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COVERS: Front -- Red fox at blue-winged teal nest. Photo by Lowell Washburn. Back -- Summertime sailing. Photo by Lowell Washburn.

Wired

Story and photos by
Lowell Washburn

On a northern Iowa marsh, DNR biologists are experimenting with a high voltage barrier that separates nesting ducks from predators. The results have been shocking.

State waterfowl biologist, Jim Hansen, moved silently through the thick vegetation of the Ventura Marsh uplands. Cautiously he stalked a small piece of fluorescent tape that fluttered from the branch of a small bush. To the casual passerby the scene may have appeared a bit odd, but there was good reason for his actions.

Located exactly five paces to the north of the orange marker was the nest of a blue-winged teal which researchers had discovered two weeks earlier. As he closed in, Hansen sensed that something was wrong. Arriving at the nest, his suspicions were confirmed. All that remained were some broken shell fragments and scattered patches of down — the all too familiar calling card of the striped skunk.

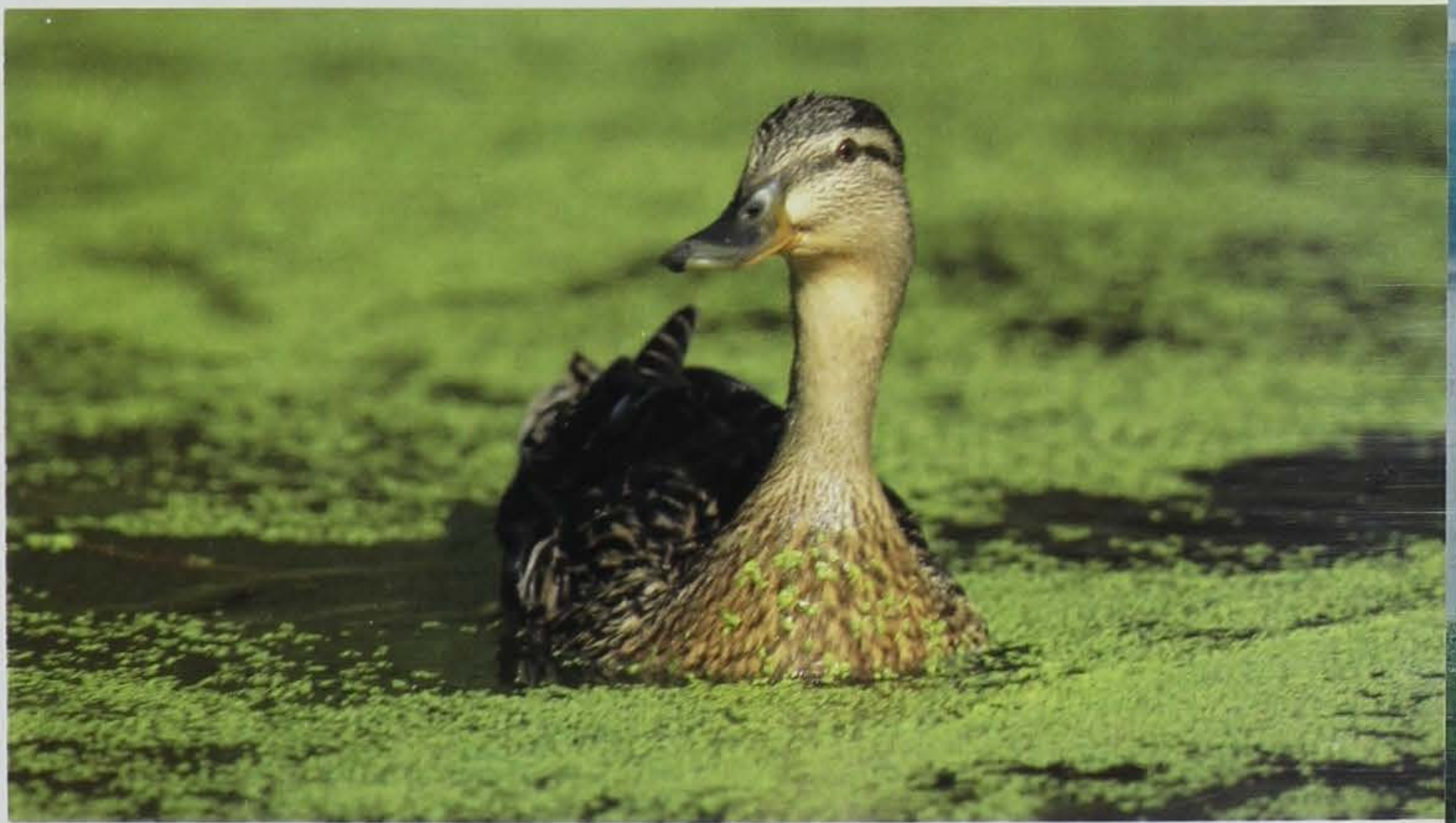
Although this development was certainly discouraging, it was not surprising. For this represented the last of 33 nests to be inspected. None would hatch. All had been destroyed by predators.

Meanwhile, at a site located directly across the 758-acre marsh,

the scene was quite different. On a grassy hillside, a hen mallard clucked softly to her brood of 11 ducklings. The ducklings had hatched just hours earlier, and before nightfall, the hen would lead her batch of fuzzballs to the water

reaching experiment designed to increase the production of wild ducks.

When European immigrants first began to push westward into Iowa, they encountered a vast six-million-acre complex of native



to begin their life in the marsh.

The reason this nest had survived when so many had failed could be summed up in a single word — electricity. And although the hen could not realize it, she had been the unwitting beneficiary of an exciting and potentially far-

prairie wetlands. The lush nesting grounds produced a sky-darkening abundance of migratory waterfowl. Predators and ducks lived side by side, and, when presented with the overwhelming task of searching an endless expanse of grassland, it was unlikely that egg-eating mam-



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mals had much impact on waterfowl numbers.

But as the first blade of the first plow sank deep into the prairie sod, things began to change. Ducks have been on the run ever since, and with each passing year, the competition has intensified as predator and prey vie for the same limited space. Remaining nesting areas have become green islands of habitat sadly bobbing in an ocean of highly developed cropland. The efficiency of predators has escalated dramatically, and their overall numbers have increased as well, as brush piles, rock piles and abandoned outbuildings provide an unprecedented number of den sites.

Of course, no one knows exactly what level of success was enjoyed by waterfowl nesting in Iowa during the 1800s. However, as early as 1939 it was reported by E. R. Kalmbach, of the U. S. Fish and Wildlife Service, that "duck nesting success should be 60 to 70 percent." Anything showing less than that, he said should be regarded with suspicion or alarm.

