play-by-play on how to handle a flaming eight-engine railroad crash and the oil spill that goes with it.

TOM WOLETZ, West Central District Spill Coordinator, Eau Claire

August 23 began quietly in Maiden Rock, a normal Thursday in this Mississippi River village of 172 people. It was 10:40 a.m. Customers were entering restaurants for mid-morning coffee when the screeching of metal against metal sounded toward the river. Seconds later two trains collided head-on and one of eight locomotives exploded filling the air with fire and dense black smoke.

At 11:10 a.m., the telephone rang in my Eau Claire office. It was Harold Hettrick, deputy director of the DNR's Law Enforcement Bureau. Hurriedly, he said two trains had collided in Maiden Rock, with an explosion causing a fire. Several people had been injured. A DNR Warden was at the scene, but no other details were yet available.

At 11:40 a.m. Dean Volenec, Pierce County conservation warden, called West Central District Headquarters from Maiden Rock. Eight locomotives had been involved, he said. One had exploded. Most of the rest were leaking #2 diesel fuel into a nearby backwater of the Mississippi River. Volenec had obtained shipping papers from train officials and a swift examination showed no toxic chemicals or gases aboard either train. There was one carload of liquid Heet, a highly flammable gasoline additive. The condition of the car was unknown. Volenec said he felt containment of the diesel fuel was possible and that I should mobilize DNR's oil spill containment equipment from Black River Falls.

At 11:50 a.m., I called the Black River Falls Area office to start crews transporting spill equipment to Maiden Rock, a distance of approximately 90 miles.

Then I started from Eau Claire for the crash scene. I arrived at 1:15 p.m.

Emergency crews clean up the track.

Sheriff's officers and members of fire departments from Maiden Rock, Plum City, Ellsworth, Lund and Stockholm had roped things off. Pieces of an exploded locomotive steamed as fire fighters poured water on it. Railroad ties cluttered the ground and fire fighters in slickers worked alongside hard-hatted Burlington Northern crews.

Civil Defense volunteers and Pierce County sheriff's officers patrolled the area to keep hundreds of onlookers at a safe distance. Volenec and Tom Thornton, Pepin County conservation warden, helped supervise transfer of fuel oil from leaking locomotives to bulk trucks. The 4,000 gallon capacity tanks on seven of the eight locomotives had ruptured. Approximately 10,000 gallons of diesel fuel already had leaked out. Wading into the backwater we found that fuel oil had spread, covering approximately one acre of marsh. It was up to three inches thick in some places. To contain the spill would take quick action. A wind change could hurt.

At about 2:30 p.m. we informed Burlington Northern officials the oil spill was a major problem and that the railroad should hire a contractor experienced with spill cleanup. Quickly they hired O.H. Materials, Inc., of Ottawa, Illinois. O.H. officials said it would be eight hours before crews could get equipment to the scene.

At 3:00 p.m. Claire Bahnub of the Black River Falls office arrived with the DNR oil spill equipment which included 505 feet of bright orange oil spill containment boom.

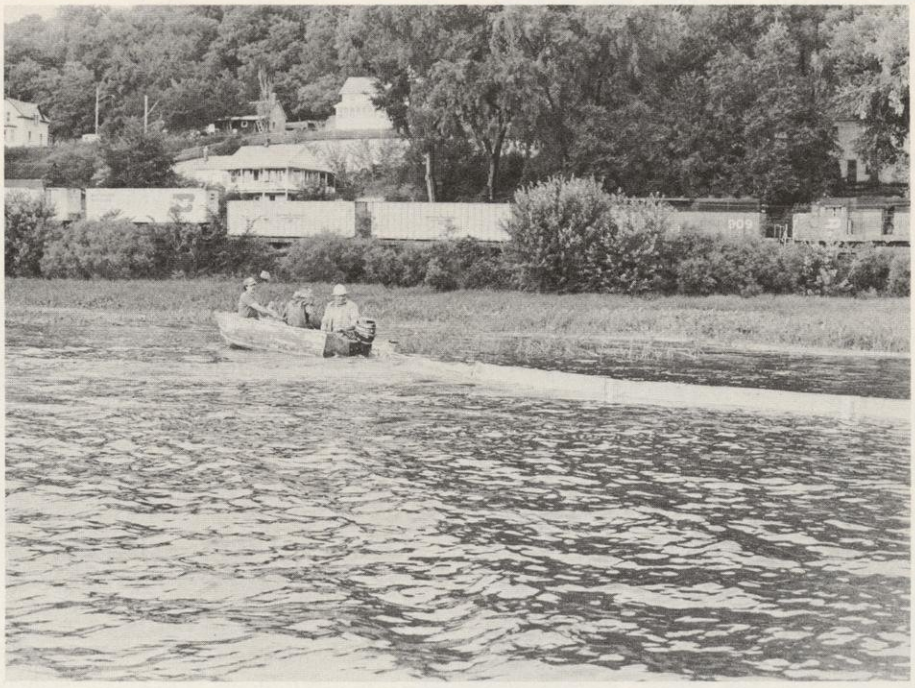
Wreckage still blocked access but with citizen volunteers and Burlington Northern personnel we half pushed, pulled, and carried boom segments to the river. There the 50-foot sections were connected to each other.

Next the boom was towed behind a boat upriver to the scene of the spill. By this time the fuel oil had spread to approximately two acres. We surrounded the oil and tied each end of the boom to heavy vegetation. This blocked the spread and the job became one of monitoring cleanup and waiting for O.H. Materials to arrive.

