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# Wisconsin
## NATURAL RESOURCES

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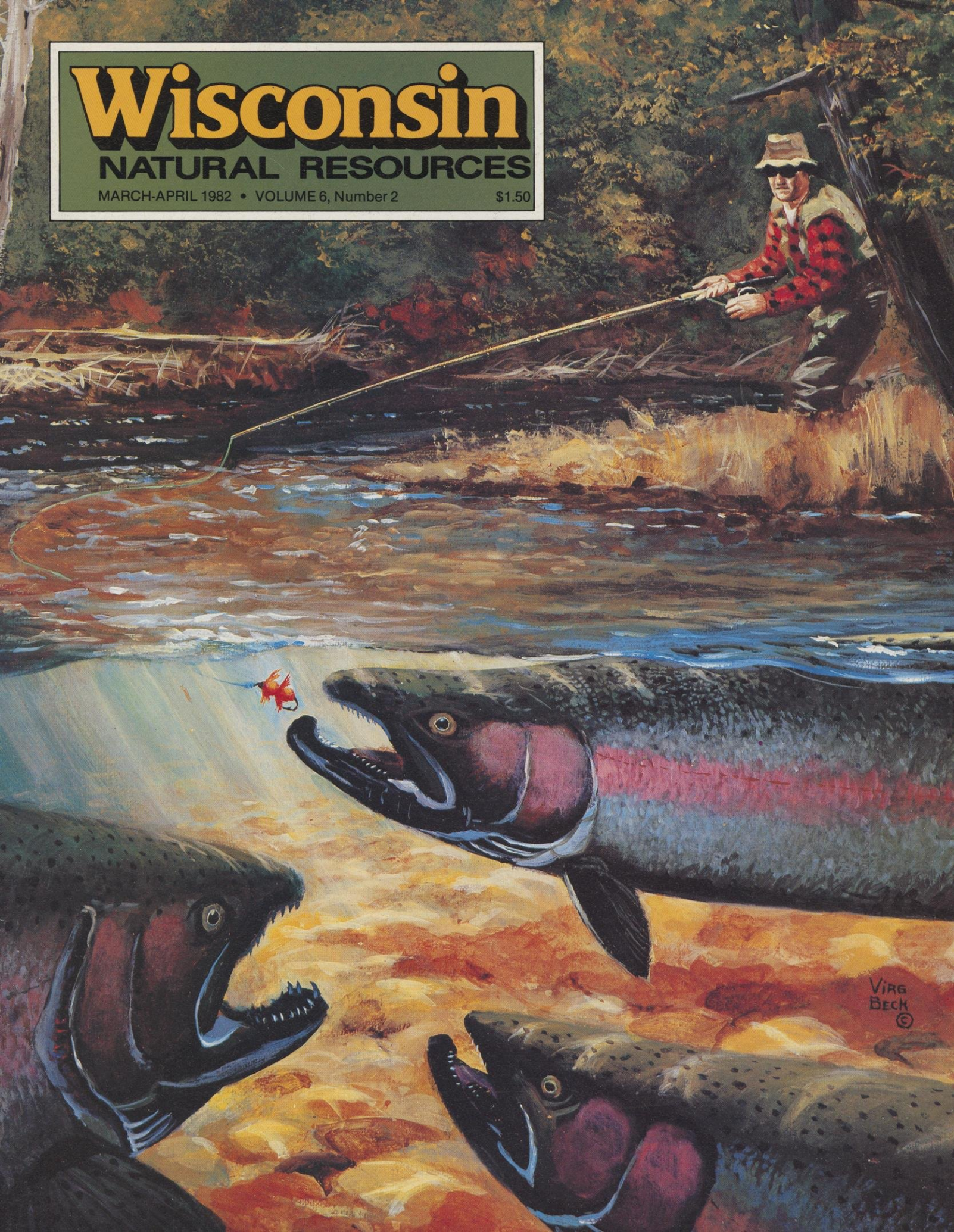

# Chinook

*CHARLES KRUEGER, Great Lakes Sports Staff Specialist*

Far from their ancestral waters in the Pacific Ocean, the mighty chinook salmon now thrive in the Great Lakes. An estimated 160,000 are caught annually in the Wisconsin waters of Lake Michigan. This giant fish that weighs in at 30 pounds at spawning time starts life in October as a fertilized egg at DNR's Wild Rose Fish Hatchery. The golden eggs soon become tiny salmon. They grow through winter and spring as silvery fry, two inches long (12 weigh an ounce). They are then released into tributary streams of Lakes Michigan and Superior. Smaller than any other trout or salmon at stocking time, in only four summers they develop into the legendary silver-green tacklebusters that thrill anglers all along Wisconsin's Great Lakes coast.

First stocked in 1969, currently DNR puts around 2-million fry into Lake Michigan plus an experimental 60,000 in Lake Superior. All eggs are collected from adult fish that return to Strawberry Creek at Sturgeon Bay. Stocking is necessary because there is little natural reproduction.

Recently, federal budget cutbacks threatened the stocking program. To offset the loss of these dollars, a $3.25 Great Lakes Salmon and Trout Stamp was authorized last fall by the state Legislature and governor. The chinook salmon in this painting by artist Martin Murk is featured in the first stamp. As of January first, the stamp was required for all Great Lakes licensed anglers. Revenues pay for continued hatchery operation and continued stocking of brook trout and splake in Lake Superior and salmon and trout in Lake Michigan.

For a story on a different technique for catching these fish, see page 24.

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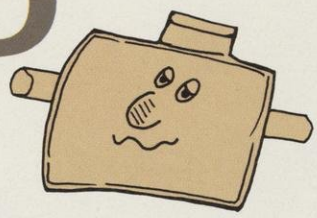
## Features



*Wisconsin Natural Resources* Magazine (USPS 346-250) is published bi-monthly by the Wisconsin Department of Natural Resources, 101 S. Webster St., Madison, WI 53702. Subscription rates are: $6.97 for one year, $11.97 for two years, $15.97 for three years. Second class postage paid at Madison, WI. POSTMASTER: Send address changes to: *Wisconsin Natural Resources*, P.O. Box 7191 Madison, WI 53707.

# All tanked up



**For a happy septic system that's out of sight and out of mind, regular maintenance is a must. If it's all tanked up with sludge and scum, look out!**

*GREG MATTHEWS, DNR, Public Information, Madison*

Americans take many things for granted — sometimes to the point of naivete. Misconceptions abound, such as believing water comes solely from the tap, electricity from the light switch and meat from the supermarket.

It's similar for sewage systems, especially in rural subdivisions. There the septic tank we rarely see somehow makes our human wastes disappear.

Unfortunately, thousands of these systems are not only out of sight, they're also out of kilter. A recent state survey indicates more than 450,000 Wisconsin homes use private septic systems and 100,000 of them don't work.

The reasons for failure are many. One is that 50% of the state's soils are unsuitable for septic systems, but many were installed in those soils anyway. People got away with it because, although there have been official specifications since 1913, it wasn't until 1936 that statewide licensing of plumbers started. Plumbing codes weren't uniformly enforced until 1971 and there was no statewide soil test program until 1974. County enforcement of sanitary ordinances for floodplain and shoreland regulations didn't begin until 1965.

A mound system under construction. Photo by Jerry Tyler

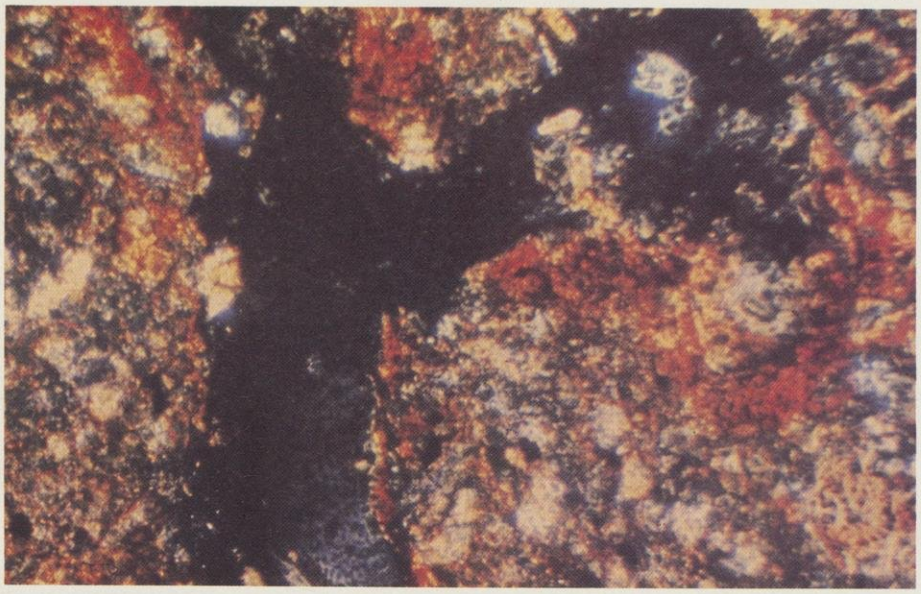
In modern installations where the law hasn't been ignored, systems fail because they aren't properly maintained or they aren't large enough to handle the extra burden of new appliances — washing machines, garbage disposals, dishwashers and the like. In many cases failure happened when a cottage changed from seasonal to year-round use.

Many septic system owners are unaware that their systems need periodic servicing (another manifestation of the "out-of-sight, out-of-mind" syndrome). Each one to three years sludge stored in the tank under your backyard needs to be pumped out or else the drainfield will clog and not absorb liquid wastes.

Don't wait for the sewage to back up into your basement some holiday weekend while relatives are visiting. Take good care of your system on a regular basis. If installed properly on suitable soils, all it needs is a little help.

A septic system does two things. First, most solids and scums — the sinkers and floaters, respectively—are separated from water in the septic tank. Next, water is absorbed into the soil through a disposal field or seepage pit.

The separation and absorption process takes time, so homeowners should be conservative with water use.



Under a microscope, soil pores show up as a dark area. Sand grains are dusky gold.
Photo by Francis Hole

This reduces the volume of liquid to be absorbed and gives more time for solids to settle out of the tank.

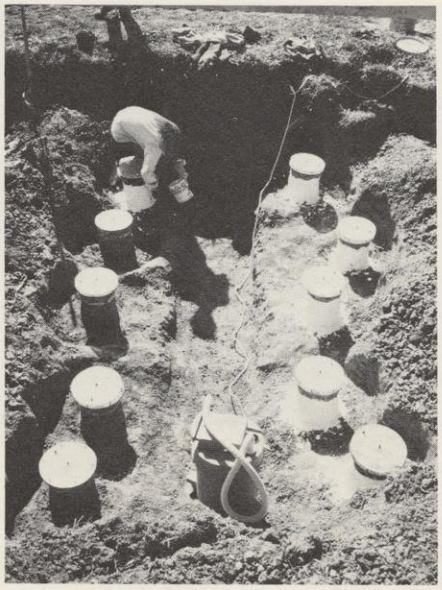
There is danger of clogging or saturation if excessive kitchen waste, such as grease, fat and ground-up food are fed into the system. The solids and fats accumulate and must be pumped out of the tank to avoid being carried into the absorption field and blocking it. With a garbage grinder or disposal, there's extra waste and the tank needs more frequent pumping. When the tank is pumped, make sure the internal baffles are inspected. They keep the solids out of the drainfield. Paint thinners, gasoline and other solvents can explode, so use care with anything flammable or poisonous.

When a tank is one-third full of scum and sludge, it needs pumping. One way to estimate the level is to fasten a strip of white cloth onto a length of stick and poke it to the bottom of the tank. Sludge will stain the cloth and give you a pretty accurate idea of how much there is.

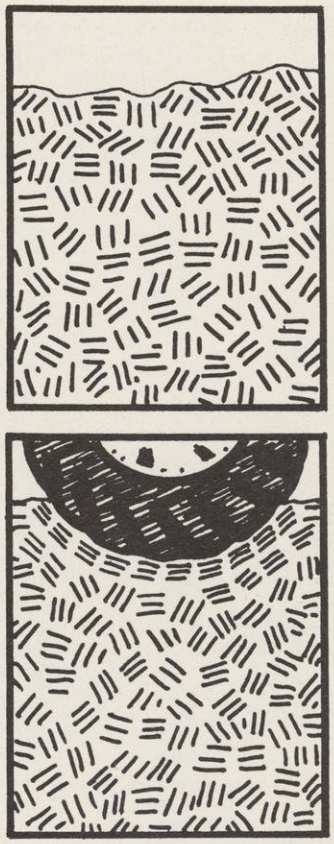
If your tank needs pumping and you plan on being away awhile, have it pumped before you leave and give the absorption area a rest. A slow drying out helps rejuvenate the soil. Some year-round homes use a holding tank while the field dries.

Never let anyone go into a septic tank without an air supply, a lifeline and a partner strong enough to pull a person back out. Lack of oxygen and toxic gases in the tank can be deadly. Skilled licensed operators can be hired to clean your tank and sometimes can even unclog a sluggish or saturated drainfield. One method is to apply a hydrogen peroxide solution.

The disposal bed area also needs preventive maintenance. Don't let rain and snow accumulate above the bed.



The "crust test" measures reduced water absorption in soil. Each pedestal marked a place on the ground surface run over by a back hoe. The spot was then excavated and a record made of the time it took for water to seep through the pedestal. The more passes by the backhoe, the lower the rate of infiltration. Photo by Jerry Tyler



Don't run over your septic system drainfield during construction. The weight of heavy machinery changes soil alignment and restricts water flow.

**Continued...**

# Soils and septic systems

*Teo Simarski, Jerry Tyler,*
*Dave Hargett, UW-Madison,*
*Dept. of Soil Science*

Soils in some parts of Wisconsin cannot purify wastewater. Others can. The personality of the soil shows why. Although it may support skyscrapers and expressways, soil is not really solid at all, but riddled with pores of various sizes. When all these voids are filled with water, or saturated, the wastewater courses through the large pores too quickly to be purified. Sometimes it even "short-circuits" through worm channels. In an unsaturated soil, effluent wends more slowly through a tortuous maze of tiny pores and more effluent is in close contact with the soil.

Soil filters wastewater by first physically trapping solids from the effluent. The solids' subsequent breakdown into chemicals harmless to the environment is like the decomposition of litter on a forest floor. Tiny soil organisms consume them. Soil bacteria produce a slime that coats soil particles and traps viruses. Then bacteria can attack and destroy the virus. If it isn't destroyed, a virus may stick to a soil particle long enough to age and lose its ability to infect. Research shows that if effluent overloads a sand's natural cleansing capacity, the viruses can escape into groundwater unscathed.

Soil also transforms phosphorus and nitrogen. Untreated, phosphorus-rich effluent runs into lakes and can speed plant growth and lake aging. But as it passes through soil, phosphorus may precipitate out or adhere to soil particles. In fact, it takes years for phosphorus to descend only a few feet through most soils.