Were Kalmbach to revisit Iowa today, he would no doubt find that cause for alarm. Studies conducted by the Iowa Department of Natural Resources at the Ventura Marsh, Clear Lake, and on Harmon Lake near Lake Mills revealed that predators had destroyed more than

90 percent of all waterfowl nests located. In 1980, no successful mallard nests were found on the Ventura Marsh uplands, and during 1982 only one hatched.

"It was now rather obvious that this so-called

island effect was having a major negative impact on duck nesting and that something needed to be done," said Hansen. "We needed to find ways to raise more ducks, and as we continue to lose habitat, we need to do it in less space."

The upshot of this concern was the initiation of a research project whose emphasis would be to separate nesting ducks from mammalian predators by means of an electric barrier. Consequently, a nine-strand, high tension, battery-operated fence was erected around

45 acres of nesting cover and five acres of wetland on the south side of the Ventura Marsh. The total cost was \$5,000, and a fence-life of 20 years was projected. A spin-off of the Australian sheep industry, this state-of-the-art concept utilized alternating hot and ground wires to deliver a snapping 4,000-volt punch. But while the charge certainly commands instant respect, its low dose amperage makes the punch very non-lethal. The fence became fully operational in March 1983.

In order to compare success rates for birds nesting both inside and outside of the fence, the study was designed to include 130 fenced acres of upland at the Ventura Marsh as well as 120 acres of nesting cover on the McIntosh Wildlife Area located two miles away on Clear Lake's north shore.

Hansen noted that the ultimate success of the project would depend, to a large extent, on the ability of certain species, such as the mallard, to return to their natal area. "Mallards have a very highly developed homing instinct," he said. "We theorized that by providing a predator-free environment we could capitalize on this trait and build a denser population of nesters inside the fence," said Hansen.

During each year of the project DNR research crews have used a 50-foot rope drag or chain drags to



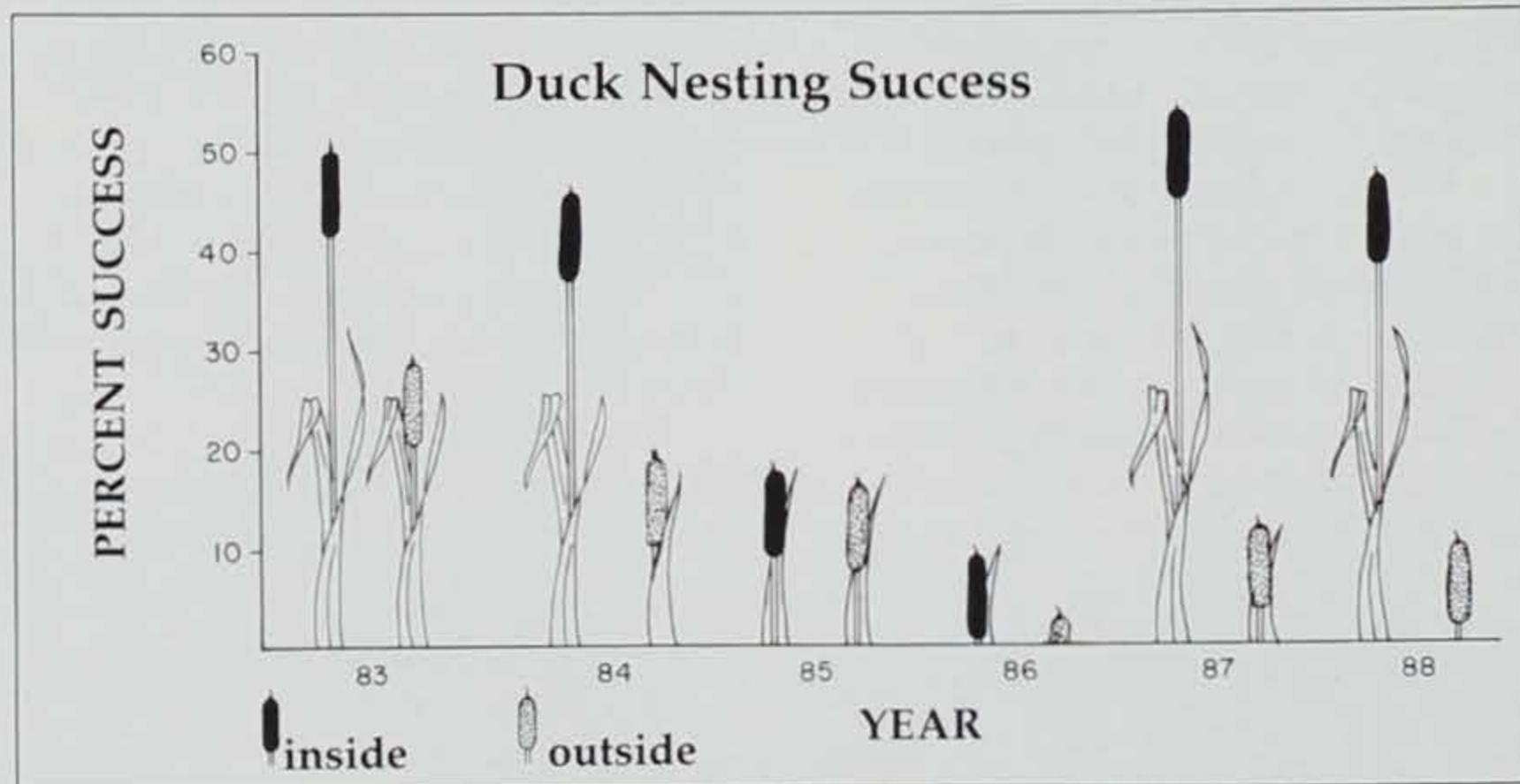
Today, nesting areas for ducks have become green islands of habitat, consequently making the eggs (above), and sometimes incubating hens, easy meals for predators.

In 1986, a solar-powered battery charging panel was added to the fencing project (left), helping alleviate power outage problems.

Prior to hatch, hens are caught and marked with nasal saddles (far left) to help monitor brood success.



systematically comb the study areas for nests. Rope dragging begins in late April and continues at 16-day intervals throughout the nesting season. Wherever a flushing hen revealed a nest, the location was marked with a strip of tape and the eggs candled to determine their age. Prior to hatch, biologists return to capture and mark the female by means of a numbered leg band and by fitting the bird with a color- and number-coded plastic nasal saddle. (The nasal saddle can be viewed at a distance and allows



researchers to monitor brood survival as the summer progresses.) Finally, on the day of hatch, all mallard ducklings were marked with individually numbered metal web tags. By marking both hens and ducklings the DNR hoped to learn whether or not the fence could build on itself or if it would simply attract ducks from other areas. During 1983, 16 ducks nested inside the fence and 10 of those nests were successful.