The last four hours had been hectic. Local Red Cross helpers had commandeered a trackside Senior Citizen Center and were serving hot coffee and fried chicken to tired Burlington Northern crews, firemen and sheriff's officers. Between sips of the steaming coffee for the first time we could compare notes and assess what had happened.

The crash happened at a track worksite. Normal northbound traffic had been temporarily routed onto southbound tracks. Earlier a southbound freight had arrived in Maiden Rock and had stopped to wait for a northbound train to switch to the normal tracks. But, instead of switching, the northbound crashed into the southbound. Although some injuries resulted, no one was killed.

Heavy equipment cleans up at the wreck site.


Volunteer firemen lay out a boom to contain the oil.

One of the eight locomotives had exploded but quick action by several fire departments had prevented serious damage to the village and the train.

Wreckage of micro-wave ovens, steel bearings, Japanese bamboo fans, books, water heaters, and even jugs of lollipops and five gallon cans of root beer extract had spilled onto tracks. But the boxcar of flammable Heet had been located intact. We had been fortunate.

Brian Peters and Greg Place, special wardens checking the spill, had found a juvenile muskrat coated with oil and shivering. Wardens washed the muskrat and turned it loose. Maybe it would recover. Other furbearers in the small marsh might not.

Main concerns with oil-soaked animals or waterfowl are two-fold: feathers or hair lose insulative qualities

and animals ingest oil as they attempt to clean themselves.

By now crews from a firm called Hulcher Emergency Services of Wyoming, Minnesota, were clearing track. They specialize in train derailments. The D-9 Caterpillar tractors with cranes on one side, counter-balanced by weights, allows them to pick up boxcars or even engines.

Acetylene torches flamed white in the dimming light as cars were cut apart. Equipment operators hooked onto the cars and pulled them out of the way or placed them back on tracks. Two Cats gently lifted a giant locomotive, cradling it like a baby. Neither operator could see the other but each one watched a foreman who directed the operation with an elaborate set of hand signals. Inch by inch, huge machines lifted the locomotive over a set of wheels on the track. In about 45 minutes, a one-thousand ton locomotive, which had been on its side in the mud, was once more on the tracks.

At about 10:00 p.m., Leroy Dietrich, district operations manager for O.H. Materials arrived. His crew and equipment would show in about three hours. I described the situation to Dietrich and we decided some oil skimming could be done at once although most work would begin at daybreak. At 6:00 a.m. Friday (August 24) morning, work began on the long task of cutting swamp grass below the water line and removing it so fuel oil could be skimmed from the surface. Machetes and gas-powered "brush hogs" cut the grass. It was removed from the swamp by hand. The job took three 12-hour days. Then skimming operations recommenced. On Monday morning (August 27) small gasoline-powered pumps directed a stream of water at the fuel oil heading it toward a suction hose skimmer which carried fuel oil to the vacuum truck. When the 1,500 gallon vacuum truck was full, pumping stopped and the oil and water mixture was allowed to separate. A bottom draw valve was then opened and the water decanted off. This was done several times until the mixture was 90% fuel oil. Finally the vacuum truck was emptied into a 7,500 gallon tanker which was taken to a Burlington Northern oil separator in La Crosse. In the final cleanup oil remaining on the surface is sopped up with absorbent pads which hold only petroleum products, no water.

Six days after the crash, cleanup was complete. Approximately 6,800 gallons of fuel oil had been recovered. The original estimate of 10,000 gallons had been revised to 7,500 gallons. The remaining 700 gallons were still in the ground or had evaporated.

Oil soaked muskrat after the wreck.

DNR Warden Dean Volenec washes down the muskrat. Photos by Dave Weitz

Hunter's choice

FRANK HABERLAND, DNR Big Game Management Specialist Madison

Use of the new "hunter's choice" deer permit starts this fall in Wisconsin. Under it, any one deer, a buck, a doe or a fawn may be taken in a specified management unit. The old party permit which allowed four or more hunters to take an extra deer will not be used this year.

Part of a program to improve the quality of Wisconsin's gun season, hunter's choice is a one hunter-one deer system. It is the sole survivor of a number of new ideas designed to disperse hunter concentrations away from parts of central and southern Wisconsin. Crowded conditions there and intense competition to bag a deer caused behavior problems. Some hunters even feared for their own safety and private landowners complained about gang hunting and trespass. An ethics committee worked with DNR to alleviate these problems. Together they proposed zone hunting, split seasons, early or midweek opening dates and one hunter-one deer. Offered for public review and reaction in meetings and mail surveys, all but the one hunter-one deer idea were shot down. Called hunter's choice because it gives the individual possessing the permit a choice of hunting either antlerless deer or bucks in the designated management unit, legislation authorizing the new permit passed last year.

The system is expected to improve things by encouraging a one on one experience — a change from the party permit hunt where many four-member groups often remained together in vigorous pursuit of their "party deer." Hunter's choice doesn't discriminate against the person who prefers to hunt alone. And there are likely other benefits too!

The number of wasted deer should be reduced because more hunters will possess permits than under the party system.