While nitrogen can sometimes speed a lake to premature death, septic system soil must remove this nutrient for another reason: if nitrogen reaches a drinking well, it can cause human disease. Sometimes nitrogen adheres to soil. More often, it keeps traveling away from the septic system until transformed or dispersed. This is why a well should never be located a short distance downhill from a soil absorption field.

Some Wisconsin soils are better sponges than others. A soil's texture—the size of its particles—helps determine how large and well-connected its pores are. Effluent trickles quickly through some sand and gravel soils in Wisconsin's glacial outwash. These have lots of passageways and a quick percolation rate—sometimes too quick to purify the effluent.

But a soil with lots of clay—with particles much tinier than sand—can have opposite problems. Clay soils blanket some of northern and eastern

## PRIVATE SEWAGE SYSTEM GRANTS BY COUNTY AS OF DECEMBER 1, 1981

| | SYSTEMS | AMOUNT AWARDED |
|---|---|---|
| Barron | 75 | 69,641 |
| Calumet | 36 | 61,140 |
| Clark | 18 | 22,010 |
| Columbia | 165 | 266,278 |
| Crawford | 80 | 106,542 |
| Dane | 307 | 463,195 |
| Dodge | 58 | 109,617 |
| Door | 5 | 13,417 |
| Fond du Lac | 62 | 137,174 |
| Grant | 25 | 28,291 |
| Iowa | 41 | 83,836 |
| Iron | 11 | 19,401 |
| Jackson | 55 | 66,419 |
| Juneau | 17 | 28,540 |
| Kenosha | 22 | 50,736 |
| Langlade | 26 | 25,169 |
| Marathon | 118 | 182,943 |
| Monroe | 132 | 215,062 |
| Oneida | 296 | 447,001 |
| Pepin | 60 | 77,626 |
| Pierce | 169 | 312,110 |
| Portage | 52 | 128,003 |
| Richland | 67 | 114,123 |
| St. Croix | 104 | 185,418 |
| Sauk | 298 | 598,181 |
| Sawyer | 59 | 67,180 |
| Vernon | 46 | 87,904 |
| Vilas | 66 | 87,095 |
| Washington | 138 | 330,550 |
| Waukesha | 392 | 795,902 |
| Winnebago | 11 | 27,310 |
| Total | 3,011 | $5,207,814 |

## POPULAR PROGRAM

By the end of 1981, the Wisconsin Fund had helped so many homeowners replace ailing septic tanks it ran out of money for this purpose. As of now, the program has more than $500,000 in applications above and beyond available funds.

However, Wisconsin residents faced with failed systems should apply to their county, anyway. On July 1, an additional $2.5-million will become available under the new 1982-83 state budget.

Don't use it as a parking lot or driveway and, above all, don't build on it. Keep the system accessible, use and care for it properly, and watch for any signs of failure so you can correct problems before they get too serious. It will save time and money.

When a septic system fails, it pollutes the surface or groundwater and endangers human health. The contaminated effluent is hazardous. Mosquitoes breed in it, pets romp in it and kids play in it. The diseases caused by a failing system may range from cholera, typhoid and hepatitis to stomach disorders and infections from scratches. Kids are most susceptible because they most often come into contact with contaminated areas.

Regular maintenance reduces the likelihood of problems and expense. Repair or replacement isn't cheap. Such work can run around $2,500 to $3,000. Money to help owners put tanks and drainfields in shape is available through the Wisconsin Fund Septic System Grant Program. Administered by DNR, the fund pays residents of participating counties as much as 60% of qualifying costs up to a maximum of $3,000. Any property owner with a faulty system can receive aid no matter whether his or her income is high or low.

To qualify:

- Your county board must pass a special resolution making county residents eligible.
- The failing system must serve one or more homes, apartments or small businesses occupied at least six months of the year.
- Construction and use of the faulty system must have occurred before July 1, 1978.
- The county must issue a repair or replacement order for the faulty system.
- And small businesses must generate a daily average of less than 2,100 gallons of sewage.

Sometimes, even if a faulty system had been built on bad soil, there's a possible solution. It's the "mound" system. Basically, this method makes do by mounding soil above the ground for the wastewater to percolate through. Liquid is pumped from a storage tank to a perforated plastic pipe in the mound, then filtered by flowing through rocks or gravel, sand and natural soil. Mound systems require special materials and are more costly than conventional septic systems — up to $4,500, depending on such factors as the particular site, system size and location in the state. There are three separate mound system packages; one for slowly permeable soils; a second for permeable soils with shallow crevices or porous bedrock and a third for permeable soils with a high groundwater table.

Basically, individual counties are pretty much in control of the state's rural sewage waste programs. Not only is the Wisconsin Fund aid program decentralized, the trend has been to turn even more septic system control over to local authorities. As things stand now, every county must have an ordinance governing private sewage systems which conforms to the state plumbing code.

continued

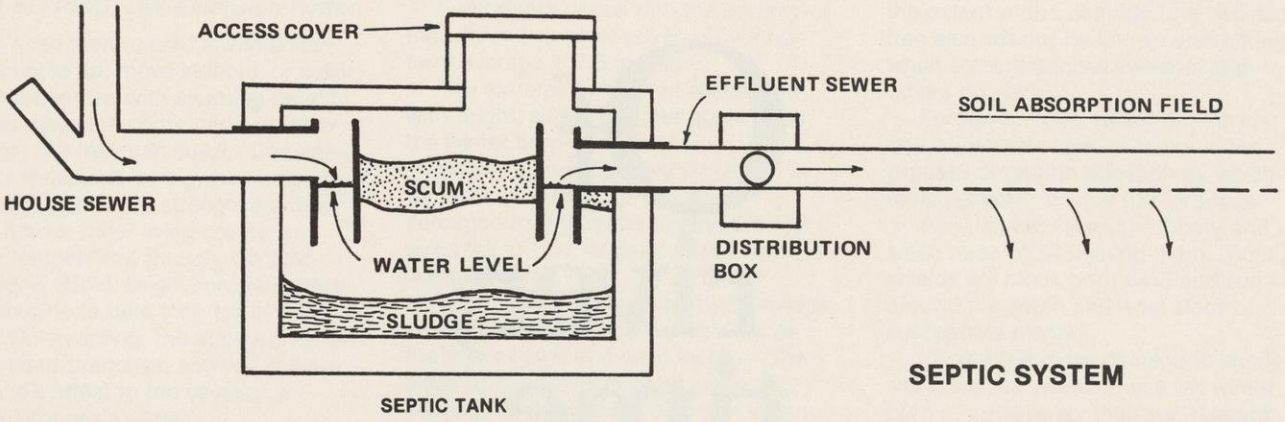
Wisconsin as remnants of lake beds from glacial times when the Great Lakes were much larger. Some of these clays swell when wet and stop liquid from penetrating. When these clays dry, they shrink and large cracks form. Effluent can run through the cracks, bypass the tiny pores, and not be purified.

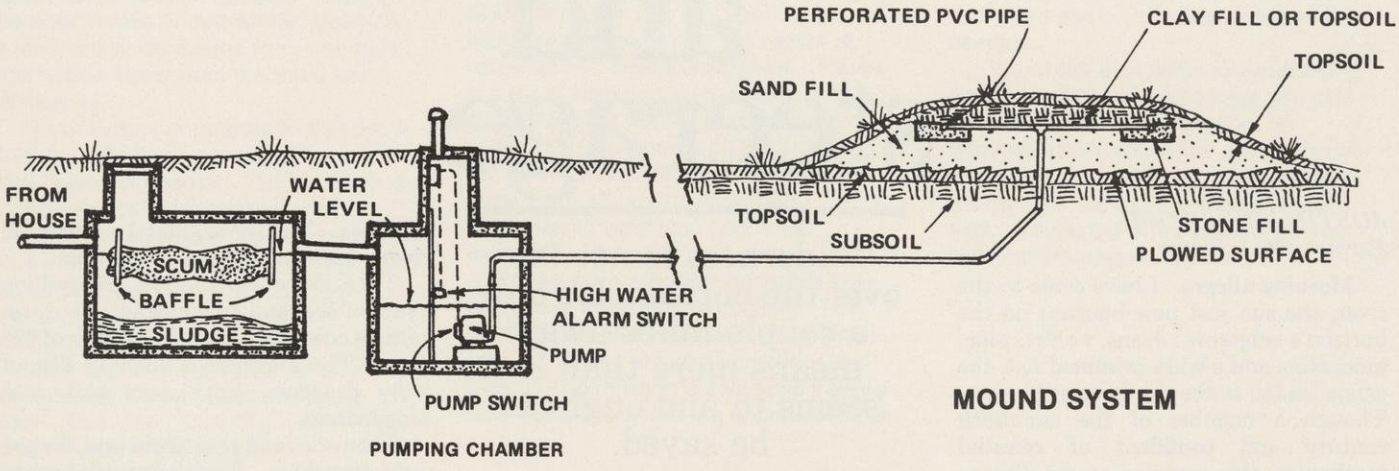
Clay particles tend to be linear and flat. In a natural soil, the particles align in various directions, so water may still drain through. But if heavy construction machinery runs over a septic field that contains clay, the compaction and smearing can realign the particles in one direction. Heavy machinery can also compact other types of soils besides clay. The result: old pores are closed off, and effluent can't flow through the compacted soil. This is one reason a septic system might fail soon after construction.

To do its share in wastewater disposal, even a properly-textured soil must be at least three feet deep. Soils too thin over bedrock in some areas of the state, like Door County or the driftless area, can let unpurified effluent pour down between the cracks in the rock directly to the groundwater. Some sandy soils, in contrast—like those in Adams and Juneau Counties—may be 30 feet deep; these let the effluent filter through more than enough layers.

Just like a system constructed over shallow bedrock, one built above a high water table can send unpurified waste straight to the groundwater. A soil tester looks for evidence of a high water table before assuming that the soil will cooperate. The water table fluctuates seasonally, but often leaves evidence of its highest level behind as so-called "mottles." These bright yellow-to-red spots stand out in color against their grey-brown background, and usually testify that the soil which contains them has been repeatedly wetted and dried. Mottles form because iron and manganese, scattered throughout the soil when wet, migrate towards dry pores, then concentrate in colored mottles when they dry.

Wisconsin's soil, the legacy of thousands of years of development, is a marvelous sponge—when the dynamic processes that make it work are understood. The well-designed septic system allies with soil in a mutual partnership to return purified wastewater to Wisconsin's rivers and lakes—just as natural processes do.

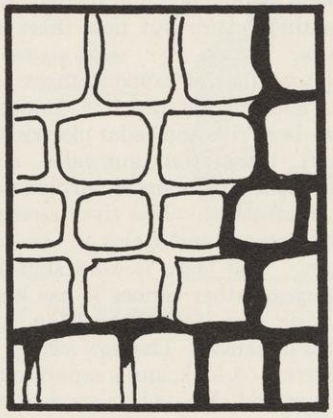



Counties are required to issue comprehensive sanitary permits for a fee of at least $35. These replace the old septic tank permits. Of this, $14 goes to the state and the remainder is kept by the county to administer its septic program. And the county must also employ a certified soil tester to review and verify soil reports submitted with applications for sanitary permits.

Today, anyone building a home in an unsewered area must first obtain this sanitary permit. To get one, the land must pass a soil test for percolation rate and depth to bedrock and groundwater.

These may seem like hard requirements and because of them a lot of land will remain undeveloped. But they are rules that protect health. They protect ground and surface water. They protect you! Although landowners and developers still exert pressure to build on unsuitable sites the questions of sickness or health, of pure drinking water or foul, perhaps of life or death have obvious answers. The program has to be uncompromising and because of sustained dedication at the local level, it is. We can all be thankful.



Water flows quickly through large soil pores.

# Of river, time and steerage

*JUSTIN ISHERWOOD,*
*Farmer, Rt. 1, Plover*

Wilderness is not far over the horizon. It's only a couple miles away, means more than it seems to and ought to be saved.

Morning allegro. I have come to the river, the sun just now buoyant on the horizon's ridgerow. Jeans, t-shirt, pipe, moccasins and a wide-brimmed hat, the canoe loaded to the car the night before. Though a member of the twentieth century and confident of celestial mechanics, this morning seems disconnected. I opt for an ancient view, that the center is here, this river and this morning.

On the map the river is labeled Wisconsin. I prefer the Ojibwa sound, the spelling from old maps sold in Paris flea markets: "Ouiscosee." A sound of vowels a breeze might gain among fern, bloodroot and silver birch.

Beyond the village the road prangs the town cemetery. My people are buried here, given to the brown, grim countenance of farmers, the grass over them slightly stove-in. Modern graves don't sag. Prairie smoke and violets prefer the bribe of old graves.

Across the road a hundred paces are yellow banks, where spring flooding eroded the river's groove. A father remembers Sunday mornings, finding femurs and copper points from the Bigelow mounds settling into the river curve. Mounds of a regular function, if an inexact communication; part cemetery, part temple. Fossil ear bones must vibrate less, now the river has gained a new channel west of Field's Island. The river is its own memory and needs neither label nor monument, unless it be the sun, beyond, yawning.

The canoe is unleashed, and shouldered to the river edge. Downstream from the village I am alone. By noon waterskiers and picnickers will stake their claim but now there is no dispute.

Sixteen foot of canoe prances in the water and tugs at the rein, impatient. Steam-bent ribs and cedar planking, ash inwales, brass-fitted gunwales, spruce thwarts, stitched canvas, airplane dope and green paint. The river recognizes the implement and seems to caress and beckon. The taste is only slightly at variance to other canoes it has known; jack pine root lashing, bark and pitch instead of canvas. The bow swings with the current. A kick, and a separate territory is gained. My paddle reaches in and levers the canoe forward, the fibers warm with the flex. A momentary dislocation at the river's dimension, then the canoe has me, and its river, and its time.

The river is old. Old as few things are old; old like orbits and dust and gravity. Here once were mountains, volcanic spires crowding a sky not yet blue. Mountains without wing or claw. Life, if there were such a thing, was a tentative bacillus huddled in the recesses of rural Australia. But it rained, sulfurous rains and caustic sleets; the river, girding and slashing, took the mountains down. Right down to the flat Precambrian shadows. This river, and I suspect all rivers, know mountains are delible.

Then there was the sea, 255 million years of sea, and beach sand of a warm saltless coast, and an odd calendar of 876 days. The sea knew a little of life, of belly draggers, egg layers and cold bloodedness.

Then the land rose again and the sea went elsewhere. What was it that could raise up mountains and empty out seas? Perhaps tides of a moon so close a cough could span the tolerance, or a meteorite the size of London landing in Hudson's Bay. The sea left behind its booty like vintage cellared wines: "Devonia, Siluria, Ordovicia, Cambria." In some places 15,000 feet of sandstone and silt, shale, dolomite and limestone.