Outside of the enclosure, predators continued to ravage nests at an alarming rate. As suspected, the



striped skunk proved the number one culprit, followed by the raccoon. The red fox ranked a distant third, but if it did find a nest, this cunning predator was much more likely to capture and destroy the hen along with the eggs.

According to DNR furbearer specialist, Ron Andrews, the nesting study was making it painfully evident that some of our best wildlife areas had become predator sinks. "On some areas the total predator base was simply unbelievable, and I am sure that in some instances we were virtually eliminating the upland component of certain mallard populations," said Andrews. "It doesn't take very many seasons of zero success before that element is out of the picture," he added. Andrews believed that at this point the study was revealing that mallard hens exhibiting the greatest homing tendencies had actually now become the most vulnerable. And instead of working for them, this instinct was now contributing to their demise.

"But the whole beauty of the fence situation," says Andrews "is that it allowed us to separate predators and nesting birds without conducting a campaign to eradicate egg-eating mammals. We are definitely not anti-predator, and species such as the red fox and raccoon are extremely valuable to Iowa's recreational picture." By 1984, web-tagged baby mallards were returning as adult females to nest within the perimeter of the electric fence. However, while ducks nesting inside the fence continued to enjoy better survival rates than those nesting outside, the barrier did prove to be less than a total panacea.

There were power outages to contend with, and batteries needed frequent recharging. It may have been during one of those outages that a striped skunk slipped through the wires and conducted a month-long rampage before it was captured. Because of that escape, a three-foot-high wall of wire poultry mesh was added to the fence. The mesh lets ducklings through but keeps large mammals at bay, and skunks have not

penetrated the perimeter since. Also, in 1986 a solar-powered battery charging panel was added to the project.

The most perplexing dilemma came in 1986 when an invasion of weasels plummeted nest success to an estimated nine percent. In 1987,



a total of 43 weasels were live-trapped inside the fence, and success returned to 55 percent. Nest success outside the fence hovered at 12 percent. Even while biologists were still working the bugs out of the system, the electric barrier was clearly having a positive impact on nesting ducks.

During 1988, a total of 102 duck nests (51 blue-winged teal, 45 mallards, 5 shovelers, 1 pintail) were found inside the Ventura Marsh fence. More than 500 ducklings, or 12 per acre, were hatched. The hatching rate outside the enclosure was less than one duckling per acre.

"Those birds are the bottom line," says Hansen, "and it makes us feel pretty good to see those 50 acres producing that many ducklings where none were hatched in 1980." He added that although fences have been tried elsewhere, no one else has yet succeeded in producing more than 100 nests.

During 1989, the research phase of northern Iowa's nesting study will begin winding down as biologists begin to sift and evaluate

the mountains of data gathered over the past seven years.

"I think that we're ready to go beyond the pilot project stage and move on to the management side," said Hansen. He noted that each time one of the fence's defects was corrected, the whole system

became more maintenance free. Consequently, Hansen feels that the management potential for the fence is much greater now than when the project began, and in the near future the DNR hopes to install at least two more fences somewhere in the state.

"This is an extremely promising management tool, and one that can't be ignored," said Andrews. "The electric fence is simply the most economically feasible, socially acceptable, and biologically compatible means of managing upland cover for duck nesting success."



"It was now rather obvious that this so-called island effect was having a major negative impact on duck nesting and that something needed to be done," said Hansen. "We needed to find ways to raise more ducks, and as we continue to lose habitat, we need to do it in less space."

Garbage Grants

Story by Kathryn Stangl

Photos by Ron Johnson

With waste disposal a growing concern for all Americans, alternatives to landfills are becoming a top priority among many state and local governments. Iowa is finding solutions to its problems through a grant program aimed at these alternatives.



solutions to these disposal problems. Created by the Groundwater Protection Act of 1987, the grant program is administered by the Department of Natural Resources' Waste Management Authority Division and is funded by a portion of the fees paid to the state for every ton of waste disposed of in sanitary landfills. More than \$1.8 million has been awarded through the program so far, although there have been nearly 100 grant requests seeking nearly \$10 million in assistance.

The grants are awarded to qualified firms, individuals and governmental agencies to conduct demonstration projects or feasibility studies involving innovative alternatives to solid waste disposal. The feasibility studies include projects to determine the environmental

The solid waste disposal crisis is not static. Trash is generated everyday, every minute, in every corner of the state. All the debris from our disposable society -- the cans and bottles, leaves and lawn clippings, paper and plastic packages, the broken furniture and appliances, the uneaten food and old tires -- multiply at an alarming rate. Each Iowan generates approximately four pounds of solid waste per day. At the same time we generate more waste, the processing and disposal capacity available to handle it lessens.

Iowans need to reduce the gap between waste generation and the available capacity in landfills. As a nation, our daily per capita generation of solid waste (approximately four pounds) is the highest in the world and our per capita solid waste burden continues to grow each year. Business as usual has meant an accelerating trend toward disposable products, "convenience" packaging and an out-of-sight-out-of-mind attitude toward solid waste. As our landfills become saturated, we can no longer rely on them to handle the more than 90 percent of our solid waste they do today. Preventing the generation of wastes and diverting waste components from landfills becomes increasingly important.

Iowa's Solid Waste Alternative Grant Program is helping in the difficult and inescapable task of finding

consequences of landfill alternatives.

Any public or private group, business, or individual with an interest in or a responsibility for solid waste management in Iowa may submit a proposal. The state's solid waste policy includes a hierarchy of preferred solid waste management alternatives (see page 11) and the grants are scored according to that hierarchy.

The grant requests for proposals are issued twice a year. Applicants must provide a description of the problem or situation that prompted the project and should explain both the need for the project and its adaptability to other communities and commercial establishments. The description must also include the percentage of the municipal solid waste diverted from sanitary landfills and the extent to which the project incorporates and reflects Iowa's hierarchy of solid waste management alternatives.

For projects that involve production of energy from refuse-derived fuels (RDF), the description should also explain the commitment of the energy market to the project, the recovery of non-combustibles and the implementation of the two steps of the hierarchy above combustion, namely waste reduction at the source, and recycling/reuse.

Once the DNR receives the grant proposals, it



selects the grantees, negotiates a contract, reviews the quantity and quality of work performed and issues payments upon completion of the work specified in the contract. The grant proposals require detailed, well-documented information. By accepting the DNR grant, the applicant agrees to provide progress reports and a final, detailed account of all the project's expenditures as well as its accomplishments.

The grants fund practical, environmentally safe projects that can be put into place immediately with existing resources and technology. Studies that gather necessary information to assist in making sound decisions about solid waste disposal options are considered for grants as well.