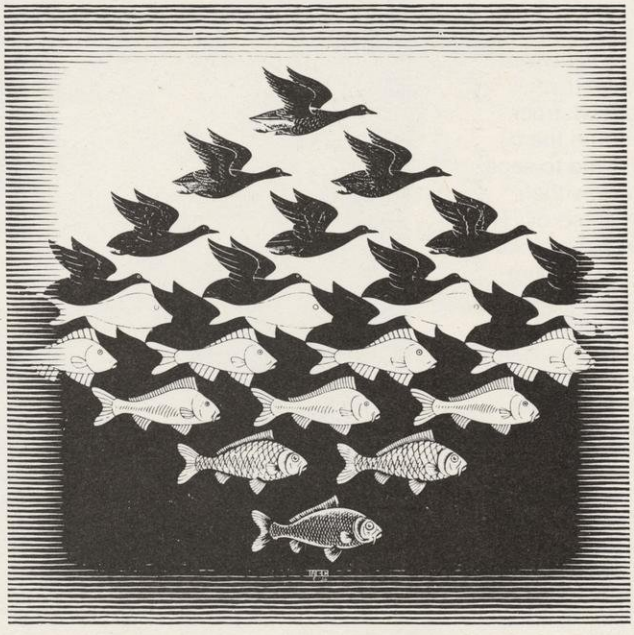
Crowding should be relieved because the permit is for one person, not four.

And rural landowners will stand a better chance of obtaining a permit because they won't have to form parties, something they've had difficulty doing.

The hunter's choice permit is free. An application for one will be provided with each deer hunting license and to be considered must be postmarked no later than October 3, 1980. Though permits are issued for specific management units, hunters are not restricted to spending all their time in that unit. They are still free to hunt bucks elsewhere and to hunt any-deer in areas where that's legal.

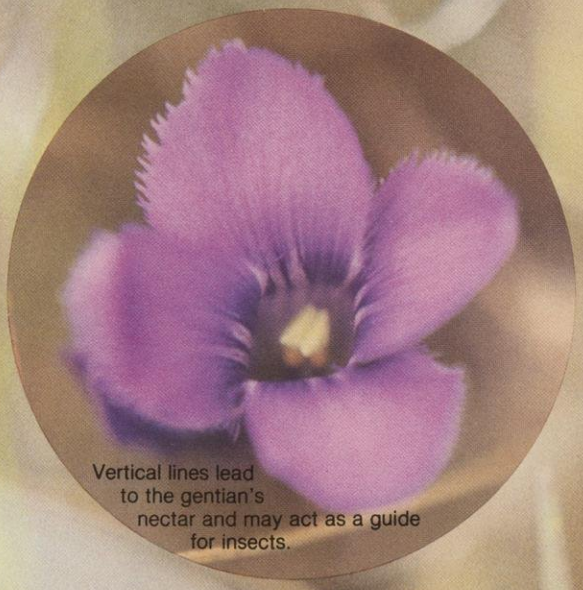
In hunter's choice, the success ratio, based on experience in Michigan, is about half that of the party permit. This means twice as many hunter's choice permits will have to be issued to take the same number of deer. Reasons are twofold: all members are eligible to shoot the party deer but in hunter's choice only one is; and "no-shows" in hunter's choice average 12%. These are people who never hunt in the unit for which they receive a permit. To take Wisconsin's quota of 39,750 deer this fall will require about 93,000 permits.

The hunter's choice system is not expected to change our excellent record of deer harvest. Neither will it correct all problems. Rather, it is a step in the direction of improvement and one that the hunters themselves have asked for and supported. It is this continuous refinement and interest that makes the Wisconsin deer management program better and better each season.



This different version of the National Hunting and Fishing Day logo was done by Artist M. C. Escher and is called Sky and Water I. Theme for this year's observance on September 27th is "Helping Insure the Future." Conservation clubs throughout Wisconsin will mark the day by inviting the public to participate in club activities that illustrate the theme.

Illustration courtesy of Vorpal Galeries, 1168 Battery Street, San Francisco, CA



Vertical lines lead to the gentian's nectar and may act as a guide for insects.

Lesser fringed gentians

I call these terraces the hanging gardens, for out of their sodden muck the fringed gentians have lifted their jewels. Such an October gentian, dusted with tamarck gold, is worth a full stop and a long look, even when a dog signals grouse ahead.

(Aldo Leopold: A Sand County Almanac)

Fringed gentians sometimes bloom as late as November. Photo by Calvin B. DeWitt

A grasshopper taking nectar.

Photos by author.

A fringed gentian seed capsule about to open. Seeds are dispersed by the wind.

CORNELIA BURR
Institute for Environmental Studies

"A full stop and a long look." The spectacular, iridescent blue flowers of the fringed gentian, so blue that they may only be described as "gentian blue," are among the last to flower in Wisconsin's wetlands. These late flowers bloom against a background of retiring autumn foliage, almost in defiance of the season. Indeed, they are worthy of more than a cursory glance.

The lesser fringed gentian *(Gentianopsis procera)* is a special plant. Having once thrived in the open areas of the plains, they have little shade tolerance, and may consequently be poor competitors with tall grasses and shrubs. Lesser fringed gentians favor unshaded areas where there is a high level of calcium, and wet soil. Such calcium-laden habitats are at a premium in Wisconsin.

One of these habitats, a sedge meadow in Dane County's Waubesa Wetlands, harbors a strikingly large population of lesser fringed gentians. Populated by a variety of sedges, asters, prairie-like grasses, and hundreds of fringed gentians, the sedge meadow has a unique character, reminiscent of the plains wet prairies which fostered the flowers in the past. Such a dramatic display, in such a unique setting, prompted my investigation in the fall of 1979. Ultimately, information concerning the life history of the lesser fringed gentian may be coupled with material concerning its habitat to unravel its special secrets.

The display of gentians in Waubesa Wetlands proved to be more than ephemeral. In late September, just as the number of flowers began to diminish, the lowermost flowers on each plant opened up, causing a resurgence in blooming. The repeat performance lasted well into October, and did indeed afford a "long look." Incredibly, a few flowers lasted, intact and in full bloom, until the first of November. Even several hard frosts did not totally obliterate the few hardy flowers which persisted.