The river was not impressed. A river, bank-rolled by clouds, knows neither economy nor impediment. Again it was the caustic rain having its way. Less a vengeance than a matter of chores. At first the river was little more than connected puddles. Puddles filling, interlacing, hesitant. Perhaps flowing south, perhaps not. But for a minor million years of ice and a hard west bow to four glaciations, the river was made. The task at hand was modest once the groove was worn, a matter of shoveling 345 million years, and still shoveling.

A great blue heron thinks it hears the polished leather of an officer and snaps to attention; instinct of the ensign. The canoe drifts, the bird goes back to feeding, tracking the shallows with the attitude of those who clear mine-fields by listening. Instead of Claymores it detects frogs and shiners and a snorkeling shrew. The head and neck are serpentine, a separate entity from the body,

"What part of soul belongs to the river?"

Photo by Charles Fonaas

coiling like secret weaponry from the narrow fuselage of a night fighter.

The paddle ticks against the gunwale and the bird, without consultation, rips from the shallows; the rent lingers long after. Big slow wings pry what appears to be an unequal weight, raising it intermittently like a car ascending a bumperjack. The long neck tucks, gangling legs streamline without the hiss of hydraulics or gear, snug to the stops.

I feel dismissed and apologetic. Historically, my kind has blasphemed the morning with buckshot and decibels. Next time I'll camouflage with a net and impersonate a moss-humbled saw-log.

The canoe probes a cove. Lily pads, duck weed and sunning carp. Frightened by the canoe, one roils the water with the event of a depth charge. Seeking a game, I sneak up on others and lay the paddle on their backs. Dull creatures, it takes half a minute for them to assimilate the alien presence, then burst forth in comic frenzy. They do not perceive the game.

In other days I have sown wild rice to these backwaters. The carp made merry with my efforts. I would trade carp for wild rice and ducks, and the carp would swap me for a river-bottom succulent, so the contest is fair.

Once there was rice in the eddies and coves. And well-fed ducks. And others in canoes armed with elm branches gathered supper with a swat. Their dead are near the river, and my dead.

Field's Island. Surveyor Hathaway labeled it "Menome Sugar Camps" on his 1839 survey. Not then an island but a mainland bulb. In the way of rivers forever seeking shortcuts, it was inevitable the peninsula would become an island. I have looked for signs of the Indian sugarbush there and rusted residuals of the Warner sugar-camp, and have imagined myself tapping the red and black maple in season and keeping the old faith.

The river heard the sound of the surveyor's hammer driving home the iron rod, a sound carried in the acoustic Precambrian; the water jiggled. The river did not know of posters nailed to foreign trees: "Good mill sites, timber and game," "Cheap land in Wisconsin." Though it has known hunger and change, and mountains where now there are none.

The North American pinery was called the most valuable ready resource the planet ever experienced. Wisconsin alone countenanced 200-billion board feet of softwood lumber. Lumber for Chicago, boardwalk for Dodge City, gingerbread for Wichita, lath and porch swing for New Orleans. Prime pine consumed at the rate of 400 acres a day; frame saws and whirring terrors wasted half the wood for every inch board cut. A resource which might have lasted a thousand years, barely lasted fifty. The decree was cut and burn, cut and burn, make way for the farmers, cut and burn. In 1840 the price was $50 a thousand board feet; by 1857 it was $12, and still the lumber fleets snaked downstream. A pilot could holler up a dollar apiece for chuting rafts through the 18-foot drop at Wausau's Big Bull Falls and the whirlpool of Mosinee's Little Bull. Sometimes the rafts flipped over or were pinned to the bottom of "suck holes." In 1872, 40 pilots drowned, buried when their bodies floated up. Somewhere in the river shallows are the nails of a pilot's caulked boots, a cast-iron pike and suspender buttons.

In the wake of the pinery ambled the farmers with wheat and hops and milch cows; aspen and paper mills established themselves on the previous authority of Precambrian granite. Paper for evening news, mail order catalogue, Bible, dime novel and *McGuffy's Reader*. A river's gift, paper in the mood for words and a common infection. The catalyst would produce, from various cuttings, a hybrid that dined on *Hoard's Dairyman*, *Popular Mechanics*, the *Wall Street Journal*. The contagion was literacy, inventiveness and an economic democracy the world had not witnessed before; the power of paper and the legacy of a river.

I take the stern seat. The bow perks up and a part of steerage control belongs to the river. I am comfortable with the thought that I share some will with the canoe and for awhile heed its senses. The canoe has evolved as the heron; ribs, epidermis, vertebrae, a self-correcting keel for a backbone. They have an acquired sensibility and giggle. We will be surprised when one day one of our creations grins back at us.

The craft glides like a leaf. Paralleling the shore, it hovers over a clam bed where, by the tracks, raccoon have partied. The tumble of shells details a raucous entertainment; and once there were button factories for iridescent fascinations on shirt sleeve and corset. The thought of 25 winking buttons on a basque is momentarily distracting.

It is ironic a major northern city is only two miles away by crow navigation. The river has certain built-in protection; a wide floodplain and a surface Precambrian. The scene here is wild but too


BERT A. KRAWCZYK ©1982

The paddle ticks against the gunwale and big wings intermittently raise the great blue heron while the long neck tucks. Photo by John Archer

often wildness is adjudged to be necessarily distant. As if, by definition, wilds cannot coexist with a city at close radius. Because of this bias, the near wilds are neglected, then violated and lost. This morning I see just six houses along the river. There are more, some better camouflaged behind the berm. A little tenderness on the part of zoning boards and householders would preserve a vision as old as the river. Upstream is a discharge tube from a milk products plant. Broken concrete is distributed under the falls. A charitable, two-mile drive to the Arnott hill would have gained granites and greenstones so the falls, this morning, would rhyme with the dogtooth violets and the fleur-de-lis.

In most river counties, a structure no longer can be built on the floodplain. What if we suggest all houses and buildings must be screened from the river view? A nature lover's 'plaint? I think not. The State of Wisconsin annually enjoys $5-billion in tourism. The river transects, in a 430-mile length, geological features separated by almost 2,000 million years. The oldest rock in the state is just downriver at Mill Creek, what the Ojibwa called "weepeesepee," the river of teeth; age, 1.94 billion. A new kind of conservancy might be gained from this river, a realization of multiple values. A system promoted on the state level but implemented by the landholders themselves! Hedgerow shields, an abeyance of artificial lights, establishment of native plantings instead of lawns facing the river. Some might offer a canoe landing, campsite and picnic table. River preservation could arise from citizen landholders joined in an informal river district similar to lake or drainage districts.

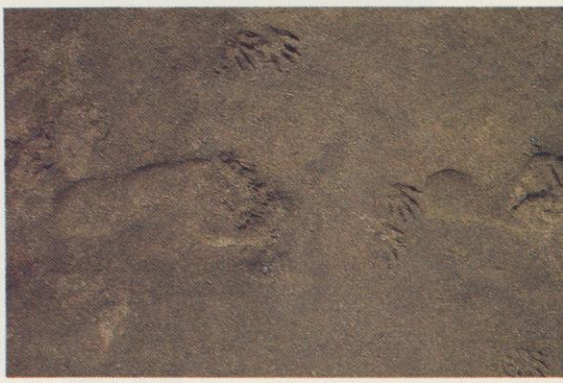
It does not take a crystal ball to predict the American recreational diameter is going to shrink in the last couple turns of the twentieth century. The availability of near wilds will prove economically benevolent. If a view is preserved, by the year 2000 the Wisconsin River itself could produce $5-billion in tourist dollars.

The morning has shed my shirt while the canoe steers to the starboard of a basswood and fern island. The water is cool to the touch. Temptation. The bow rope is drizzled overboard, the canoeman follows, the jeans do not. Suddenly the river is all the more wild and timeless. Twice around the canoe, once beneath and then I ponder how to get back in. After the second attempt at boarding over the side, a vaulting-horse maneuver is successful at the bow, if lacking in grace. But there was neither audience nor judge, and the lack of grace is not what they would have observed.

How quickly my species is wild and vulnerable again. In vulnerability is a definition of wilderness, a detachment from tools. The canoe is a tool, and the paddle. Together they opened, explored and exploited the northern frontier. I think the broad-brimmed hat is a tool. Jeans and t-shirt are tools.

Is this river a wilderness? Purists snicker at the very supposition, for it is decreed, commerce and wilderness cannot correlate. Rivers that touch towns and 150,000 people cannot be wild. Wilderness isn't people. It's lack of people. Sigurd Olson defined wilderness as a place where man himself is a visitor. Thoreau thought wilderness was the preservation of the world. I have wondered what H.D. meant by "world;" that complication of organism, or civilization, or some average between the two? A.N. Whitehead defined wilderness as a submersion in solitariness; he went on to suggest religion is what one does with that solitariness.

Conventional thinking purports that rivers which provide jobs can't be wilderness, nor can wilderness have anything to do with working farmland. The osprey nest in the power pole does not concur. This morning on this river, wilderness access is a matter of removing the shoes, wilderness occurring natural to the toes.



The shore where raccoon have partied.
Photo by Ruth Hine

The most often-used word in the Old and New Testament is not God or holy or prayer or love, but land and its synonyms earth and soil, and wilderness. Wilderness is not separate from

◀ The river here is wild, but too often wildness is adjudged to be necessarily distant. Because of this bias, the near wilds are neglected, then violated and lost. Watercolor by artist Bert Krawczyk, 5317 South Lake Drive, Cudahy, WI 53110

The sun just now buoyant on the horizon's ridgerow.

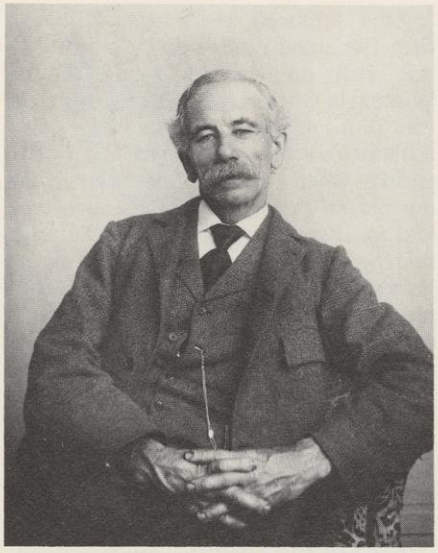
Photo by Richard Chenoweth

mankind, instead it seems to be necessary to achieve the best that is in us. The herd does not generate ideals, but survival. Culture cannot create its own conscience. Though morality is the gear of civilization, it is not readily perceived when morality is part of the organism itself. Vision and prophecy depend on separation, the chance to be alone, an exo-spirit.

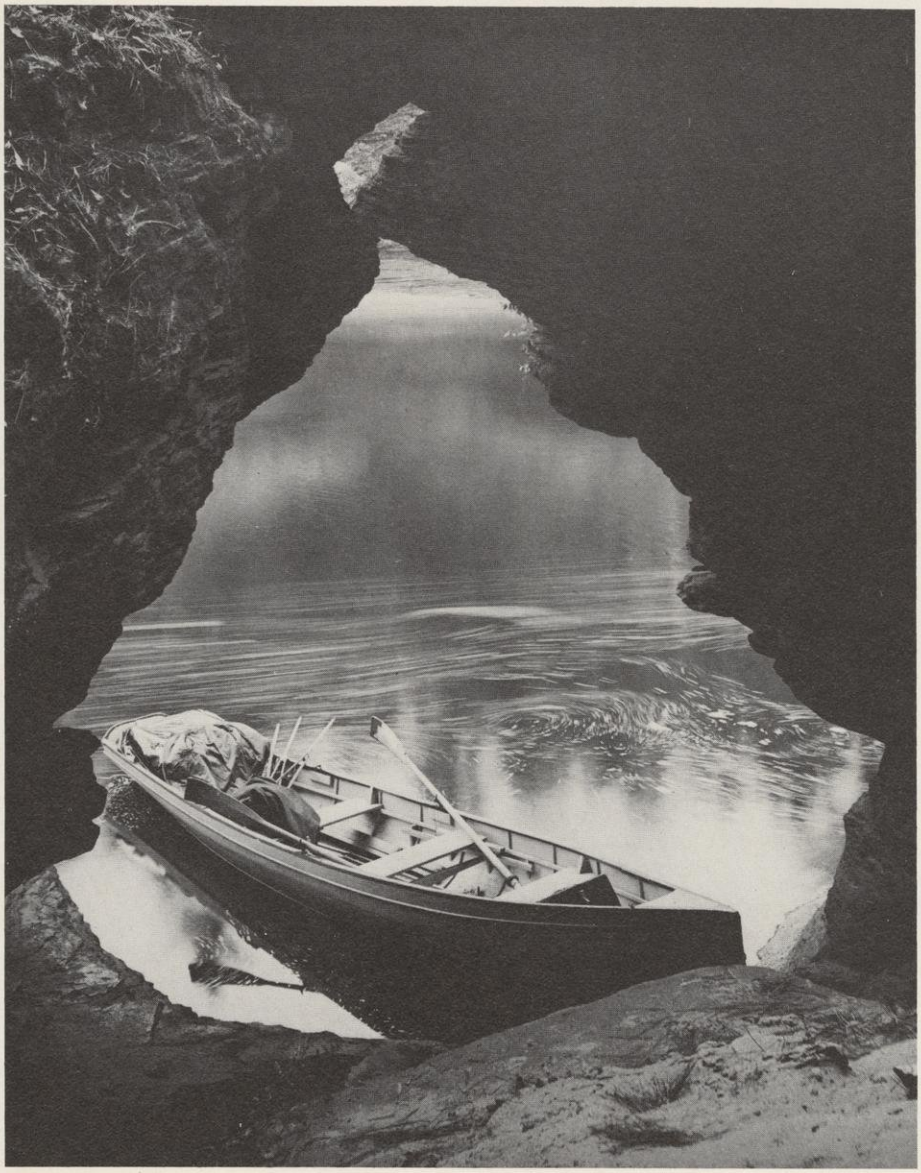
What part of soul belongs to the river? I do not think, in all fairness that because of cranial size, concrete road or the oxyacetylene torch, I can claim the one and only lineage with the dawns. Soul is more than man. More than advanced respiration, more than the common definition of life. Soul is beauty without trying, purpose without product, peace without document. Soul is the circle of Father Abraham, a unity where everything fits. His sense was a monotheism. Leopold's was a land ethic, Olson's and Thoreau's was wilderness.

The canoe bobs and I am hungry for breakfast; a two-egg omelette with hedgerow asparagus, two glasses of cold milk, toast with blackberry jam and tea. A turn of the paddle sends me shoring. I am reluctant to leave the old river and its buoyancy. I come to river, to be alone, to be quiet, to be a better farmer, father and friend. I come to talk; and to be talked to. I don't use the term God, neither will I quibble.