The first round of grants awarded show a variety of solid waste alternatives that will be valuable to all



Operations like this plastic recycling project in Ames are beneficial to Iowa's environment as well as the economy.

areas of the state. The initial grant recipients include one volume reduction project, two composting demonstrations, a community drop-off plastic recycling project, and three different types of municipal recycling operations.

The second and latest round of grants followed the two-pronged approach of demonstration and studies. Grant awards involve practical projects done on a city-wide basis and studies of statewide problems.

Fort Dodge will be initiating a city-wide curbside collection recycling program. The recycling center for resource recovery will collect, sort, bale and ship recyclable material diverted from the county landfill through the curbside program. Recycling has the potential to reduce the amount of solid waste being landfilled by at least 25 percent. The Fort Dodge recycling center will be operated by the local sheltered workshop, providing employment to handicapped and mentally disabled clients. The project will have a strong public education component. This is necessary to encourage participation in the program and educate citizens of their responsibility for the solid waste they generate. Solid waste is everyone's problem and Fort Dodge will encourage city-wide participation through flyers, posters, radio, television and newspaper spots as well as direct mailings.

In the demonstration projects funded in the latest round, the city of Marion will be diverting leaves from the landfill and composting them. They will recycle the composted leaves by using them in the city park system and giving compost to residents for use in their gardens and flowerbeds. Leaves and other yard debris contribute significantly to the solid waste stream. Yard waste comprises 20 to 25 percent of the municipal solid waste stream. Once buried in a sanitary landfill, leaves and other materials do not rapidly decompose. They remain for years occupying large amounts of valuable space.

Marion plans to distribute degradable plastic bags for the leaf collections, and then monitor the condition of the degradable plastic bags. This project will provide information on a simple but effective way to divert large quantities of waste from a municipal

landfill while testing plastic bags containing an Iowa agricultural product -- cornstarch.

Sometimes it is easier to understand the need for and significance of demonstration projects than to understand the applicability and necessity of the "study" projects.

A brief look at the study projects funded in this second round of grants should help make the need for additional studies clear. The latest round of grants funded a study of air emissions and ash toxicity testing of shredded tires used as tire-derived fuel (TDF). This will provide useful information regarding the environmental acceptability of using shredded tires as a fuel source, which will in turn assist in the market development of TDF if it is shown to be an environmentally safe fuel supplement.



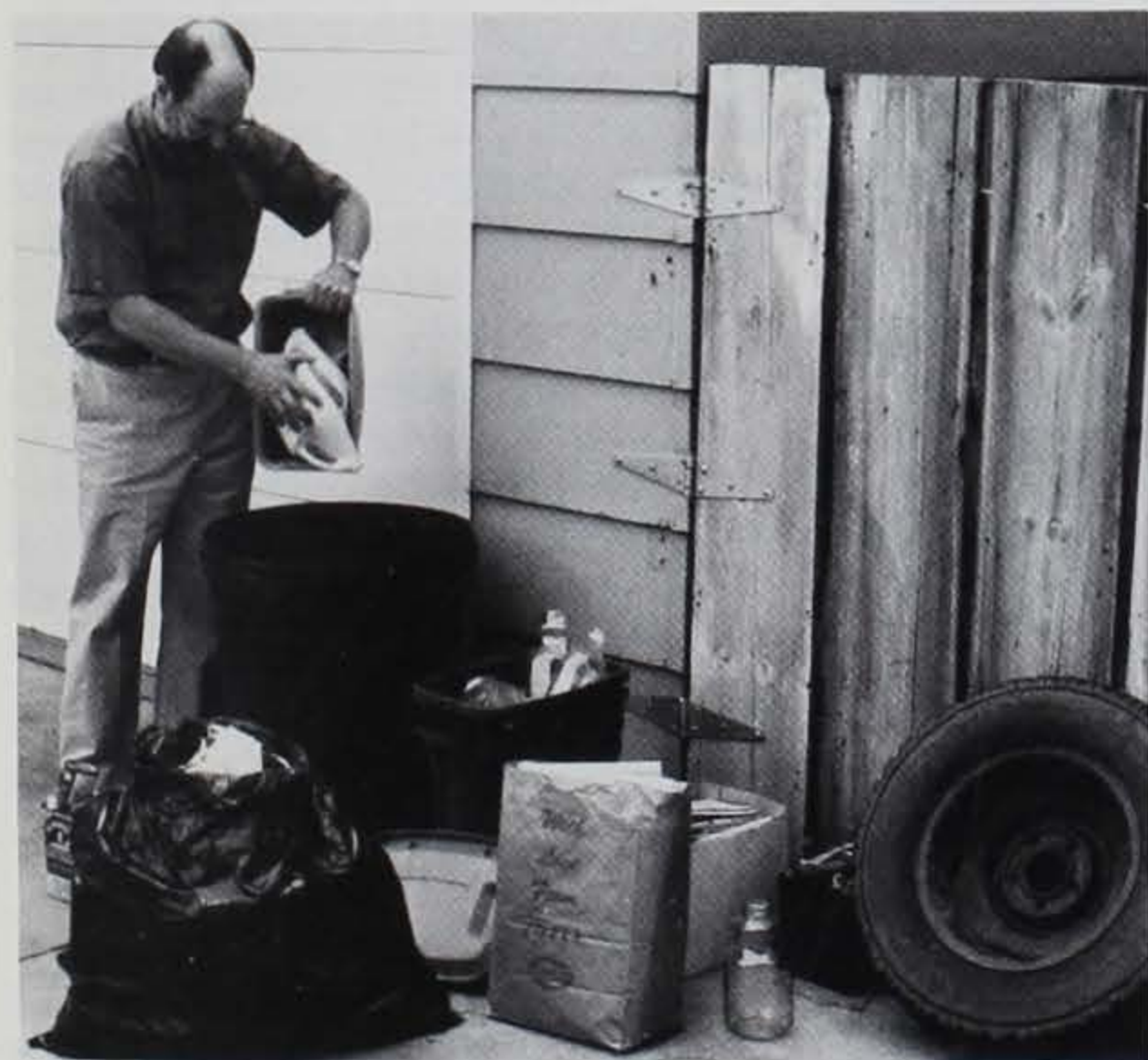
More than two billion used tires are currently stockpiled in the United States. Iowa generates nearly three million additional waste tires each year from tire manufacturers. We need to find non-landfill, non-stockpile disposal options for these tires.

Stockpiled tires catch rainwater and become a breeding ground for disease-carrying mosquitoes and other vermin. Researchers have recently found that mosquitoes breed roughly 4,000 times faster in tire piles than in forests. When buried in landfills, tires tend to "float" to the surface creating problems even in filled and sealed landfills when they break through the cap

covering the landfill. Fires that begin in stockpiled tires are nearly impossible to put out.