Insect visitors to the flowers included bee-like syrphid flies, and a variety of small bees. Numerous features of the tube-shaped flowers facilitate insect visitation. Vertical lines on the outside of the flower, leading to the nectaries at the base, may serve as guides for foragers. Color is also an attractive feature. Generally, most bees are more responsive to blue and yellow than to green and red. An interesting feature of the flower is its white interior which reflects light and serves as a "light trap." Only open in the full sun, at a time when most insects are most active, the flowers are heliotropic which means they turn toward the sun.

Brightly colored, yellow striped syrphid flies, which at first glance, could easily be mistaken for small bees, were the most frequent visitors to the Waubesa fringed gentians. Capitalizing on the late blooming gentians, they moved rapidly from flower to flower, and collected pollen at most stops. At times a loud buzz punctuated their routine, a sound the flies use to vibrate pollen from the anthers. Although there were plenty of large bumblebees in the sedge meadow they were not seen working the gentians. The tube-shaped flowers may be too cumbersome for them. However, evidence, in the form of tongue holes at the base of the flower, suggests that bumblebees are "nectar robbers" and forage on the flowers from without. As the flowers close up for the evening, some insects remain inside taking advantage of a sheltered microhabitat. One evening's observation yielded a small bee in one closed flower, and a leafhopper in another.

The sedge meadow is located on an unusual peat mound which is about five acres in size. Within the meadow, a depression, or "pocket" about an acre in size is the site of hundreds of fringed gentians. A thorough understanding of the hydrological features which support this most unusual microhabitat may aid in understanding the ecology of the lesser fringed gentian. Such systems have rarely been investigated. Recently, however, researchers Tim Kratz and Marjorie Winkler measured groundwater levels and found that at the top of the mound, two meters above the surrounding wetland, the level of groundwater is very close to the surface. Peat soils, formed by delayed decomposition of purely organic matter, such as the sedge itself, characterize the entire meadow. As is the case for other lesser fringed gentian habitats, there is an abundance of calcium in the mound area. Deep within the earth, springwater flows through limestone deposits. These underground springs may originate far from the meadow, but they play an integral role in creating conditions conducive to fringed gentian growth. Calcium loads, which originate far from the soil surface may produce dramatic differences in species composition on the peat mound.

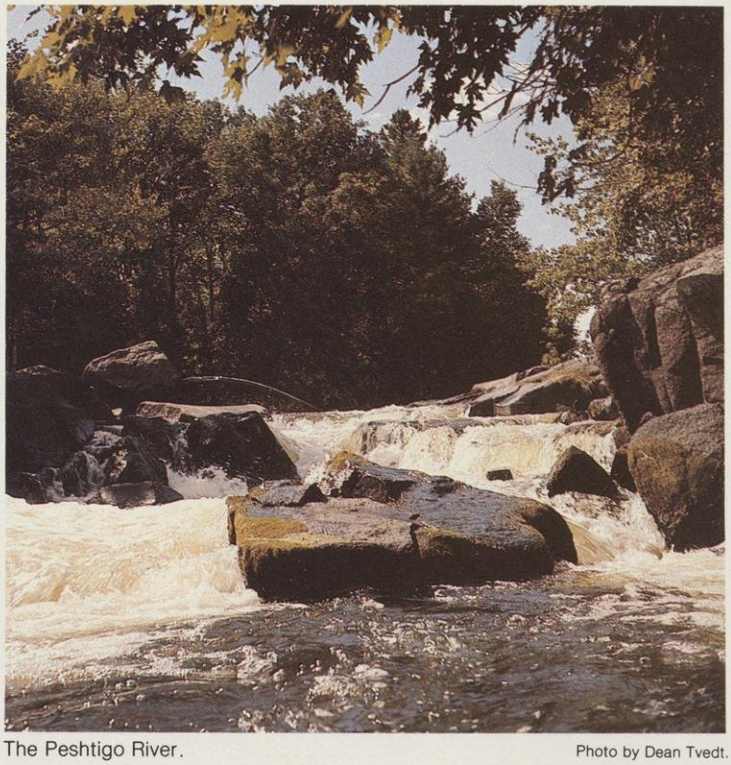
Red osier dogwood *(Cornus stolonifera)*, often an indicator of disturbance, rings the edge of the "pocket" where the flowers are found. Reed canary grass *(Phalaris arundinacea)* was introduced as a crop plant in the thirties, only to spread all too thoroughly throughout the fields, and destroy much diversity in flora and fauna. It has not taken a stronghold in the "pocket," but is dense in other areas of the sedge meadow. Although reed canary grass grows thickly right up to the edge of the "pocket," shorter, more prairie-like grasses grow in the "pocket." As the lesser fringed gentians are not shade tolerant, this arrangement is convenient.

Particular attention was paid to changes in the water table in the "pocket." This factor, too, may influence the success of the gentian population at various stages of its life cycle. In October, at a time of gentian blooming and seed dispersal, the water table rose to a point very close to the surface. At this particular time, especially, the rise of the water table may be significant for seed dispersal and germination. The seeds may need to be hydrated for germination, and although fringed gentian seeds are primarily wind dispersed, they do float. Water may be another mechanism of dispersal. Calvin DeWitt of the Institute for Environmental Studies attributes the October rise in the water table to the shutting off of plant "pumps" in the sedge meadow. As the plants die back, they are no longer pumping otherwise rising groundwater from the soil and through their roots.