*Left:* Henry Hamilton Bennett, 1843-1908.
*Right:* The H.H. Bennett studio today.
*Below:* "Looking out of Bass Cove."




# A portrait of H.H. Bennett



## His fame rests on the Dells, but H. H. Bennett's other pictures of landscapes, cities, mansions and people will also endure.

*SARA RATH, Freelance Writer, Madison*

Picture yourself as a visitor to the Dells of the Wisconsin River a hundred years ago. While you're at it, hope for good weather.

*"There can be no more disagreeable city in the whole world than this little country place during these alternations of dull cloudy days, high raw winds and coquettish suns. The roads are bottomless and there is not a horse or vehicle to be hired for love or money. Visitors are bundled up in rubbers and waterproof cloaks and use their umbrellas to pilot them through muddy streets economically paved with slanting sidewalks slippery with mud and wet moss. These visits are only made to the post office in search of letter or paper with which to relieve the monotony of hotel life . . . The little steamers leave the docks three times daily to carry people up the Dells, the latter sit around on decks with white lips, blue noses and chattering teeth, asking questions of the loquacious guides between convulsive shivers and attempts to appear delighted."*

*— Chicago Times, 1880.*

Continued...

*Opposite, top:* Tourists and musicians aboard the gaslighted Dell Queen. In his early days, Bennett would photograph boat and passengers, hop aboard for the trip to sell prints, then unlash his boat and row home.

*Opposite, bottom:* Bennett took the first recorded photographs of fireworks. This was taken at the St. Paul Winter Carnival in 1886 and called "Storming of Ice Palace by the Fire King."

*Below:* Before the coming of steamboats, guides and rowboats took tourists through the Dells — singly or in fleets like this one. Even after the floating palaces, smaller boats persisted, allowing a closer look.

One hundred years ago, Kilbourn City (renamed Wisconsin Dells in 1931) was still on the raw edge of the Wisconsin wilderness. A wandering cow was not adverse to strolling down Kilbourn's streets now and then, but in spring when brawny raftsmen came downriver riding the floods, livestock and local gentry took cover. The town marshall often found himself tied up "so he wouldn't get hurt," and one street in town became known as "Bloody Run," due to the boisterous revelry.

It was a gentlemanly characteristic back then to show one's appreciation of the wilderness, especially for city folk who didn't have to cope with its less-romantic deprivations year-round. Tourists, enamored with the village of Kilbourn and its nearby inspirational vistas, came to swell the summer population a century ago, just as they do now.

The man who recorded that colorful era in our state's colorful history was photographer Henry Hamilton Bennett (1843-1908). He arrived in Wisconsin at the age of 14, to help build a railroad bridge across the Wisconsin River near the Dells. Because of an injury in the Civil War, Bennett was eventually unable to pursue his former carpentry career and purchased the business of Kilbourn's local tintype artist, Leroy Gates.

Photography was still a primitive craft in 1866 when Bennett opened his studio. The young man soon tired of posing restless toddlers for portraits and succumbed to the lure of the landscape, testing his new-found art on rocks and gorges of the enchanted riverbed which Winnebago Indians called "Neeh-a-ke-coonah-er-ah," or "where the rocks strike together." His beginnings were tentative. Lean years prevailed. But, Bennett persevered and his stereo photographs eventually began to advertise the beauty of Wisconsin scenery throughout the United States.

There had been river tours of the Dells for some time, but prior to 1873 the only boats available to visitors were

rowboats, which could be leased with a guide. In 1873 a sidewheel flatboat was brought downriver from Quincy, Wisconsin, and the Kilbourn paper rejoiced, "Hurrah for the steamer and jolly excursions through the Dells!" The boat could carry 70 passengers. The following year the *Dell Queen* was brought overland from Madison and the Kilbourn paper thrilled that the Dells "has become a place of great resort for invalids, tourists, artists and pleasure seekers." The enterprising Bennett photographed passengers on the *Dell Queen* every day before the morning trip, then went along for the ride to take orders for prints. Within a few years the *Dell Queen* was lighted by gas for evening excursion trips complete with harp- and violin-playing musicians for an even more romantic atmosphere.

Bennett's new studio, financed by William Metcalf, a wealthy philanthropist friend from Milwaukee, opened for business in 1875. By this time Bennett had applied his own inventions and innovations to his photographic repertoire, and his catalog of stereo cards offered a choice of over 450 views. In addition, Bennett was soon able to offer panoramic views of the Dells and large-format landscape photographs taken with an 18 x 22-inch camera he built himself.

On warm summer evenings in the 1880's, one of the most popular places for tourists was the Bennett Studio, where the photographer projected lantern slides onto a screen and illustrated the show with informal talks. By 1885 his stereo sales reached 30,000 prints per month, and 600 different photos were offered for sale in a choice of five different sizes. Subjects included examples of Milwaukee architecture and street scenes, views of Minneapolis and St. Paul, Indians from the neighborhood of the Dells, and the rocky outcroppings at Devil's Lake. One of Bennett's most popular lines was a series of stereo views taken when he achieved a boyhood dream and accompanied lumber raftsmen down the Wisconsin River on a trip from Kilbourn to Boscobel.

In 1886, with his homemade instantaneous shutter, Bennett captured what became probably his most famous shot — his son Ashley in mid-flight, jumping the chasm over to Stand Rock. That same year Bennett went to the St. Paul Winter Carnival and took the first photographs of fireworks.

In 1887, Bennett visited Chicago and took photographs of street scenes for a rotogravure book of the city, as he had previously done in Milwaukee. The book sold well, but in 1888, George Eastman introduced his Kodak box camera, already filled with a roll of film. "You Press the Button, We Do the

*Top:* In later life the slightly built Bennett grew stooped and round-shouldered — "from exercise at the oars of his boat," according to his daughter.

*Bottom :* "Fisherman coming in from mouth of harbor, Milwaukee."

Rest," Eastman claimed. After you exposed all 100 frames you were to send the camera back to Kodak with $10 and they'd reload the camera and return it to you with the finished prints. The once-mysterious craft of the professional photographer was now within reach of everyone.

Not surprisingly, Bennett's studio business began to fall off in the 1890's. Bennett himself believed the slump was due to tourists who came to the Dells on one-day excursions and didn't have time to visit the studio to purchase photos. People still wrote to him about accommodations and he served as a kind of informal chamber of commerce. He still offered advice to amateur photographers who visited the area, and provided the railroad with lantern slides and information for use by a lecturer to further advertise the beauty of the region. But the H.H. Bennett Studio came to rely more and more on the sale of souvenirs to maintain its existence.

One hundred years have changed the character of the Dells area considerably. Yet, visitors today may sense a feeling of continuity if they take the boat trips past the rocks and out-croppings once explored and recorded by the enterprising young photographer who gave them such evocative names as "Witch's Gulch," and "Coldwater Canyon." The names persist today.

Throughout Bennett's career, he remained a man of the Midwest. In spite of the place he earned in the history of American art, Bennett did not become famous outside Wisconsin. He never gained the greatness that claimed several of his contemporaries, partly because of his particular personality —

*Continued page 21...*

# Catch-all

## Landfill site bill

**Larry Sperling,** Public Information Madison

**Madison** — After more than two years of verbal wrestling, the Assembly Environmental Resources Committee has produced a bill that improves state chances of locating solid and hazardous waste disposal sites.

Assembly Bill 936 addresses many concerns that DNR, industry, waste haulers and local governments have had about limitations in existing law. One major stumbling block has been that landfill developers collide with town officials over where landfills should be built. Developers prefer rural fields with thick soils which can prevent buried pollutants from seeping toward surface and groundwaters. **Many towns refuse to rezone agricultural lands for commercial landfills and have passed ordinances leading to court confrontation with landfill proponents.**

The new 103-page bill addresses many issues including the question of overriding town zoning. Legislative crystal ball gazers do not expect passage this session because so many complex alternatives are offered.

Key provisions include:

**Local zoning override: If the state finds a site environmentally acceptable but local approvals are not granted, a developer can then try to negotiate a settlement with a committee of local communities. If negotiations fail, a state siting board would arbitrate final settlement.**

**Contested case hearings:** Citizens would have the right to request a contested case hearing. In contested cases the hearing is run more like a court trial then an informational meeting. All testifiers are under oath, witnesses can be cross-examined and a non-DNR hearing examiner presides.

**Groundwater: The bill would give DNR authority to make landfill owners who pollute, supply nearby residents with another source of clean drinking water.**

**Special study grants:** Communities with approved solid waste plans could apply for special grants under the Wisconsin Fund to study local recycling programs or new methods of handling sludges.

**Waste Management Fund revisions: The fund provides long-term environmental insurance for problems that develop after landfills are closed.** Source of the money is a landfill surcharge. The bill would require the fund to replace private wells if the wells become contaminated by approved landfills. The fund would also pay for studies of potential health problems caused by landfills.

## Sigurd Olson dies

**Ashland** — Environmental philosopher and author Sigurd F. Olson, 82, died January 13, 1982, while snowshoeing in the woods near his home in Ely, Minnesota. He was a leader in the fight to designate the Boundary Waters Canoe Area in northern Minnesota as a federal wilderness area.

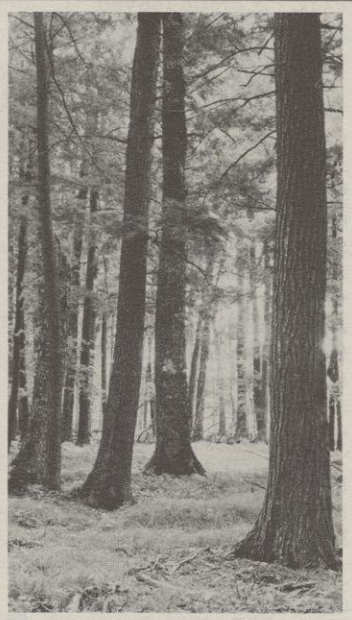
The Sigurd Olson Environmental Institute at Northland College here was created in 1972 to further the ideals and philosophies of Olson, who attended Northland from 1916-'18.

He was the author of many important books on the North American wilderness. His first and most widely known was *Singing Wilderness*, published in 1956.

## LAWCON kudo

**Washington, D.C.** — Of all states, Wisconsin did the "most thorough" and fair job of dispersing federal Land and Water Conservation Fund (LAWCON) grants among local communities, according to the Advisory Council on Intergovernmental Relations.

Since its beginning in 1965, LAWCON provided $55 million in grants to match state and local dollars for buying and developing more than 1,600 parks and recreation areas in Wisconsin. The federal government recently eliminated the program.



Hardwoods can help neutralize acid rain.

## Hardwoods cut acid rain

**Madison** — First results of a three agency study, partly financed by the state utility industry, show that hardwood forests help buffer acid rain, but conifer forests add more acid.

**Research by UW soil scientist James G. Bockheim, finds that hardwood canopies made up of species like aspen, maple, oak and birch can neutralize up to 57% of the acid in rainfall. The soil beneath them can neutralize an additional 40% for a total reduction of 97%.**

When acid rain hits a conifer forest, on the other hand, additional acid is leached from the pine bark and the amount of acid goes up.

Bockheim says that changing the forest cover in sensitive areas may be worth considering. He points out that the length of time hardwoods can help buffer without being harmed is unknown. Also unknown is the long-term affect of acid rain on forest productivity.

DNR, UW-Madison and the US Geological Survey together intend to track acid rain's course to lakes through forests, runoff and groundwater. The study will look at the ability of forests to withstand acid rain and maintain their buffering capacity, the interaction of acid rain with the ecosystem including lakes, and techniques like vegetation management that may help stall acid rain's consequences.

# Show shocker

**Milwaukee** — This year's DNR exhibit at the *Milwaukee Sentinel* Sports Show will feature a specially-designed fish-shocking boat plus fish tanks showing native species. Personnel will be on hand to answer questions. Licenses, stamps and park stickers will be sold.

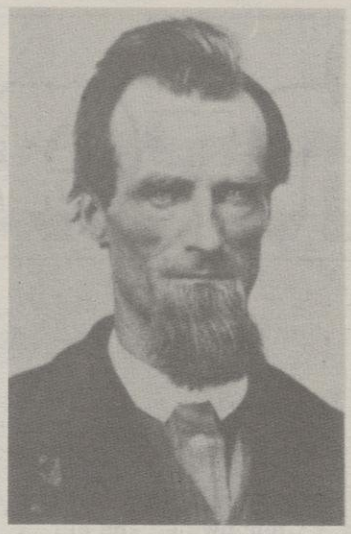
Dates are Friday, March 12 through Sunday, March 21.

# FFA sale

**Madison** — Some 20 state chapters of Future Farmers of America took part in a *Wisconsin Natural Resources* Magazine subscription drive last fall. The Baraboo FFA Chapter sold most—28 subscriptions—and earned $28.00 for their treasury.

Two of the Baraboo members, Darin Schubring and Pamela Bruns sold six each, more than anyone else, and both received a $50.00 United States Savings Bond.

Plans are already being made to repeat the drive next fall when more chapters are expected to participate.



# Frank Wellesley Wade

**Hudson** — Wade, an early water rights pioneer, has been rescued from oblivion by Wild Heritage, Incorporated a group devoted to preservation of natural areas here. In 1898 when the exclusive Willow River Club fenced off shoreline for private use, Wade challenged it. The landmark Wisconsin Supreme Court decision in the case established the principle that fish in a stream are public property. Site of the club is now part of Willow River State Park. Wild Heritage has revived Wade's history and plans to honor him.

# 32% flunk emissions test: hearing set

**Madison** — Nearly a third of all motor vehicles tested last summer in southeastern Wisconsin failed to meet clean air standards.

Between April and September, more than 4,000 volunteers stopped for tests at shopping centers in seven southeastern counties.

**Nearly half the 1975 through '77 model cars failed. Surprisingly, the proportion of failures dropped to 33% for both pre-1975 and 1978-'79 vehicles. Only one-tenth of the cars built after 1980 failed.** The limits used were more lenient for older models to account for wear and different emission control systems.

Next January, a mandatory emissions testing program is scheduled to begin as part of federal Clean Air Act requirements for the region.

**Motor vehicles in southeastern Wisconsin now emit more than 86% of the ozone-forming hydrocarbons in the seven county area. These emissions are responsible for the region's failure to meet national health standards.** Despite 10 years of clean-up efforts, southeastern Wisconsin still experienced 20 days of ozone alert conditions last summer.

**After January 1, 1983, the approximately one million vehicles in Ozaukee, Milwaukee, Waukesha, Washington, Kenosha and Racine counties will have to pass annual emissions tests to be licensed.** The program is designed to help southeastern Wisconsin clean up its ozone problem by 1987, a deadline specified in the Clean Air Act.