However, that same combustibility could be a real energy option if the combustion of TDF is found to be environmentally safe. Tires have an energy value of 30 million BTUs per ton, equivalent to 115 gallons of oil. The emission and toxicity testing information gathered in a study such as this are crucial to making environmentally sound decisions about the future of TDF as a disposal option. A separate grant will provide the state with detailed analysis of the potential uses, other than combustion, for waste tires.

Another study to be conducted by the Scott County Landfill will be a comprehensive sampling program to determine which "white goods" (appliances such as stoves, refrigerators, microwaves, dishwashers, etc.) contain dangerous polychlorinated biphenyls (PCBs). The PCBs can be released when appliances are shredded to recover the metal or crushed when they are buried in landfills. The PCBs are potential cancer-causing materials which can quickly contaminate our landfills and threaten our groundwater resources. By providing information on which brands, years and model numbers have capacitors that contain PCBs, the study will make it easier to promote the recycling of white goods.



Recycling can reduce waste going to the landfill by nearly 25 percent.

Air emissions and ash toxicity testing for the burning of the densified refuse derived-fuel (dRDF) made primarily from paper refuse and corrugated cardboard is also being funded. This study will provide the same kind of information on environmental acceptability and market development for dRDF that the TDF study will provide for shredded tires. The dRDF testing may have even more significance for reducing the waste stream than the TDF testing as paper is a major part of the waste stream that is currently landfilled. Newsprint, corrugated cardboard, office waste, phone books, food wrap, packaging and the assorted paper debris from our daily lives make up 40 percent of the landfill totals.

Paper does not biodegrade quickly when placed in a landfill as was previously supposed. A recent study utilizing core samples from a major metropolitan landfill showed paper products virtually unchanged from when they were first buried in the early 1970s.

Combined with the markets for recovered paper, the energy market could use large volumes of paper now being buried. If the testing proves dRDF can be safely burned for energy, the energy market will expand, reducing the amount of paper that must now be landfilled as well as providing an additional source of energy that does not rely on foreign imports.

All of the studies provide crucial information necessary to make wise solid waste disposal decisions. Across the state, the Solid Waste Alternative Grants program is providing information to Iowans to help evaluate our waste disposal options, forging new alliances to develop and implement integrated waste management systems. The grant program is helping eliminate the growing "capacity gap" between our waste generation and our saturated landfills.

Kathryn Stangl is an information specialist with the department and is located in Des Moines.

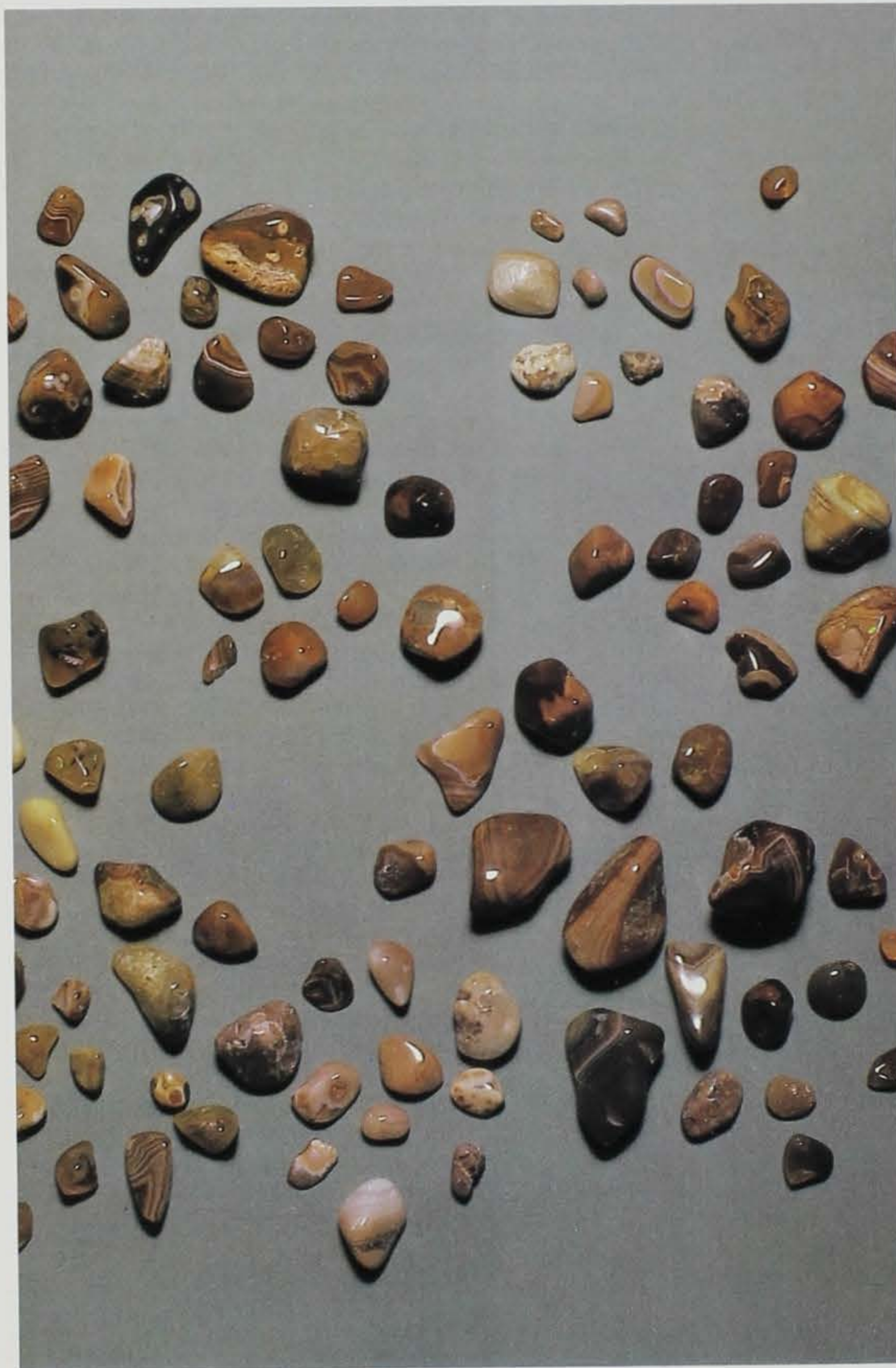
Iowa's Hierarchy of Solid Waste Alternatives

1. Volume Reduction at the Source
2. Recycling/Reuse
3. Combustion with Energy Recovery
4. Combustion for Volume Reduction
5. Sanitary Landfills

Rock and Mineral Collecting

Story by Paul J. Horick

Photos by Tim Kemmis



These translucent stones, tumbled to a high polish, are composed predominantly of varieties of quartz and include beautifully banded Lake Superior agates, which are prized by rock collectors.