Interestingly, the almost unique hydrological features of the mound may create the conditions to support the thriving lesser fringed gentian population. Rarely has such information been taken into account in the examination of particular habitats of species. Botanical approaches have been based largely on an examination of plant communities. Usually habitat types are classified in a general way, often without in-depth surveys of soil and water conditions. When considering the microhabitats which foster rare or threatened species, a "systems" approach to their study may pinpoint conditions vital to survival.

A postscript should be added to the report of this investigation. Fringed gentians are not listed as threatened or endangered species in Wisconsin. However, they are dependent on relatively special habitat types. Only the trespass laws protect them. So handle with care!

Trout the hard way



The Peshtigo River.

Photo by Dean Tvedt.

Painting by Bert A. Krawczyk

Wisconsin trout anglers looking for challenge, mystique and big fish are lured to special stretches of stream where the rules say only a fly can be cast. Fish managers and fishermen learn a lot in these places.

GREG KORNELY, Natural Resources Technician, Marinette
DAVE CREHORE, Public Information Officer, Green Bay

Cold, rushing water against your waders, the aroma of cedar and pine, the hiss of the line as you cast, the delicate presentation of a lure that is weighed in hundredths of an ounce, the cautious strike and powerful fight of a trout — factors that add up to the appeal of fly fishing. Spin fishermen or baitcasters use live bait or relatively large plastic or metal lures tied to wispy monofilament line. But fly fishermen cast only tiny feather imitations of insects or minnows, using a heavy line tipped with a fragile leader.

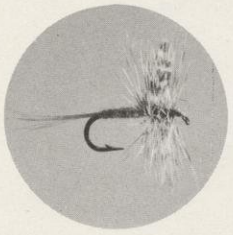
Fly fishing is hard to learn and probably impossible to master. But it is the classic way to take trout in a stream, and in Wisconsin, two stretches of good trout water have been set aside strictly for fly anglers. The quantity of water designated for fly fishing only is small — about nine miles of river in all, a 10th of a per cent of the state's 9,000 miles of streams. But the quality of fishing in these stretches, which are located on the Peshtigo and Wolf Rivers, can be high.

The quality is there for two reasons, one of which is esthetic. The waters are wild — near-wilderness for the most part — and while popular, are rarely crowded with fishermen. Quality is also improved by the special kind of management for these stretches, which can result in more and bigger trout during more of the season.

First of all, the bag limit on fly-only stretches is half that of most other inland trout streams — five per day rather than 10. The minimum size is higher: to be legal trout taken on the fly fishing stretches must be at least 10 inches long, compared to a six-inch minimum on other inland streams. These regulations emphasize fishing for sport rather than meat, require the release of small trout and tend to build up the supply of larger ones.

The fly tackle itself also makes a difference. Studies conducted by DNR show that only about 5% of the trout hooked and released by fly fishermen die later as a result of the experience. Fish taken on flies are almost always hooked in the "lip," and by a very small hook at that, so that a considerable majority of them survive to be caught again. Trout caught on live bait, however, are frequently hooked in the gullet or gills and are more likely to be injured during the fight or when the angler attempts to unhook them. Studies show that 40% or more of the trout taken on live bait will die after release.

The collective effect on fly-only management also increases the probability that the stream will hold somewhat more trout, of a larger average size, later in the season. Even if the opening-week crush of fishermen makes big inroads on stocked trout, most of those returned to the stream "to get bigger" survive.



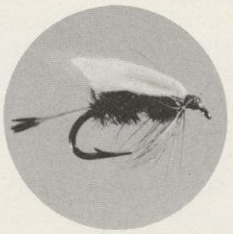
Fly-fishing-only trout stream management in Wisconsin began in 1956, when 5½ miles of the Peshtigo River northwest of Crivitz were set aside for the purpose. Later, a stretch of the Wolf River near Hollister in Langlade County was added. Both areas have proven popular.

In recent years, trout streams in two other counties have been experimentally managed with tackle limited to fly or other artificial lures only, to see if spinning lures, for instance, would have the same advantages as fly lures. These streams are stretches of Doc Smith and Castle Rock Creeks in Grant County, and part of the Willow River in St. Croix County. Exact boundaries of the fly-only and experimental streams are listed in the Wisconsin fishing regulation pamphlet.

Bob Hunt, a DNR fisheries research biologist stationed in Waupaca, says the fly-only and experimental management approaches have two purposes; to yield knowledge that will help preserve the quality of trout fishing in the state, and to provide diversity in the kind of trout fishing the state offers.

While many trout fishermen are content to do most of their fishing early in the season with live bait, others prefer to work the season through with artificial lures, valuing the experience and the complex fishing technique as much as the catch itself. The fly-only areas give these fishermen a limited opportunity to do their thing.

Flies courtesy of The Orvis Company, Inc., Manchester, Vermont



The readers write

Years ago my father, my brother and I used to fish the Buckhorn area described in your May-June issue. It was an area where we all saw many bald eagles. They were easy to recognize, even for kids of 10 or 11. We first noticed the nest on top of the power poles in 1967 and often, for years after, would see young eaglets peeking over the top. I remember my dad saying how eagles mate for life and often use the same nest year after year. I've heard too, that they add on to them year after year and that nests have reached diameters of 30 feet. This particular nest was about 12 to 15 feet when it disappeared around 1973-74.

Afterwards there was no nest for a couple of years but then we again spotted adult eagles carrying large sticks and branches to the pole. There is little question in my mind that these were the same birds, and there is no mystery as to why they disappeared a second time—too many people, and idiots with shotguns. Just last year, for crying out loud, two mature eagles were shot in Adams County. So the ones that tried to reestablish the nest abandoned it again and it sat vacant for another year until the ospreys in your picture finally took over. The two bald eagles were never seen there again.