**The Department of Transportation will hold a public hearing on rules governing the inspection procedure on March 30 at the state office building in downtown Milwaukee.**

# DNR career workshop

Hands on at MacKenzie Center career days. Photo by A. Craig Benson, courtesy of the Wisconsin State Journal.

**Poynette** — This June, the MacKenzie Environmental Center here will sponsor workshops for high school students interested in natural resource careers. Participants will get a chance to practice hands-on forestry, fish and wildlife management, fire control and environmental protection.

**A boys session will run from June 14-20, and the girls session from June 21-27. Cost is $100, including meals and housing.** A limited number of scholarships are available; local sportsmans clubs also sometimes provide financial assistance.

For workshop or scholarship information, write or call: Workshop Coordinator, MacKenzie Environmental Center, Route 2, Poynette, WI 53955, (608) 635-7311 or 635-4498.

# Rare plants rediscovered

**Madison** — Botanists have rediscovered three endangered plants that had gone unseen in Wisconsin for 40 to 60 years.

DNR botanist Bob Read found the **Broad-leaved Sandwort *(Arenaria macrophylla)*,** a plant that had not been spotted since 1929. The department's endangered plant specialist, Bill Alverson relocated the small-flowered **Grass of Parnassus *(Parnassia parviflora)*,** unseen since 1918. And Fred Case, an orchid specialist from Michigan visiting in Wisconsin, found the **Auricled Twayblade Orchid *(Listera auriculata)*,** unseen since 1938. The orchid is being considered for listing as a federal endangered species.

The rare plants were found last summer as part of a continuing effort to update historical endangered species records.

Grass of Parnassus rediscovered in Wisconsin after 62 years. Art by Jim McEvoy.

# Catch-all

## Weather says "watch out"
### wildlife already hurt

**Madison** — If the heavier than normal snow cover in Wisconsin this season doesn't melt off in just the right way, there's trouble ahead. Some wildlife has already been hurt. Floods, overloaded sewer systems, drowned septic tanks and dead fish could be poised to happen.

**On the other hand, a benign and gentle freeze-thaw pattern, helped by limited additional snow could ease the state into spring without much more damage.**

**DNR wildlife managers say the quail population in southwest Wisconsin which was growing nicely during the last two mild winters, has been decimated again. Ruffed grouse there, unable to roost in the crusted snow, are also hurting. So are newly stocked turkeys. As for pheasants and rabbits, Ed Frank, DNR Farm Wildlife Specialist says, "The pattern of weather during the next month will determine whether the effect is merely negative, or a disaster."**

**Frank Haberland, who's in charge of deer management predicts some losses to the herd this year but says the extent will be determined by how tough weather is through March.** He points out that the good harvest last fall means more food for the remaining deer which should help them make it through until spring.

**When Catchall went to press, snow in northern Wisconsin was deep, but fluffy. Most deer were still able to move about freely and find browse.** The winter severity index, which is used to judge the herd's condition, stood at 50. Noticeable losses begin to occur when the index rises to about 80. It is based on the number of days below zero and the snow depth.

In mid-February, Ed May, hydrologist at the National Weather Service Flood Forecast Center in St. Paul, said "Right now we're looking at a mid-March map of Wisconsin as far as water equivalents are concerned."

**He said the north has about 4½ to 5 inches, central Wisconsin 3½ to 4 and the southern part of the state around 2½ inches of water on the ground in the form of snow.**

State Climatologist Val Mitchell says, "There's enough snow so that if it melts rapidly, we may be in trouble."

Floods cause up to $100 million damage annually in Wisconsin and the Federal Emergency Management Agency which administers the National Flood Insurance program expects an unusually high number of claims this year. **Only property owners in communities that have enacted floodplain zoning ordinances are eligible for the insurance.**

Sewage plant operators in Milwaukee, Racine, Kenosha, Marinette, Ashland, Superior, Wisconsin Rapids, Chippewa Falls and some other communities will watch this spring's melt with fingers crossed. Their plants get runoff from both storm and sanitary sewers and when too much pours in, raw sewage must be diverted directly into lakes and streams. Projects underway to correct this are not yet complete, and the heavy snow cover is a standing threat.

**Whether fish will be hurt by this year's snow is a wait and see problem.** Wisconsin has several hundred so-called "winterkill lakes." Most are shallow. Fish die in them when heavy snow blocks light penetration, cuts off photosynthesis and kills plants that rot and reduce oxygen below life-sustaining levels.

So far the only lakes affected are those that winterkill every year, but fish managers are nervous. They want a good melt that will squirt oxygen-rich runoff into state waters. Meantime, they keep testing the oxygen level and hope it stays above five parts per million.

Heavy snow and sub-zero temperatures will mean deer losses. Weather severity through March will determine the extent. Photo by Staber Reese

## Magazine index offered

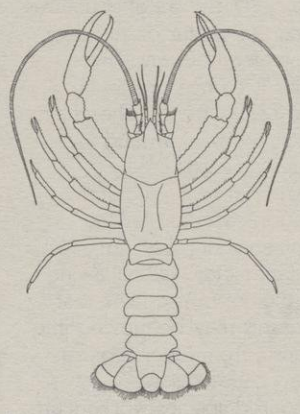
**Madison** — An index to stories that have appeared in *Wisconsin Natural Resources* magazine during the first five years of publication (1977 through 1981) is now available. It will cover title, subject and author.

**Copies may be obtained by sending a business size, self-addressed, stamped envelope to Index, *Wisconsin Natural Resources* Magazine, Box 7186, Madison, WI 53707. Allow six weeks for delivery.**

## Exotic crayfish take over

**Oshkosh** — DNR is recommending restrictions on use of crayfish because an exotic southern species is causing damage to lakes, streams, vegetation and fish in Wisconsin. The proposal will be voted on at the April 26th County Conservation Congress meetings. The recommendation would prohibit the sale, use as bait, transportation from one body of water to another or introduction of live crayfish into any waters except Lake Michigan.

**To date, an estimated 250 Wisconsin lakes and streams have been seriously harmed by the exotic crayfish. In Ohio and Indiana the invader lives in shallow streams and is not harmful. But in Wisconsin's large lakes and streams, they systematically eliminate native crayfish and then eat up all aquatic plants. They also attack and feed on fish eggs and spawn. In some waters in the past 10 years they have become so abundant anglers catch nothing else. Even swimmers are sometimes bitten.** In infested lakes the bottom literally crawls with crayfish.



**At present, no method is known to eradicate them once they've become established.**

# Irrigation pumps up

**Madison** — A DNR report predicts demand for water to irrigate farmland in Wisconsin will rise by about 53% through 1985 and by another 36% through the year 2000.

The US Water Resources Council says irrigated acres in the state will increase from the 122,000 recorded in 1975 to 269,000 by the turn of the century. DNR, however, estimates an even higher rise because of the trend for agriculture to move from arid states to those with abundant water.

Most water used for agriculture (97%) is pumped from underground and in Wisconsin permits for high-capacity wells rose from 118 in 1975 to 577 in the drought year of 1977.

**Portage County is Wisconsin's heaviest irrigator with 10 billion gallons pumped in 1979. A big jump in farm water use occurred between 1959 and 1969 when irrigation skyrocketed 900% in Portage County and 700% in Adams County.**

Although irrigation means higher yields, plus jobs in food processing, it may also cause a drop in the groundwater level and possible groundwater contamination by herbicides and pesticides.

In 1979, Wisconsin industry used about seven times more water than agriculture but most of it came from surface sources like rivers and streams. **However, the Water Resources Council forecasts that this will drop. In 1975 Wisconsin industry used just over a billion gallons per day and this is expected to be down to 363 million gallons by the year 2000. High energy costs and stringent federal and state waste treatment regulations have encouraged industrial water conservation in Wisconsin.**

Industrial use could be even further reduced by changing water rate structures, providing incentives for installing conservation systems, and adding sewer surcharges where none now exist.

The DNR report is entitled "Statewide Water Conservation, Part II—Agricultural and Industrial." Recommendations on just how to handle water conservation for farm, home and industry are expected in April.

# 3,500 cormorants

**Madison** — People can help endangered species and Wisconsin has the birds to prove it.

Not so many years ago, Wisconsin's double-crested cormorant population hovered at a dangerous low. To help out, wildlife managers put up telephone poles with attached artificial nesting platforms to duplicate cormorant dead-tree nesting sites. **In all, they erected over 800 platforms in six different marshes across the state. Now they find they've succeeded beyond their wildest dreams. Wisconsin's cormorant population stands at more than 3,500 birds—and climbing.** One Green Bay colony alone had an all-time high last year of 1,000 cormorants, with 250 nests producing around 400 young.

The most recent addition to the cormorant-colony list is a 17-pole, 70-nest set of structures erected this winter on the deep-water marsh at Grand River Wildlife Area near Berlin in Green Lake County. The colony has a capacity of around 150 nesting birds.

Artificial nest structures alone don't account for the phenomenal increase. An important factor was outlawing DDT. Biologists also think that cormorants may be moving into Wisconsin from other regions. Whatever the reason, endangered species workers are delighted with the change and are thinking of reclassifying the birds to less-serious threatened status.

Sales on county forests hit near $3-million, thanks to Project Backlog.

# County forest millions

**Madison** — Last year, Wisconsin county forests brought in $2.8 million in revenue, down only slightly from record sales of $2.9 million in 1980.

Groundwork for the record revenue was laid when DNR hired 12 special foresters to inventory and mark mature timber on county lands. **The foresters set up 1.8 million cords for sale. That's enough to form a pile eight feet wide, four feet high and 1,372 miles long that would reach from the state capitol in Madison to the nation's capitol in Washington—and halfway back!** Until completion of this so-called "Backlog" project only a fraction of existing mature timber was available for sale.

DNR Chief Forester Milton Reinke says the project assures high county forest revenue during the next few years. He estimates the total income at $10 million.

Reinke says that because most Wisconsin wood winds up as paper, housing doldrums that decimated timber industries in other states have had little effect on timber sales in Wisconsin.

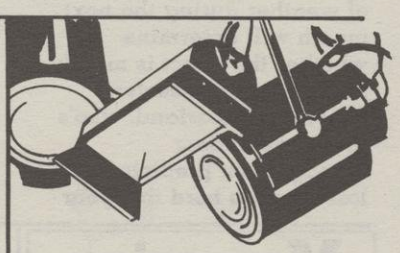
# Report asbestos raze

**Milwaukee** — Demolition projects that involve handling asbestos must be reported in advance to DNR because, if inhaled, it can lodge in the lungs and become an irritant or possible cancer-causing agent.

**Robert J. Luzinski, a DNR engineer-inspector here said a citizen recently reported that workers in a Milwaukee east side renovation project had illegally removed asbestos ceiling insulation. DNR was not notified and the workers failed to wear masks or other protection.**

Luzinski said that although known demolition contractors were notified about the reporting requirement a year ago, others tearing down old buildings may be uninformed.

Notice of asbestos removal here should be given to Air Management, Box 13248, Milwaukee 53213.

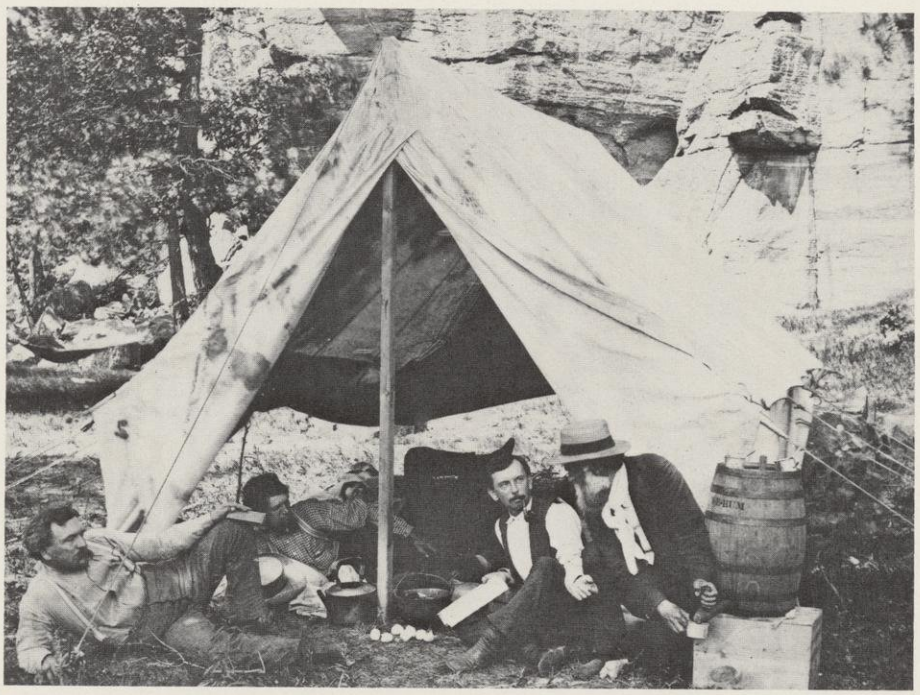


# Coming attractions . . .

- ***Special 40-page color supplement on Wisconsin's endangered plants and flowers.
- ***A "how to" on making your own net for trout fishing.
- ***Special 16-page supplement on erosion control and nonpoint pollution in rural Wisconsin.
- ***A profile of DNR Warden Dennis Kirschbaum of Prairie du Chien.
- ***Newport State Park in Door County site of an old lumber town.

*Top:* "Camp Mosquito Bite," Bennett and friends camping trip to a then-remote region of the Dells. The man on the right next to the keg of rum is Bennett's long-time friend and patron, Milwaukee philanthropist William Metcalf.

*Bottom:* "Rafts in the Narrows." This spot at the Dells was thought to be one of the most difficult places to navigate on the Wisconsin River. Bennett's life-long dream was to accompany one of these great lumber drives, a wish he and his camera fulfilled at age 43.

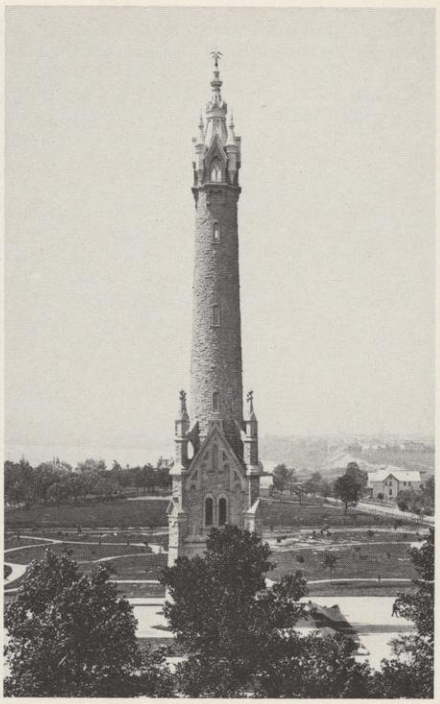


*Left:* Winnebago woman and baby.