There are many places to visit in Iowa that will spark the interest of rock and mineral collectors. Scenic outcrops along stream valleys, exposures at roadcuts and quarries, as well as sand and gravel bars and pits along rivers provide good collecting grounds for a surprising variety of rock types and associated minerals and fossils.

The glaciers that invaded Iowa in the geologic past left thick deposits of pebbly glacial drift covering the state's bedrock surface, and glacial meltwaters concentrated deposits of sand and gravel along the state's river valleys. Gravel bars and gravel pits are logical starting points for many collectors, as these sites have a wide range of stones to attract the eye. The beautifully banded Lake Superior agates, as well as other agates, jaspers and cherts, are excellent materials for polishing, and can be found in gravel deposits along major eastern Iowa rivers.

Beneath the upland glacial deposits lie much older, fossiliferous sedimentary bedrock formations. Mineralized veins and vugs, found in limestone quarries and exposures, contain a large assortment of minerals such as barite, calcite, chalcedony, dolomite, fluorite, galena, glauconite, goethite, limonite, marcasite, millerite, pyrite, quartz, sphalerite, and smithsonite. Certain fossils, notably *Hexagonaria* and silicified *Lithostrotion* corals are also found in limestone and are prized by collectors because they can be cut and polished. Varieties of travertine also occur in Iowa as flowstone deposits coating crevices in carbonate bedrock.

Shale exposures and pits are noteworthy for well-developed selenite (gypsum) crystals at many places in southern and western Iowa. Abandoned coal strip-mines also yield specimens of petrified wood and fossil plants. Calcareous shales such as the Warsaw formation in Des Moines, Henry, Lee and Van Buren counties are the principal setting for geodes. These spherical rocks with chalcedony shells and hollow interiors are easily extracted from the enclosing shales, and when split open they

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exhibit sparkling crystals of quartz or calcite along the cavity walls. In 1967, these southeast Iowa geodes were designated by the General Assembly as Iowa's "state rock."

Though rock and mineral collecting is often regarded as a rather solitary activity, Iowa has an active group of "rockhounds" and lapidarists as exemplified by the many rock and mineral, or gem and lapidary clubs scattered around the state. As of 1982 there were 26 such organizations listed in the *Directory of the Midwest Federation of Mineralogical and Geological Societies*. The activities that make joining a local rock and mineral society worthwhile include the exchange of information on collecting locations, trading, buying and selling specimens, educational programs, and regular meetings with others who have similar interests. Members often know which landowners to contact for permission to collect on private property. Experienced collectors also know where to find the most interesting specimens for cutting and polishing, and making cabachons and other ornamental jewelry. Some Iowa collectors have accumulated valuable collections of rocks and minerals, with many beautiful and rare specimens suitable for display in museums.

Much practical information on Iowa rocks and minerals can also be obtained by visiting exhibits at Iowa Hall in the University of Iowa Museum of Natural History and in museums at Cornell College, Drake University, Iowa State University, University of Northern Iowa, as well as the Davenport Public Museum, and the Waterloo (Grout) Museum. The Geological Survey Bureau in Iowa City has lists of rock and mineral clubs, as well as maps and educational materials on rocks, minerals and fossils that the beginning collector will find helpful.

Reprint from *Iowa Geology*, 1988, pages 16 and 17.

Paul J. Horick is a geologist for the department located in Iowa City.



Specimens of calcite (left) show an iridescent play of color from their crystal faces. A Keokuk geode (below) is lined with quartz crystals. A specimen of Mahaska County limestone (bottom) contains crystals of white dog-tooth spar (a variety of calcite) and pyrite or "fool's gold."



Recommended reading materials include:

- Anderson, Wayne I. (1983) *Geology of Iowa*: Iowa State University Press, 268p.
- Horick, Paul J. (1974) *The Minerals of Iowa*: Iowa Geological Survey, Educational Series 2, 88p.
- Rose, J.N. (1967) *The Fossils and Rocks of Eastern Iowa*: Iowa Geological Survey, Educational Series 1, 147p.
- Wolf, R. C. (1983) *Fossils of Iowa, Field Guide to Paleozoic Deposits*: Iowa State University Press, 298p.

Fly Fishing

Another Way To Fish

Story by Bruce C. Adair
Illustrations by Newton Burch

A lot of us Iowans have preconceived notions about fly fishing and/or fly anglers. We visualize some Izaak Waltonish-looking individual wading in a sparkling clear trout stream. They gracefully wave a priceless bamboo rod as fish magically dimple the surface feeding on the latest insect hatch. These fish are fooled occasionally by the angler's imitation of bits of feathers nestled around a tiny hook, and after a short but spirited struggle, each fish is gently deposited in the angler's wicker creel.

In contrast, this individual donned in the latest L.L. Bean clothing and equipment, probably envisions the basic Iowa angler dressed in blue and white striped overalls hunched over in a folding lawn chair, drowning massive globs of squirming night crawlers under a golf ball-sized red and white bobber. The angler waits for the next yellow-bellied, beady-eyed monster bullhead to meet its doom. The creel is not wicker, but burlap. A couple months earlier it held 100 pounds of seed potatoes.

Of course, the typical Iowa angler does not fall into this description, but rather somewhere between the two. I find myself envying Izaak a bit, however. Unfortunately, the streams I fish in southern Iowa, often resemble liquid corn fields, and no doubt



We visualize some Izaak Waltonish-looking individual wading in a sparkling clear trout stream. They gracefully wave a priceless bamboo rod as fish magically dimple the surface feeding on the latest insect hatch.

contain many of the same agri-chemicals found in the real fields bordering them. Because of this and the fact that they are warm-water streams, they never have and never will be dimpled by feeding trout. However, a couple years ago I decided to do the best I could with the situation at hand. I invested in a fly rod suitable for catching panfish out of the lakes and ponds typical of southern Iowa, and I would like to encourage all enthusiastic anglers to do the same. You can really enjoy fly fishing if you just give it a chance. It does not need to be as complicated or as expensive as you might think.

Dig out your favorite sporting goods catalog. With a little research you will find the correct rod, reel and line suitable for your purposes. Stay

away from the cheaper glass rods listed as "ideal for beginners." Because I believe you will soon get hooked on this fly fishing thing, you will not be a beginner for long. Start off by purchasing a decent rod now, preferably graphite. You do not have to be extravagant.