RICHARD A. BRANDT, Kenosha

Thanks for the nice job on the reprint of the Leopold chapter from my book *Pioneer Conservationists.*

I am really taken by the variety of articles in that issue, ranging from puddles to Indian ruins. Best wishes for continued success.

PETER WILD, Tucson, Arizona

The article on the loon in May-June was fascinating. We have a cottage on a small 50 acre lake near Land O' Lakes and have been visited by loons. They can take off from the lake, but must make two circles before they are high enough to get above the trees. Needless to say we enjoy them and hope they continue to visit us.

Thank you for a great magazine.

MRS. SUE SAZAMA, Shawano

Though I seldom have time to read each issue cover to cover I always look forward to it. The format is attractive and the articles great. It is reassuring to know there are departments like yours that care as much as you do. It's also reassuring and encouraging that your message is getting across.

When you first changed format to the high-gloss full color style I was a bit disturbed but the photos and stories are so good who really wants to do anything but pass them on (or keep them).

Thanks for being there!

ELSE ANN KURTH, Madison

I thought that you might like to know that the article and picture on swampflowers, by Frank J. Vanacek, prompted this amateur painter to use some of those flowers in one of his first forest scenes.

I enjoy your magazine—keep up the good work.

HANK SENFLEBEN, Oconomowoc

My heartiest congratulations and admiration for the completely super job you did on the latest magazine—absolutely superb.

You've sure come a long way, baby, since a few years ago when the magazine was almost extinct.

CLIFF MESSINGER, DNR BOARD MEMBER, New Berlin

I'm sorry, I can no longer support and read your magazine. I refuse to be brainwashed by your claims of the deer population up north—where I lived for some time!!!

I don't know if it's the paper companies' desire to get rid of the deer or your department's desire to make so much money on licenses. The deer population is only 25% of what you claim. If you don't believe me, just go up there and ask around at the resorts.

In a way, it looks as though deer license permits are tied in with the DNR retirement fund!!!

MERLE G. WENDT, Appleton

I have read Aldo Leopold's book "Sand County Almanac" and am grateful that DNR has the broadness of mind to include some of this enlightened philosophy in its management scheme.

MICHAEL D. HAMUSHI, Maplewood, Minnesota

What was that article "Don't kill a camper" all about? Please spare us the satire.

WILLIAM CURRAN, Milwaukee

Your article on the nursery program makes it appear that practically all trees offered for forest plantations are conifers, with only shrubs for wildlife.

Conifers offer no food and little if anything else to wildlife except shelter. Of course, they do make good paper mill fodder.

DNR should immediately begin to consider hardwood plantations especially on state and county lands. This would provide a more natural forest for wildlife, with food from oaks, birch, maple, etc., as well as for normal recreational use. Also, this would aid in getting around the energy shortage by providing fuel for wood burning stoves. And paper mills use hardwoods too.

Conifer plantations are practically a biological desert, not even grass grows in them.

ELTON FAVELL, Wausau

DNR nurseries currently sell one-million hardwoods a year including black walnut, white ash, sugar maple and red oak. Hardwood plantations don't grow in Wisconsin but this doesn't mean hardwoods are neglected. More than 11-million of the state's 14-million forested acres are hardwoods. They do best when allowed to reseed themselves in a forest environment. Conifers, on the other hand, easily adapt to plantations.

A balanced forest provides timber for wildlife, recreation, firewood and fibre for Wisconsin's paper industry. Wisconsin's conifer plantations play an important role in meeting an increasing demand for forest products and yet they account for less than one-fourth of the state's total forest.

The March-April cover with the fern crosiers of *Osmunda claytoniana* is stunning.

On the mast head you indicated Wisconsin has 118 different ferns and fern allies. But according to my last count (for a list of references) we can claim only 105. The other 13 ferns no longer warrant recognition because they are trivial forms without genetic meaning or biological relevance. This shuffling around of scientific names may seem unscientific, but it reflects an attempt by botanists to weed out unuseful names and better describe the relationships between "good" species.

Keep up the superior job on the magazine.

JAMES H. PECK, UW-La Crosse Biology Dept.

I read your article, "Coming Through the Mountain" and would like to try the Elroy Sparta bike trail.

You mention that information can be obtained from the National Elroy-Sparta State Trail Association but didn't say where to write. The address please?

CAROL TOMAN, Oconomowoc

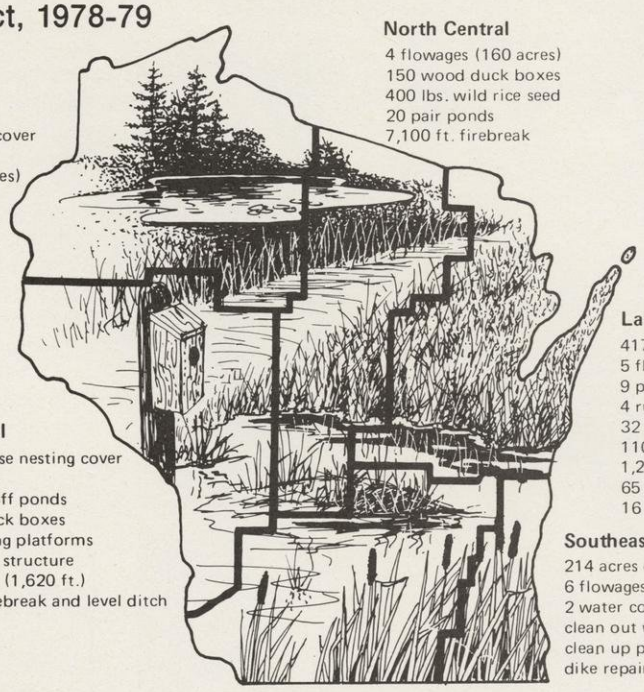
That address is: ELROY-SPARTA STATE TRAIL
KENDALL DEPOT
KENDALL, WI 54638
Phone (608) 463-7109

I see lots of stuff in the press about arguments over steel shot, Horicon geese and the point system, but no one ever mentions the Wisconsin duck stamp money. What is it used for?