*Right:* The Milwaukee water tower at North Point.

*Below:* Crowded Madison Street, Chicago, 1892.

*Opposite:* Downriver from the Grand Avenue Bridge in Milwaukee.



always gentlemanly, humble and generous.

Bennett's singular devotion to the Dells was probably most evident when, shortly before his death, Kilbourn residents voted to become a center of industry. Construction of a huge dam that would raise the water level in the Upper Dells at least 15 feet troubled the photographer, and he wrote: ". . .My energies for near a lifetime have been used almost entirely to win such prominence as I could in outdoor photography and in this effort I could not help falling in love with the Dells. There are few people who see them who don't become infatuated in a greater or less degree. Except with me, every rock that is to be hidden from sight is a sacrilege . . . but few of my Kilbourn neighbors feel this way and most of them believe *now* that the Dells will be quite as beautiful with fifteen feet of them under water. If I thought the rest of the people of Wisconsin felt as they do I would have to be convinced that I have overestimated their beauty."

Eventually, the dam was built and Bennett's beloved Upper Dells flooded despite his objections. But Bennett himself never lived to see it. He died on New Year's Day, 1908, two weeks before his 65th birthday.


Photos courtesy H.H. Bennett Studio, Box 145, Wisconsin Dells, WI 53965

Sara Rath is the author of *Pioneer Photographer — Wisconsin's H.H. Bennett*, published by Tamarack Press. The book is available from H.H. Bennett Studios, 215 Broadway, Wisconsin Dells 53965.
Rath is also co-producer, together with filmmaker husband Rick Smith, of a half-hour TV special on the life of H.H. Bennett. It will be aired this spring or summer on Wisconsin Educational Television Network stations.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# Spot and plot for trophy fish

**Here's a new exciting way to catch salmon and lake run trout. You can see it happen.**

*JOHN BETH, Fisherman*

My brother and I drove northeast out of Reedsburg toward Algoma and a run of steelhead. A few deer picked in the cornfields. Flocks of Canada geese flew toward Horicon marsh. Grouse crouched near the blacktop, seeking warmth.

Before we knew it, we had reached what we call Cabin Creek, a mile from Lake Michigan.

"Let's stop and just peek over the bridge," Gene said.

I walked upstream and he walked down. Within 10 minutes, I was back and hadn't seen a thing. But, my brother burst through the brush, panting.

"Steelhead!"

We fumbled with our boots, vests and fly rods and hurried carefully downstream.

"Look — three, four, five of them!"

The big lake-run rainbows lay there, not more than 60 feet ahead in a shallow run of water above a little pool.

Gene grabbed my arm. "Down there!" He pointed. Thirty or 40 feet below the first fish were more steelhead. They came up slowly, climbing the rapids, backs just barely out of the water, red flanks glowing in the sun.

In the two hours that followed, using our special technique, not snagging or bait fishing, we caught six. They were full of fight, bright in color and still silvery from the lake. None of the females had spawned. Weight was six to 10 pounds.

After such auspicious luck, we wondered about even bothering with another favorite creek, our planned destination, 15 miles north. But, by early afternoon we found ourselves parked there at the bridge. After all, it had always been gracious with rainbows in spring and coho in fall.

I squinted through my polarized glasses into the glare of the tea-colored water below the bridge. What were those long images?

Coho!

Within minutes, we were walking the bank. Upstream 100 feet, a male coho 26 or 27-inches long, 10 pounds at least, lay in the water like a rock. Another 100 feet beyond, in a shallow rapids, rested a second—pink-sided, olive backed and flanked on both sides by brown trout.

Suddenly, a splash!

A big male coho in full fall spawning colors flamed through the rapids, almost out of the water except for the strong tail pushing him over the rocks — 30 or 40 feet in a spurt — barely covered by water, muscling upstream.

Here was the Mount Everest of fishing and Gene and I climbed it. Before the day was through, we shared 10 fish — browns up to 6 pounds and coho to 13 — a limit apiece.

Storybook fishing? You bet! But the technique is available to you and everyone else who wants the excitement. I call it the "spot and plot" method. Anglers on the Pacific Coast use it a lot. But I sort of evolved into it naturally for a variety of reasons. First, stream trout fly fishing has always been my bag. I know using bait, spawn, spinners and spoons is good sport, but I prefer flies. For me, the snagging that's allowed during fall spawning runs is indecent. I like to catch fish with all their body parts intact. So, "spot and plot" is a dignified, fun alternative. And to catch a trophy trout or salmon was always a long-term private dream, but, until DNR's spectacular, management success on the Great Lakes, it was thousands of miles and thousands of dollars beyond me. Now, it's just a short trip down the road. And no charter boat needed either!

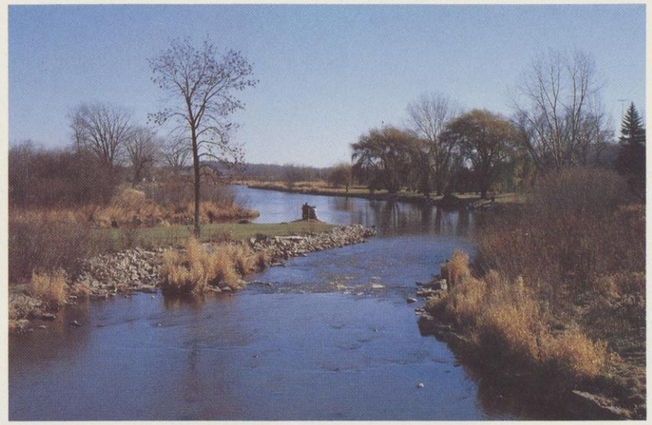
I use a 9-1/2 foot graphite rod with a number eight fly line and six-foot tapered leader that goes down to an eight-pound test tippet.

This is a bit long for some of the small streams you might encounter, but the control for mending line, roll casting and so forth is worth the inconvenience. Moreover, the long rod's loading strength is a big plus when hooking a fish with sometimes as little as 10 or 15 feet of line out. But your own favorite fly rod with a beefed-up leader section will work fine.

My reel is a two-to-one multiplying type and I keep 100 yards of backing behind the 30-yard fly line.

Spotting trout or salmon in a tributary stream and then fishing for them is a very different, special technique. You have to continually remind yourself that it's not the same as the stream fishing you've done before. Very seldom, unless you hit a hatch where the fish are rising, do you really actually see many of the trout you catch in a small stream. But "spot and plot" is a little like hunting and 90% of the fish you catch will be ones you see and fish to. It is not the "well-I-think-there-should-be-one-in-that-hole" procedure. You don't read the water the same way. Of course, in the large rivers water becomes very turbid during peak spring runoff while the steelhead run is on. Then it's either fish





Lake Michigan's little streams hold big fish at spawning time.

blind until clarity improves or stick with the small, clear streams. Many of the best ones are surrounded by private land so be sure to ask permission.

Imagine that it is springtime or fall when the trout or salmon have come in to spawn.They are moving. They are in a shallow tributary stream. You must stay low, keep back and watch carefully. Actually, seeing the fish is not as difficult as you may think. They are quite easy to detect with ordinary polarized sunglasses.Try to locate a holding fish. One that's still! If you're lucky, you'll find a spawning bed with fish near it. This technique works only for spawners. Once your fish have moved into the stream, temperature, humidity, barometric pressure and the usual factors you might consider in other angling have little effect. The main talent is to remain unnoticed.

Early morning seems to be the best time, although the same darkness that hides you also makes it far more difficult to spot the fish. Once I fished the first half hour of daylight to a nice 10-pound stump.

I think it's universal that when spawning salmon and trout are about to strike, the fins tense and movements grow short and nervous. This is what you watch for while your fly waits. When you see tenseness, look out! Your fish will either take off like a streak or nail that fly. It's this visual element that never fails to give me an extra rush of excitement!

My flies are of traditional design, taken from the Babine special or the double flame egg. Both have been popular steelhead flies for a number of years.

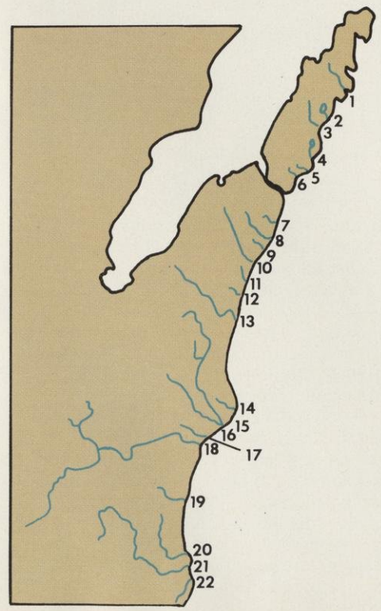
I like a size six, medium-length hookshank, but sometimes use one a little larger if I anticipate fishing for king salmon. An upturned eye is best. The patterns are all basically yarn styles in gold, orange, yellow and pink plus various other bright colors with small amounts of calftail or marabou. The eggs are either single or double. When I use two, I tie a small red or white hackle in the center gap between them. For fast water encountered in spring, I often weight the hookshank with a lead wire before the fly is tied. In all this, I strive for a sort of neutral buoyancy that will suspend the fly in the current right in front of the fish and entice a hit.

## LAKE

DOOR COUNTY

1. **Reibolts Creek**---Excellent runs of rainbow, brook and brown trout. Stream entirely owned by DNR but fishing area limited.
2. **Heins Creek**---Outlet of Kangaroo Lake. It has almost a mile of excellent water and holds many steelhead in its brushy holes in April.
3. **Hibbards Creek**---One of the best streams with almost two miles of fine water. Excellent for steelhead and brook trout in early spring.
4. **Whitefish Bay Creek**---Outlet of Clarks Lake. Clear water often difficult to fish.
5. **Shivering Sands Creek**---Very small but holds some fish during periods of peak flow.
6. **Lily Bay Creek**---Mainly in private ownership, access is difficult.
7. **Schuyler Creek**---Small with limited fishing areas.
8. **Stony Creek**---One of the better streams. Good size with extremely fast water with good holes. A favorite for steelheads and brown trout.

## MICHIGAN TRIBUTARIES WITH SIGNIFICANT SPAWNING RUNS*




KEWAUNEE COUNTY

9. **Silver Creek**---Small with limited fishing areas.
10. **Ahnapee River**---Good fish right up to the dam at Forestville. Its main tributary from Bruemmerville also holds many fish during the run. A major steelhead stream.
11. **Three Mile Creek**---Small with limited fish areas. Will be posted at times.
12. **Mashek Creek**---Very fast water. Good numbers of steelhead when flow is heavy in April.
13. **Kewaunee River**---Very big. Probably the best river for steelhead. Large numbers of fish use it and over 10 miles of river hold fish. Several of its tributaries are also good bets. Public fishing areas.

MANITOWOC COUNTY

14. **Molash Creek**---Slow, deep and very brushy. Point Beach State Park affords access.
15. **East Twin River**---Most fish taken below dam and immediately downstream at Mishicot.
16. **West Twin River**---Most fish taken below dam at Shoto. At times of high flow fish may gain access to the upper river.
17. **Little Manitowoc River**---Attracts fish during high flow conditions.
18. **Manitowoc River**--- Very big. Concentrations of steelhead build up beneath dam at Manitowoc Rapids.

SHEBOYGAN COUNTY

19. **Seven Mile Creek**---Small with limited fishing areas.
20. **Pigeon River**---Challenging stream with good numbers of fish but no concentration points.
21. **Sheboygan River**---Fish migrate up to the Kohler Dam. Look for fish at the mouths of small, clear tributaries.
22. **Black River**---Good fishing during periods of high flow. Lies partly in J.M. Kohler State Park.

*Most of these streams run through private land and you should ask permission to fish.

In presenting the fly, I try to keep a low profile and position myself upstream at least 30 feet from the fish I've spotted. You may have to use one or two different flies to get the proper reaction and make the presentation effective. The fly is drifted downstream attached to a 10-foot sinking tip and a six-foot sinking leader, which positions it in about mid-current. I like the fly to end up a foot or so ahead of the fish. Unlike spoons and spinners, a fly is small enough not to scare the fish, yet pesty enough to make it nervous.

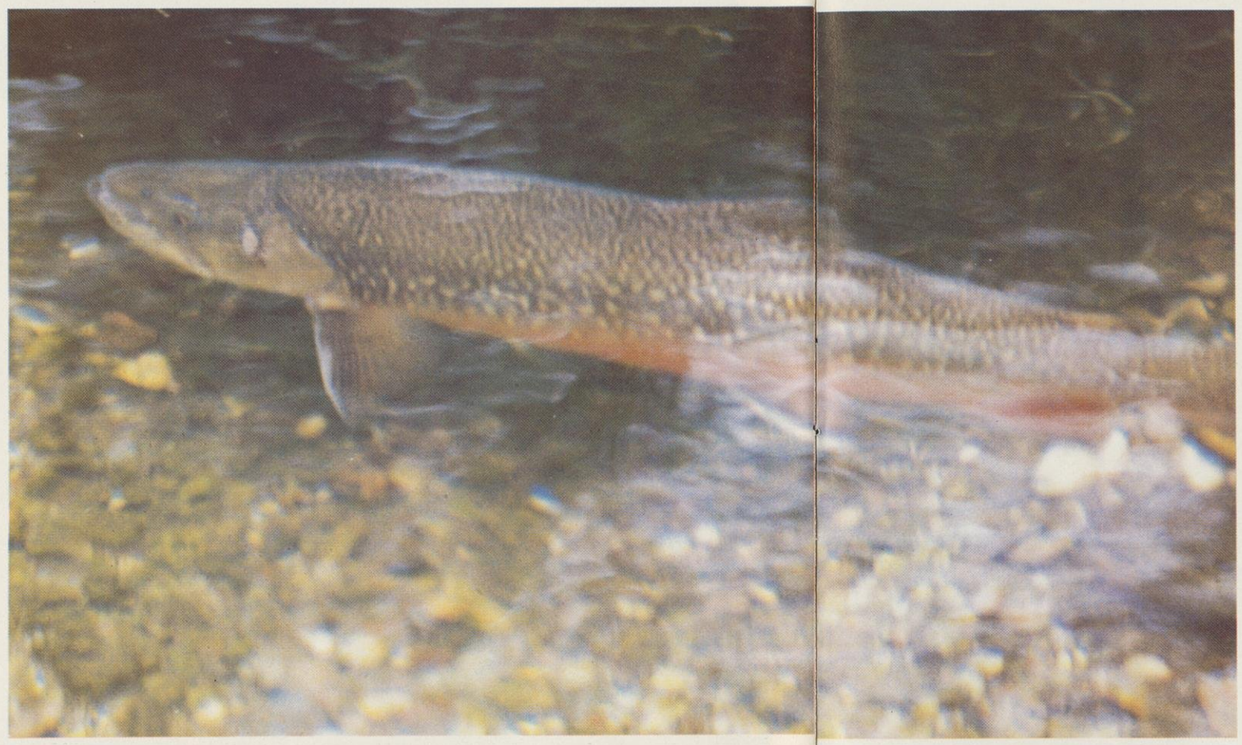
Sometimes you'll get an immediate reaction and sometimes none at all. An aggressive fish, on the offensive near a spawning bed usually either hits the fly, trys to scare it away or kill it. At that instant, you've got to set the hook quickly. Otherwise, as soon as the fish feels the metal, it's long gone. I've made 20 or more drifts near a holding fish and had nothing happen. I've also had a large male rainbow refuse the fly at two locations, but later on, after I'd followed it upstream for a few hours, it hit.