The rod I purchased is an eight-foot, light-action model, teamed up with double taper line on a single-action reel. The entire outfit weighs next to nothing and is tremendous. It is a delight over bluegill spawning beds with small poppers. Although my experience

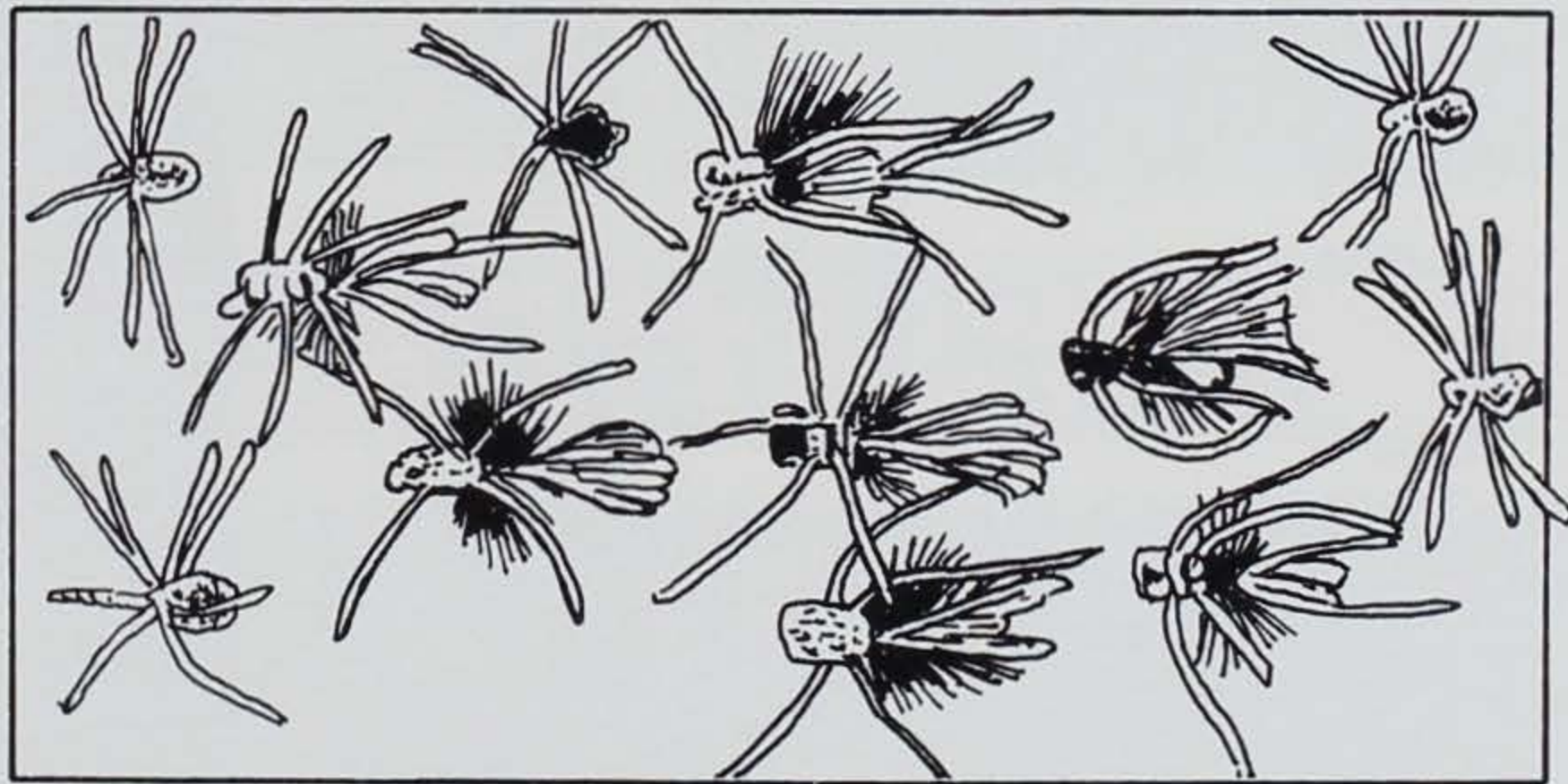


... the basic Iowa angler dressed in blue and white striped overalls hunched over in a folding lawn chair, drowning ... squirming night crawlers under a golf ball-sized red and white bobber.

is limited, it seems to be the perfect setup for my needs. I would suggest something similar if your main target is panfish in a pond or small lake. There are lots of books, magazines or even video cassettes available that discuss fly fishing techniques. I suggest doing a little research before your first outing.

You will find bluegills and crappies to be ideal subjects on which to practice your new hobby. Southern Iowa panfish are very forgiving of the novice fly angler. Match the hatch if you wish, or just use whatever fly pattern looks like it might work — chances are it will. These fish are also very tolerant of your early, awkward attempts at presenting those tiny lures and heavy line. With practice you will improve.

Before too long, you will want to make an attempt at tying your own flies — another very humbling experience. The best way to learn is over the shoulder of an experienced fly tyer. Otherwise, take advantage of a good book or video. The equipment and supplies needed are not complicated. Virtually anyone can tie a little foam rubber spider, which will fool about 9 out of 10 surface-feeding



bluegills. From this simple beginning, you can get as complicated as your patience and eyesight allow. Fly tying is a fantastic hobby for those long winter months in Iowa when you reminisce about last summer's fishing experience or dream about those to come.

I would hope by trying this classic method of fishing, using today's equipment, you will find out how much fun and sport you have been missing.