PAUL SISULAK, Wauwatosa

Wisconsin duck stamp:
Where the money goes

The projects by district, 1978-79



Northwest
30 acres dense nesting cover
1 12-acre flowage
6 run-off ponds (42 acres)
21 pair ponds
30 mallard nest baskets

North Central
4 flowages (160 acres)
150 wood duck boxes
400 lbs. wild rice seed
20 pair ponds
7,100 ft. firebreak

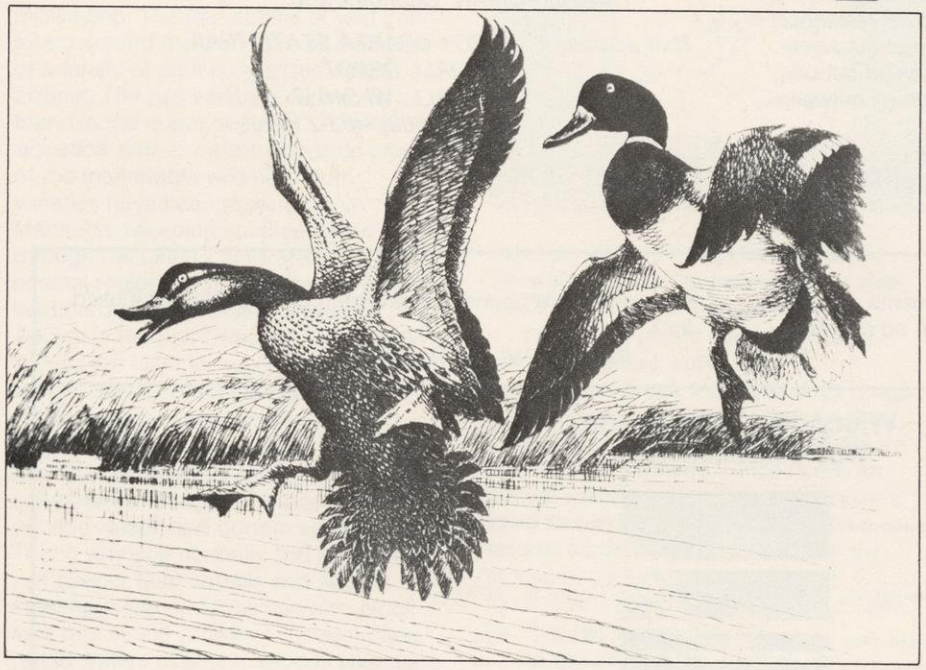
Lake Michigan
417 acres dense nesting cover
5 flowages (613 acres)
9 pair ponds
4 run-off ponds (15 acres)
32 nesting islands
110 wood duck boxes
1,250 ft. of dike repair
65 mallard nest baskets
16 acres cattail control

West Central
904 acres dense nesting cover
49 pair ponds
2 1-acre run-off ponds
180 wood duck boxes
6 goose nesting platforms
water control structure
2 dike repairs (1,620 ft.)
10,760 ft. firebreak and level ditch

Southeast
214 acres dense nesting cover
6 flowages (65 acres)
2 water control structures
clean out water supply ditch
clean up predator denning area
dike repair (1,000 ft.)

Southern
1,429 acres dense nesting cover
10 acres experimental dense nesting cover
4 flowages (30 acres)
3 pair ponds
1.5 acre run-off pond
2 water control structures
5 dike repairs (7.9 miles)
5 mile dike region
2.25 mile firebreak

The first duck stamp



Pen and ink sketch drawn by Ding Darling on the back of a shirt cardboard.

Steel shot standoff

Ducks are poisoned if they swallow lead shot. Nationwide, at least two-million per year die from this cause. To prevent such losses the U.S. Fish and Wildlife Service (USFWS) has ordered that steel shot be used for nearly all waterfowl hunting in Wisconsin and elsewhere. And for all shotgun gauges.

The Wisconsin Natural Resources Board has concurred. It ordered steel shot everywhere the feds wanted it plus a few other places. But the state Legislature changed things. It attached a rider to the budget that requires steel only in the Horicon Goose Zone and makes lead legal everywhere else.

This overrode the Wisconsin Natural Resources Board, but not the federal rule. So the question arises: Will the Fish and Wildlife Service enforce its steel shot order in Wisconsin this fall?

There's been no official word, but one thing is certain: Last year the U.S. Congress wouldn't have allowed it. Congress attached a rider to the USFWS budget forbidding enforcement of steel shot rules in any state that didn't want them. Action on the USFWS budget has not yet been taken and the rider may be in there again. So the enforcement question for Wisconsin is on hold. Same for Missouri, Maryland, Louisiana, Arkansas and other states with reservations about steel.

As of now, these are the rules for Wisconsin waterfowl hunters: Steel shot will be required in all gages in the Horicon Goose Zone within 150 yards of water. It may be required on the federal refuge on the Mississippi River and on federal waterfowl production areas in East Central Wisconsin. But maybe not.