Your chances are dramatically increased if the fish does not actually see you during this whole ordeal. Sometimes, unfortunately, it may even be necessary to crawl on your hands and knees to keep out of sight.

When you finally hook one of these fish, you'll definitely have a fight on your hands. Until you've gone through it once, there's no way of comprehending the intensity. To help myself a little, I've built a small two-to-three-inch fighting butt onto my fly rods. It's definitely an advantage during a long battle with a large fish.

The geography of a stream can be of help or hindrance in bringing one in, depending on the discretion of your trout or salmon. I always try to get behind a fish if it goes upstream. With the fish fighting both you and the current, chances of landing it are far better than if the fish is headed downstream. In spring, when there is high water, an exhausted fish pulling against the drag of the current can break a tippet.

If you get a large fish on and it moves downstream — under, over or through



About 90% of the fish you catch will be ones you see and fish to. Photo by Gene Beth

snags, which is usually the way — your only luck is to fish close to a companion who can get ahead of it and slow it down. As for applying more drag, my personal experience has been that unless the fish heads for some hopeless log jam snag, don't do it. More drag only makes the fish pull harder or run faster. Let it tire itself out, rather than force it and risk breaking a tippet or dislodging the fly.

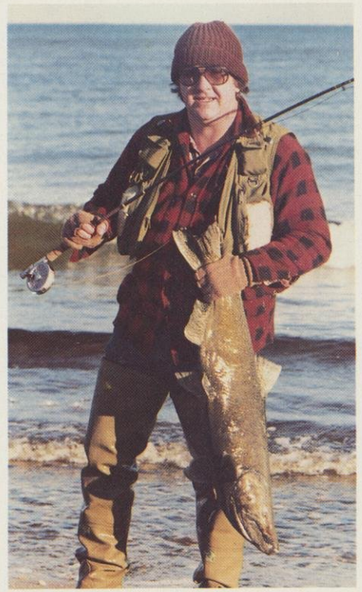
When you get one within landing distance, certainly follow the general rule of taking it in head first, downstream from it, so the natural drift is toward you. Where there are a lot of snags, you may have to apply some pressure. I've had to reach in with a foot, force the fish out into the stream again and start playing it all over before I could get a net to it.

My net is steelhead size, with about a 10-or-12-inch opening and a 24-inch-deep sack. I made it myself out of white ash and walnut and it has taken in some fabulous fish using my "spot and plot" technique. Your net can too.

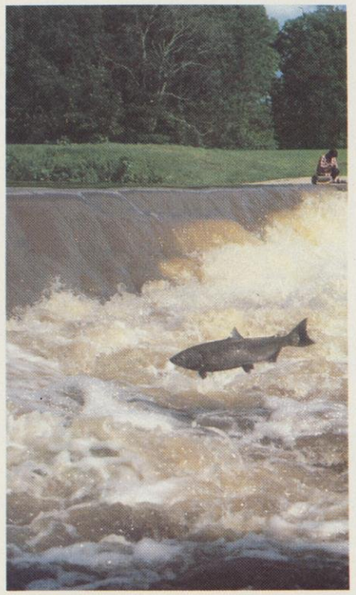
If you find a stream that hasn't been heavily fished, one where trout and salmon have just moved in to spawn, you can use this method any time of day and be successful. After you've learned it, your spotting and plotting will conjure up fishing bonuses that will live in memory forever. For me, one of those







My chinook measured 38 inches and weighed 31 pounds. It was the thrill of my life. Photo by Gene Beth



A 30 pound chinook tries to hurtle the dam at Kohler on the Sheboygan River. Photo by Paul Schultz

bonuses happened last fall.

I had just caught a nine-pound steelhead as it moved in from the lake at the head of the pool below the bridge. Within a half hour I saw five or six more there, working through the small chute of water at the creek's mouth. Then, as I walked closer to the lake from high up on the dirt bank above the beach, I spotted another dozen! They were holding in the little pool or bay at the lake's edge. I couldn't believe it! With so many in sight, I assumed there must be many more just off shore waiting to enter the creek. And I decided to try something I'd never done before. I waded out into the lake as far as I could and cast. The line went out 50 or 60 feet and the current pulled the fly down and took it out further. It was almost 120 feet from shore in about seven feet of water. The 10 foot sinking tip on the fly line kind of suspended the fly out there and the waves tossed it around gently. The flow from the creek was just enough to keep the line out and counteract the waves. But, nothing happened!

After about 20 minutes, my fly hung up in the rocks. I pointed the rod tip, took up the slack and gave a little tug to try and free it. But, the rock took off! I had hooked a chinook salmon! The battle went 45 minutes. It was the thrill of my life. The fish burst from left to right, in and out of the surf at maximum warp. At the end, I was totally exhausted, but with slow assistance from the waves, I was able to gradually back up onto the sand. The fish was so big, it wouldn't fit into the net and I was forced to beach it. As I lifted that trophy off the sand, I noticed the hook hadn't even passed through the jaw. It had punctured the bottom of the mouth and held. The eye of the hook hung out over the jaw so that fortunately the snapping action king salmon often give to a line failed to break my tippet. A super sharp hook was the only thing that saved me!

I've always made it a religious habit to sharpen my hook every four or five casts, whether it needs it or not. I've worn out a few flies that way, sharpening them to death, but with a big, tough-jawed fish, it's one of the best possible advantages you can have.

This beautiful king was still lake-colored. It was a male, 38 inches long and weighed 31 pounds. My last fish of 1981! A "spot and plot" bonus trophy!! You can bet I'll be out there this March for the spring steelhead. Chances are the place will be deserted. There'll be me and the fish. Or maybe you. I hope you try.

The fly patterns are all basically yarn styles in gold, orange, yellow and pink. The artificial eggs are either single or double.

# Winter burn on trees

*CHRIS ELFRING, UW-Extension Writer*

Man's reaction to cold is immediate — we bundle up, move indoors, or suffer the consequences with alarming rapidity.

Trees may look contentedly inactive all winter, but they can suffer. Damage may not show until spring, but nonetheless winter is a test of strength for trees just as it is for other living creatures.

Low temperature though, isn't the sole culprit. Cold, bright sun, wind and frost combine to take their toll in the forest. Come spring, the appearance of brown, dead branches, and whole trees as well, will attest to the severity of another Wisconsin winter.

"The problem is called 'winter burn,'" says Gordon Cunningham, University of Wisconsin-Extension forester. "During the deep freeze of mid-winter, moisture is removed or transpired from tree bark and foliage faster than the roots can replace it."

Many factors contribute to this dehydration. All plants lose water through their leaves or needles. Transpiration is a physiological cooling mechanism similar to perspiration. The winter burn problem begins when, despite the cold air, sunlight warms the foliage and branches enough to increase transpiration.

More warming can occur when snow reflects even more sunlight onto the plant. This reflected sunlight and wind, which worsens the dehydration by carrying moisture away more rapidly, can further increase the amount of water lost.

Winter burn actually is caused by more than the rapid loss of moisture through transpiration. At the same time the tree is losing essential moisture to the air, it is also unable to replace it because the roots are threaded through frozen ground. Ice simply is not a good source of water for plants — it cannot be readily absorbed. And in cold weather, what liquid water there is moves more slowly into the tree and through its cells. Like oil in a car, the colder the weather, the slower the movement.

"Sunlight, wind and radiation off the snow combine to cause excess transpiration, and these set the stage for winter burn," Cunningham says. But the extent of the burn also depends on how deeply the ground is frozen and how deep the tree's root system extends.

Frost depth varies with the severity of the winter and snow cover. The long-term average is 7.5 inches.

The extreme cold often associated with bright, sunny weather aggravates the winter burn problem.

Winter burn is not very visible in winter. It is in early spring, when damaged foliage starts turning brown, twigs fail to bud, or dead bark becomes noticeable.

When spring arrives, the dying foliage and branches will be most obvious on the tree's south and west faces — the sides where winter sunlight is most intense. Severe winter burn can kill an entire tree, but more often damages only portions.

"Sometimes you can judge how deep the snow cover was in a spot by examining low evergreens for the extent of winter burn," says Cunningham. "Snow is a good insulator, so the parts of the evergreen that were buried will be alive and green. But there can be a sharp line above which needles are brown — these were above the snow and subjected to wind, sun and harsh weather."

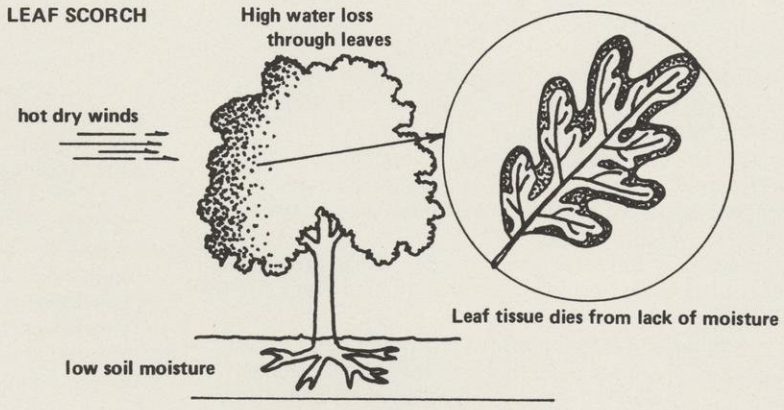
Winter burn is harder to spot in bare, deciduous trees than in conifers. Thin-barked trees like maple will show "frost cracks." These are small cracks in the bark that form when a cold spell freezes sun-warmed water in the underbark. But the extent of the damage to a deciduous tree also will not be known until spring, when some branches blossom and others do not.

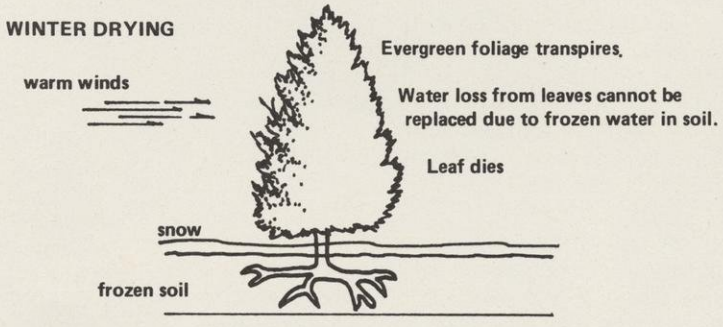
For forest trees, winter burn is just one of nature's tests, a factor in the process of natural selection by which the more resistant survive to reproduce.

You can help lawn shrubbery and small trees by protecting them. Burlap shields will block both wind and sun — around the south and west sides of susceptible plants.

"You'll find more damage to shady-site trees like yews. These will winter burn more severely than sun-tolerant species like junipers," Cunningham says. This is because yew foliage has a thinner cuticle, or outer skin, which loses moisture more easily than waxy juniper needles.

One of the best ways to avoid losing trees to winter burn is to keep site-preference in mind when planting. In Wisconsin's severe winter climate, yews do better when they are protected from the sun, perhaps in the shade of buildings, while junipers are able to survive sunny southwestern exposures.




*Top left:*
Frost crack on ash

*Top right:*
Sunscald on red oak

*Left:*
Winter injury to scotch pine

Photos by Thomas H. Nicholls

# The readers write!

Your September-October issue carried a painting of sandhill cranes by Owen Gromme. Can you tell me where I could obtain a reprint of that painting? Two pairs nest in a marsh just north of my home.

***KENNETH MEIER, Merrill***

*Artist Owen Gromme donated "Marshland Elegy—Sandhill Cranes" to the Leopold Memorial Reserve and the International Crane Foundation. Proceeds from the sale of prints go to maintain the reserve and to world-wide efforts to save cranes and their marshland habitats.*

*Prints can be purchased for a minimum donation of $200 (tax-deductible) from the International Crane Foundation, City View Road, Baraboo, WI 53913, 608-356-9462.*

I've read and enjoyed your magazine for the last four years, and I have a subject I'd like to bring to your readers' attention. The topic is wildlife damage — who benefits and who pays.

I own a farm in central Adams County. Our wildlife damage problems here are due mainly to deer and sandhill cranes. In my case, on 250 acres of corn, soybeans, alfalfa, oats and clover, I experience an average $3,000 annual crop loss due to wildlife.

Many area farmers have it even worse. They grow vegetables for canning and the damage to their snap bean and carrot fields is tremendous!

As you can see, farm owners do not benefit from the great Wisconsin deer herd. To make things even worse, the Wisconsin Legislature recently cut off all wildlife damage claims. Now we lose even more.

Since we bear the total cost of feeding these animals we will, of course, post our farms and save the hunting for family and friends.

The number of landowners who pay the price of wildlife damage is a very small percentage of the total Wisconsin population. We can't make enough noise to be heard very far. On the other hand, we're left holding a very large bill, with very few of us to pay it.

In my opinion, the state must consider that it "owns" Wisconsin's wildlife population. The state controls it, the state protects it, the state collects license fees from the public to use it. My position, therefore, is that the state should have a program of some kind to compensate landowners for damage done to their crops by wildlife.

***JERRY CARDO, Coloma***

*Now you can see why DNR is a controversial agency. We're caught in the middle between landowners — who suffer crop damage from high wildlife populations — and urban hunters — who want even more wildlife to hunt. We manage wildlife to maintain a compromise between these two extremes, but compromise usually pleases neither side of a controversy.*

*The obvious solution is to pay landowners for wildlife damage and maintain high wildlife populations for hunters. But like many other issues in this complicated world, the answer is not so simple.*

*The old wildlife damage program was inefficient, it benefitted less than ¼ of 1% of the state's farmers, was very expensive to administer (costs almost equaled payments), and it kept wildlife managers from more important duties.*

*The Legislature viewed the program as we did and ended it in mid-1980. But it did so on one condition — we had to find something better to replace it. A multi-agency committee recommended a wildlife damage prevention program, but it failed to pass in the Legislature. Attempts were made to restore the old program, but these also failed.*

*The wildlife damage problem is not a dead issue. The Natural Resources Board is still studying the problem. Many legislators are still very concerned.*

*In the meantime, closing your land to hunters will certainly not help your damage problems. I hope you will reconsider.*

***DNR Big Game Supervisor Frank Haberland***

In Your September-October 1981 issue, Robert C. McBroom of Franklin condemned the auto emissions test program scheduled to begin in 1983. (Catch-all, May-June 1981) Mr. McBroom calls this program "a futile inspection boondoggle," and declares that it "won't make one microgram improvement in air quality."