Things may change so watch the papers.

*JOHN MADSON**

"The creation of the first duck stamp is quite a story. 'Ding' Darling was the political cartoonist for the Des Moines Register and as a dyed-in-the-wool Republican, he did some devastating cartoons about Franklin D. Roosevelt who was also an ardent conservationist. Ding told me this story long after he had retired as a cartoonist. He came back to Des Moines frequently and I was with the Iowa Conservation Commission at the time.

"Anyway, on the basis of 'Ding's' reputation in conservation, Roosevelt appointed him chief of the Bureau of Biological Survey. 'Ding' said it was so they could shut him up.

"The bill which created the duck stamp was introduced by a senior senator who had a thick foreign accent and was also suffering from cancer of the palate. His colleagues could hardly understand him, but he was an ardent conservationist and they liked him. It was a rider on an appropriations bill of some kind.

"At any rate, it whipped through the Senate and the House at the end of a session and went to Roosevelt's desk for signature. Roosevelt was in a hurry to go off fishing somewhere and literally signed the bill without reading it.

"When he came back it was law, and the government thus had a program which would provide funds to buy wetlands to help waterfowl. We had had severe droughts in areas frequented by the migrating birds and something needed to be done. Now that the Duck Stamp Act was law, a stamp was needed.

"'Ding's' chief of information, Hal Sheldon, came into his office one day, worried. 'Well, we've got to have a duck stamp for the hunters.'

"And 'Ding' said, 'Okay. What should it look like? Should it be vertical or horizontal? Who are we going to get to do it?' And Sheldon said 'Well, I think it ought to show some ducks in action. The main thing is we've got to get cooking on it. We've got to get the art and it has to be approved by the Bureau of Engraving, and it's got to be printed and then it has to be distributed to all the post offices. And it has to be publicized. Time is fleeting. We've got to find an artist somewhere.'

"'Ding' worked crazy hours, and he kept a supply of clean shirts in a desk drawer in case he needed to change before going to some function. So he took a couple of the cardboard stiffeners launderers used to put in to keep shirts looking neat, and he did a couple of quick sketches on them. Then he called

*Reprinted from "Prints," Spring, 1980. John Madson is a well known writer and former game manager for the Iowa Conservation Department.

This pair of widgeon by Artist Martin R. Murk, Greendale, is the 1980 Wisconsin duck stamp. It will be purchased by about 120,000 state waterfowl hunters this fall with proceeds to go for projects similar to those in the chart on page 27. A talented wildlife artist, Murk won the 1977 federal competition with a pair of Ross' geese and his painting of a rainbow trout was the 1979 Wisconsin trout stamp.

Sheldon in and said he thought it ought to look something like that.

"He forgot about it for awhile and then when time was really getting short, he went to Sheldon and said something to the effect they were going to have to move very fast if they were going to get the job done.

"And Hal told him they had a stamp — that everything had been taken care of. It was one of the little sketches 'Ding' had done on the back of one of the shirt cardboards! A simple little, quick pen-and-ink sketch 'Ding' had done as a working model, so to speak, of what he thought some artist should come up with.

"And that was the first Federal Duck Stamp!"

This acrylic of a pair of mallards won first place in the 1980-81 Federal "Duck Stamp" competition for Minnesota artist Richard W. Plasschaert. Plasschaert's painting won out over a record 1,362 other entries. Since 1934 when Federal duck stamps first went on sale, nearly 2.4 million acres of prime waterfowl habitat have been acquired with over $315 million in revenue (includes $117 million from loans guaranteed by duck stamp income). The stamps are bought by 2.2 million conservationists each year and bring in close to $16.5 million.

The finest feathers

▲ "Sand Bank Flyers, Cliff Swallows" by Artist J. F. Landenberger.

▼"Killdeer" by Artist David Plank.

▼ In "Finale" by Artist Richard Sloan a peregrine falcon attacks a bufflehead.

DAVID J. WAGNER, Director,
Leigh, Yawkey, Woodson Art Museum,
Wausau

The best bird art in the world is brought to Wisconsin every year in late summer by the Leigh Yawkey Woodson Art Museum in Wausau.

Reproduced here are just a few of the show's nearly 100 original paintings and carvings. Of the 83 artists represented, 13 are from Wisconsin including eight wood carvers and five painters.

Dates for this season's free exhibit are September 6th through October 19th.

In addition to contemporary art, the show will feature an "Old Master's Corner" with seven original pieces by early American ornithologist and artist, Alexander Wilson. His books on "American Ornithology: or the Natural History of the Birds of America" were published starting in 1808. In all, Wilson's work included nearly eight volumes with 76 plates showing all the birds known to exist at that time in the U.S.

This year's Master Wildlife Artist's Medal goes to Sir Peter Scott of Gloucester, England, reknowned painter, naturalist, author and ornithologist who is also Chairman of the World Wildlife fund. Five of his works will be on display. Earlier recipients included Owen J. Gromme and Roger Tory Peterson.

On permanent display is the collection of 100 Dorothy Doughty American and English birds from the Royal Worcester Porcelain Company of England. This highly-prized collection is one of only eight known complete sets of Dorothy Doughty birds in the world.

The museum is open Tuesday through Friday from nine to four and Saturday and Sunday from one to five. Free tour guides are available to groups if reservations are made two weeks in advance. Phone 715-845-7010.

This "Snowy Egret" by Artist Wayne Anderson was one of last year's entries.

Department of Natural Resources
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