I beg to differ. These tests—which cars, vans and light-duty trucks should be required to pass before being licensed—will not only prevent further emissions from escaping into the oxygen we breathe, but will also make the drivers of these vehicles more aware of the emissions and pollution problems we face today.

Many people have died because of carbon monoxide escaping into non-ventilated vehicles. The testing program is expected to reduce tailpipe emissions by 42% and carbon monoxide by 50%. Maybe this program will even save some lives!

***MARYROSE SNIEG, Milwaukee***

I wish to compliment you on your great article about the George W. Mead wildlife area in September-October.

Why not do the same for other wildlife areas in Wisconsin? It took me a long time to find the Powell Marsh. Even natives living within a few-mile radius knew nothing about it.

***GEORGE G. RUESCH, Medford***

*The magazine publishes articles on parks and wildlife areas several times each year. Powell Marsh is on the agenda for sometime.*

I disagree with Lawrence Krak's negative remarks about wolves in November's "Readers Write" column.

Mr. Krak compares wolves to rats and mice. Rats and mice are disease-carriers, a major health hazard in many areas around the world. I certainly would not want to find them in my cupboard.

But timber wolves on the other hand, are an endangered species which seems to be making a small comeback. Many people, myself included, are encouraged by this. And I neither "write about them or chase them through the woods with transmitters."

I think I should also point out that automobiles, just like the one or two that Mr. Krak probably owns, kill more deer every year than timber wolves could in 10. Also don't forget your basic domestic dog pack, which is much more common and probably downs far more deer than wolves ever could.

I find it a shame that there are still people like Mr. Krak who wish to destroy a beautiful animal like the timber wolf, a creature which has as much right to be here as we do.

The timber wolf's only chance for survival will come when guys like Mr. Krak are extinct. Move over, Krak, and make some room for the wolf. I'm betting he'll be here long after you're gone.

*GARY J. HUEMPFNER, Rogers, AR*

I'm sure you're aware that your magazine is very widely read. From "The Readers Write" letters, I find that people are truly "reading" your magazine in depth, not just looking at the pictures.

Your photography and artwork are excellent, and do a good job interpreting the words "natural resources." The articles are written so that the layman can understand them, and yet technical enough to hold the interest of someone more knowledgeable. Keep up the wide variety.

Has the magazine ever sought out the work of Wisconsin's aspiring young artists and painters? Why not let our youth show how well they've learned what "natural resources" means to them?

*DOMINIC BRYNGELSON, San Lorenzo, CA*

*The magazine maintains a photography and art file, and encourages photographers and artists young and old to submit samples of their work for consideration. For illustration guidelines, write: J. Wolfred Taylor, editor, Wisconsin Natural Resources magazine, P.O. Box 7921, Madison, WI 53707.*

I'm a resident of Wisconsin and a sportsman, but until recently I was unaware of your fine magazine. I had been purchasing issues of *Wisconsin Sportsman*, and enjoyed the magazine so much I asked my wife to order it for me. By accident, she ordered a subscription to your magazine, instead.

Now I am subscribing to both, and find them to be informative and interesting reading. Thank you.

*GENO VALENTINO, Wisconsin Rapids*

I'm so glad you were crazy enough to publish "Wild Goose Chase." It was difficult to read about all the drama, pathos, mystery, suspense and high adventure because I was nearly blinded by tears of laughter.

Thanks, Don Bronk. I'd love to hear how you made out during the deer season.

*(MRS.) CAROL M. TRUDELL, Almond*

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

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**Front cover:**
The big lake-run rainbows lay there in a shallow run of water above a little pool, red flanks glowing in the sun. For more on how to catch these fish see "Spot and Plot for Trophy Fish" on page 24.
**Painting by artist Virgil Beck, Box 1548, Wausau, WI 54401.**

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**Back cover:**
The black tern is the smallest, darkest-colored and most common member of its clan commonly found in Wisconsin. With ease it performs the aerodynamically tricky task of feeding young on the wing. For more on Wisconsin birds, see page 32.
**Photo by Steven Lang**

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# Wisconsin's birds – *a season for nesting*

*KEN WARDIUS*

Photos by author

The lonesome cry of the loon echoes across northern lakes. The cardinal's sweet whistle fills country woodlots and city streets. Kingfishers rattle, meadowlarks sing, grouse and woodpeckers drum. With the first warm wind, colorful wood warblers and majestic Canadas wing in on their spring migration.

Everywhere, harried parents are endlessly feeding ravenous nestlings. From the tip of Rock Island to the deepest northern forests, from the western upland to the central plain and Kettle Moraine, crisscrossing lakes and rivers, fields and forests, Wisconsin comes alive with the nesting season.

Rich in abundant habitat — from oak and pine woods to prairies and wetlands — Wisconsin nurtures a large and diverse bird population. According to the Wisconsin Society for Ornithology, at least 220 species are known nesters here. Another 150 do so occasionally and an additional 26 are listed as hypothetical.

Actually, Wisconsin's nesting period officially opens not in spring, but in midwinter, where in mixed woodlands, the questioning courtship call of the great horned owl booms across the nighttime countryside. This early bird on the Wisconsin nesting scene, *Bubo virginianus,* begins incubation duties in the cold heart of frigid February. Many an owl has been spotted on its nest wearing a bonnet of snow atop its feathery ear tufts.

The list of other hardy, early breeders includes owls and hawks, certain ducks, woodcock, killdeer, doves, horned larks, crows and ravens. But most songbirds prefer more hospitable weather before tackling the rigors of parenthood. The bulk of them nest from May through July.

Last to take up parenting in Wisconsin is the American goldfinch. It patiently waits until thistles mature in late summer before reaping the relished seeds and lining its nest with soft thistledown. This lovely yellow and black wild canary may produce offspring as late as September.

More than half of all Wisconsin nesters are migratory. An internal, hormonal clock triggers the long flight to their summertime breeding grounds. As spring's hours lengthen and temperatures mellow, the birds reproductive systems become active and enlarged. A restlessness, called "Zugunruhe," takes hold and their bodies store fat for the long northward flight.

Wisconsin is the summer home of many species which winter in Mexico, the West Indies and Central and South America. Some of them cover staggering distances. Bobolinks, noisemakers of the grasslands, may journey 6,000 miles from Argentina. Chimney swifts travel nearly 4,500 miles from the Amazon basin.

Immediately upon arrival, birds set up territories. Any old spot won't do. An ample food supply, suitable nesting material and just the right nest site are essential. Males typically arrive first and proclaim ownership of an area. Lilting songs, threat postures and aggressive behavior are the order of the day.

Territories vary considerably in size. Colonial nesters such as gulls, herons and swallows defend only a few square inches or square feet. Larger raptors, on the other hand, patrol many acres.

Once the males are firmly at home, females arrive to inspect the premises. Attracted by song or showy plumage, prospective mates vie for one another's affections. Some males present nesting material or food as a coaxing gesture. House wren bachelors go so far as to build several alternate nests for the females' inspection — sort of an avian open house.

Displays are also an important part of bird courtship. These exhibitions help synchronize the pairs' reproductive readiness. Hummingbirds, hawks, woodcock and snipe perform aerial acrobatics, while prairie chickens, bufflehead ducks, sandhill cranes and herons strut and dance below.

If the tempted female succumbs, the two form a "pair bond" and become mates. Most birds mate only for a single season, although some waterfowl like geese as well as birds of prey join for life. On the other hand, polygamy and promiscuity exist too, and are common among many species.

As the cycle continues, copulation occurs and the laborious nesting process gets underway. Females normally select the site and build the nest. Every conceivable niche is used by one bird or another. Barren ground, shrubs, tree cavities and limbs, man-made poles and buildings — there are few vacancy signs in the avian world.

The nests that occupy these varied niches also vary as greatly in size as the birds themselves. Kinglets, hummingbirds and gnatcatchers have tiny nests while bald eagles, great blue herons and ospreys have massive ones.

Most birds build a new nest each year. The material and structure depend on the species and its choice of habitat. Aquatic residents use wet vegetable debris. Woodland birds gather forest leaves, sticks and lichens. Meadow-nesters incorporate grasses and rootlets.

Some birds need no nest materials at all. Killdeer, other shorebirds, nighthawks and whippoorwills deposit their eggs directly on stones or open soil, on rooftops or in shallow depressions.

Cowbirds go even one step further, and lay their eggs in other bird's nests. When the unruly cowbird youngsters hatch, they demand most of the unsuspecting foster parents' food offerings, and may even jostle rightful siblings out of the nest.

Different birds use their chosen nesting material with greater or lesser skill. Bitterns and mourning doves build primitive stick nests with little shape or form. But several species construct much more complex, intricate and interesting homes. Northern orioles weave a swaying, purse-like pendant dwelling. Ovenbirds form a domed-over nest and birds of the swift family hold their residences together with a cement-like salivary gland secretion.

But great crested flycatchers probably use one of the most bizarre nesting materials of all. If available, these birds will thread pieces of shed snakeskin into their dwellings!

Once the nest is complete, egg-laying follows shortly thereafter. Traveling down the female's oviduct, basic egg constituents — yolk, albumen and shell — come together and she lays her egg. Variations among species in clutch number, size, shape and color are infinite depending on food, weather, nest conspicuousness and the size of the bird. After the laying, the lonely vigil of incubation ensues. Both sexes generally participate, providing warmth and continuous protection, although the female is usually the chief brooder in most perching birds. Equipped with the "brood

These baby robins get constant care. Their nest is a sturdy affair of mud and straw that is sometimes used as a base for next year's nest.

Like most birds, male tree swallows often stake out a territory before females arrive, then defend their turf against rivals.

Northern oriole. Its nest is a tightly interwoven hanging pouch.

patch," a featherless abdominal area rich in blood vessels, she diligently tends her eggs' precious cargo for hours at a stretch. Temperatures for proper embryo development average 93°F (34°C), with the eggs occasionally rotated to insure equal heat distribution.

Hardly idle during this phase, the mate also bears a share of the load. Responsive to the female's needs, males often carry food to the nest-bound mother or stand guard nearby. During this most-critical period, the pair must contend with predation, parasitic cowbirds, nest-robbing jays, foul weather and human disturbance.

Length of incubation periods are influenced by environmental factors, nest vulnerability and bird type. Perching birds require 12 to 14 days, while prey species and some waterfowl can take more than a month. Well-concealed nests tend to have longer incubation times than exposed ones.

Near the end of their incarceration, chicks can sometimes be heard peeping within the egg. Possessing thick neck muscles and a tiny nonpermanent egg tooth on the upper mandible, the young — on their own — slowly extricate themselves from their calcium prisons.

Hatchlings are of two main types. The "precocial" species include most water, shore, marsh and chicken-family birds. They are alert and active almost immediately upon hatching. Most have well-developed leg muscles and are covered with warm, fluffy down. They are soon able to feed themselves and leave the nest area relatively quickly. The "altricial" nestlings are blind, naked and immobile. Wholly dependent upon adults, they are confined to the nest for days or even weeks. Most birds of prey and songbirds fall into this category.

The obstacles facing all new avian arrivals are immediate and three-fold: they must have a proper diet, be safe from weather, and protected from predators. A high percentage do not survive.

Slowly the family settles into a routine. The parents hunt tirelessly for food, sometimes the entire day. Sources rich in protein are essential for the rapidly growing youngsters. Often, to supply the hungry nestlings, normally shy and retiring species venture into open areas they would otherwise avoid. Suddenly, owls are seen hunting in the daytime. Hawks seem to be everywhere. Insects, fruits and berries, seeds and animal meat are possible choices, depending on the species.

Through it all, the overworked parents must keep up with household chores. Sanitation and nest maintenance cannot be ignored. Waste products, in a neatly enclosed fecal sac along with egg shell remnants, must be removed or ingested. The slightest tip-off to a sharp-eyed or keen-nosed predator could be deadly.

Day to day wear and tear on the nest occasionally necessitates reconstruction or rehabilitation. Sometimes the parents add fresh green sprigs for extra camouflage.

Eventually, the chicks grow and feather until they begin to overcrowd the nest. As accommodations start getting cramped, the parental feeding trips become fewer and fewer. Finally, at fledging time, some parents withhold food entirely. Others entice the little ones onto a nearby limb, dangling a tidbit just out of reach. Still others forcibly evict their offspring, literally "kicking them out of the nest." Depending on the level of development, fledging can produce powerless tumbles or graceful flight.

But parental duties are still far from complete. The young must learn to find and eat palatable foods, as well as be on the alert for danger.

Some young birds learn the ways of adulthood through repetitive imitation, some by trial and error. Other actions are innate — instinct ingrained within the species. Eventually, all juveniles exhibit the typical traits, habits and songs of their kind. Flight skills are honed to a fine edge. Initial hesitant wing beats are replaced by precise and beautiful aerial movement.

At the end of the ordeal, adult birds are visibly and understandably fatigued. But some energetic species repeat the whole sequence all over again, raising two or three broods a season!

When the young are able to fend for themselves, the family unit gradually dissolves. Sparrows, finches, blackbirds and chickadees group into loose flocks, while others wander about on their own after nesting-time.

Finally, the nesting season winds to a close. Fancy breeding plumage disappears. Songs and territorial displays cease. Permanent residents courageously prepare for the upcoming winter. Transients wing their way on fall migration to southern wintering grounds where better food and warmer days await.

Swiftly the full brunt of winter envelopes the state and all appears quiet. But ever so slowly, the harsh winds always subside, the snow always melts and the cycle begins anew.

The bird nesting season in Wisconsin is a special time, a time to observe, enjoy and remember. When once again you hear the haunting, lonesome cries of the loon and the cardinal's sweet whistles, the kingfishers rattle and the meadowlarks song, the annual renewal is affirmed. All is well in birdland and elsewhere too.



These redwing blackbird nestlings hatched in late spring. Adult females don't show up in Wisconsin until almost a month after males proclaim their territories and may take another month to pick a mate.

Killdeer eggs and young are well camouflaged. The nest is a shallow gravel depression on the ground.

***Top right:*** A mourning dove's nest is little more than a haphazard jumble of sticks suspended in the crook of a branch.

No matter what the species, the demands of a growing family are insatiable. Feeding these hungry bluejay chicks keeps the parents hopping.