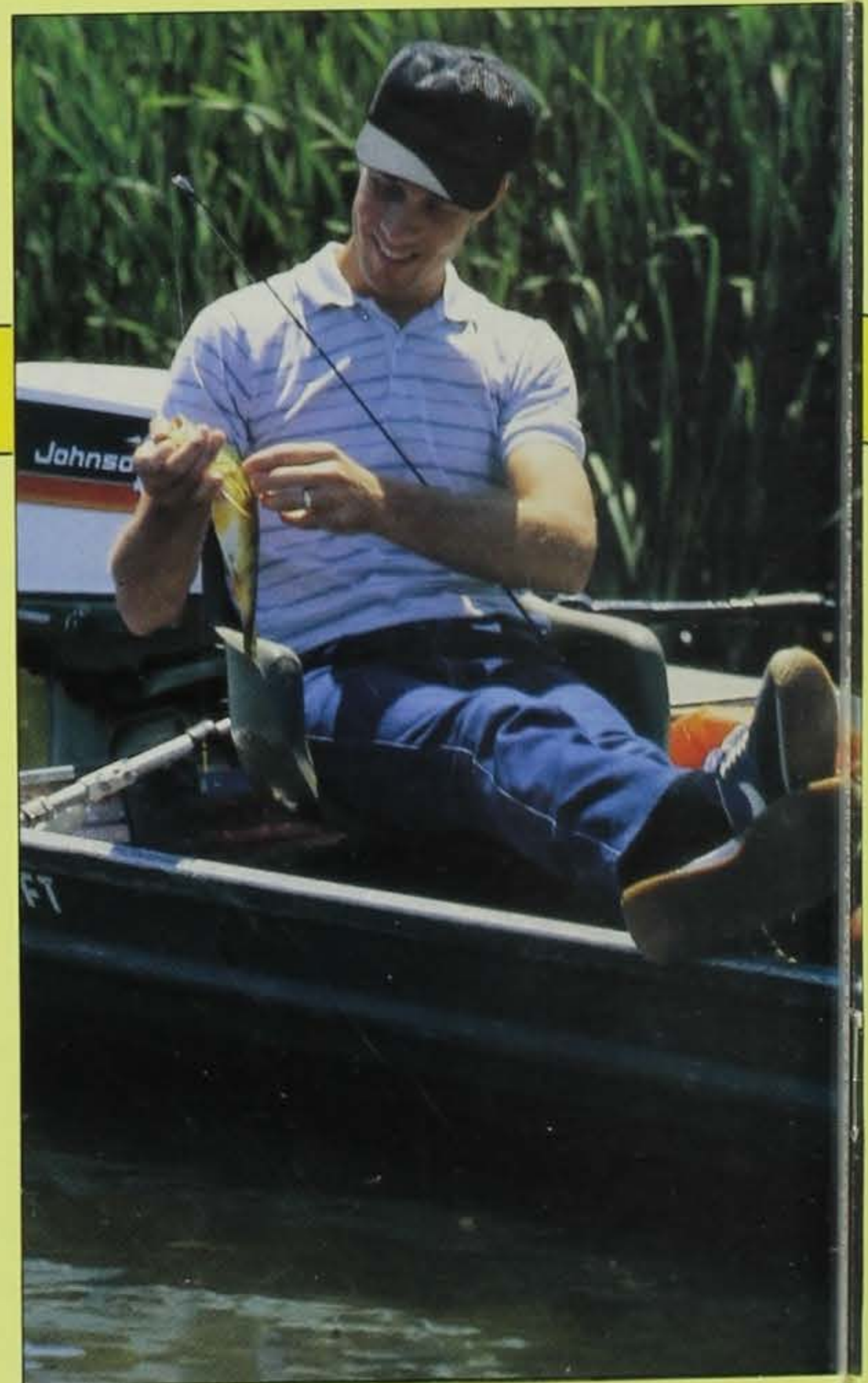
Bruce C. Adair is a fisheries management biologist located at the Cold Springs district office.

A variety of flies, sponge spiders, poppers, ants and crickets can be purchased from sporting goods catalogs or tied by hand. Either way, they should produce plenty of panfish and lots of fun.



With summer approaching, why not check out what Iowa's state parks have to offer? Take in the festivities of State Park Week at your favorite park, or discover a new one. Our parks are once again open free of charge, so . . .

Come Visit!





State Park Week • June 10-17



The beaver has the honor of being Iowa's largest rodent reaching weights up to 60 or 70 pounds. It is in fact the largest rodent in North America. As is true with all rodents, beavers have two pair of very large ever-growing front incisors. To maintain the proper length and sharpness of these front teeth, the beaver must continually gnaw. It uses these front teeth very effectively in cutting trees and branches. Aside from its teeth, the beaver is equipped with several specialized physical features that make it well suited for a semi-aquatic existence. Most notable is the broad, flat, nearly hairless tail which is used as a rudder while swimming or to signal danger to other beavers by slapping the water surface.

The front feet and legs are short, stout and heavily clawed with excellent dexterity for handling small twigs and branches while feeding or dam building. A waterproofing oil produced from glands located near the base of the tail is carefully worked into its fur while grooming. Waterproofing is vital to provide protection and buoyancy during the beaver's underwater activities. The hind feet are large and fully webbed to provide propulsion while swimming. Special respiratory adaptations allow the beaver to stay submerged for extended periods of up to 20 minutes in duration. While submerged, special valvular struc-

MASLOWSKI WILDLIFE PRODUCTIONS



The Beaver

Nature's Engineer

by Michael P. Mahn

tures close to prevent water from entering the ears, nose and throat. A beaver can actually gnaw under water without water entering its throat.

All of these specialized physical adaptations make the beaver well suited for a semi-aquatic existence but these adaptations also restrict it to very specific habitat requirements. A beaver requires adequate water depths, a good food supply, and suitable denning locations.

This large Iowa rodent has the unique ability to modify habitat to make it more suitable for survival. A water depth of at least three or four feet is required by beavers in order for them to survive through

Iowa's cold winter months. Many of Iowa's small streams and creeks do not meet these depth requirements. Small streams may have only inches of flowing water. But beavers can construct dams on these small streams and actually create adequate water depths for winter survival. Beavers construct dams

using available vegetation at the site which may include willow, cottonwood, elm, mulberry, box elder, and even corn stalks when trees are unavailable. Mud and grasses are also commonly used to seal the leaks in addition to tree branches and corn stalks.

Most of Iowa's beavers live in bank burrows which satisfy their need for a secure above-water denning chamber. A beaver will usually dig from six to 20 feet into the bank before it excavates the above-water chamber lining it with fresh shredded bark. The entrance to the underwater burrow is commonly beneath a tree that is growing on the creek bank. The roots provide support, preventing the burrow from collapsing.

Beavers may build a lodge instead of a bank burrow. The lodge is a conical structure made of limbs, branches and mud. It may resemble a giant muskrat hut. A denning cavity is hollowed out in the center of the lodge and is lined with bark. The entrance to the lodge is under water, similar to that of a bank burrow. Although bank burrows are the most com-

mon in Iowa, lodges can sometimes be observed in backwater river areas.

The old saying "busy as a beaver" likely came about in late summer or early fall. During this time of year beavers have many preparations to complete before winter seals an icy lid over their stream, pond, lake or river. Besides dam and den construction, food piles called "caches" are built. The caches are located near the underwater burrow entrance for convenient under-ice accessibility during the winter. The food cache may be a pile of tree branches or in farm country, it may be made up of corn stalks. When feeding on branches, beavers eat only the bark and nutritious cambium layer off of each branch. In the spring after ice-out, beavers will abandon the souring underwater food cache and seek fresh vegetation.

Beavers usually live in colonies consisting of a family unit. The family unit typically is made up of an adult male, an adult female, the previous year's young and current year's young, called kits. Mating activity occurs in January with two or three young being born in May. The young are weaned within three months and usually remain in the colony for up to two years. The two-year-olds then leave the colony, pair up, establish a territory, and at the age of three years, raise their first litter.

Sometimes, the beaver's activities may conflict with human's, especially concerning drainage. Tile outlets or croplands may be flooded behind a beaver dam. Burrowing activity can also cause damage to pond dams, shorelines, or field edges bordering a stream or river. Most of these negative impacts are minor and can be

minimized through population regulation.

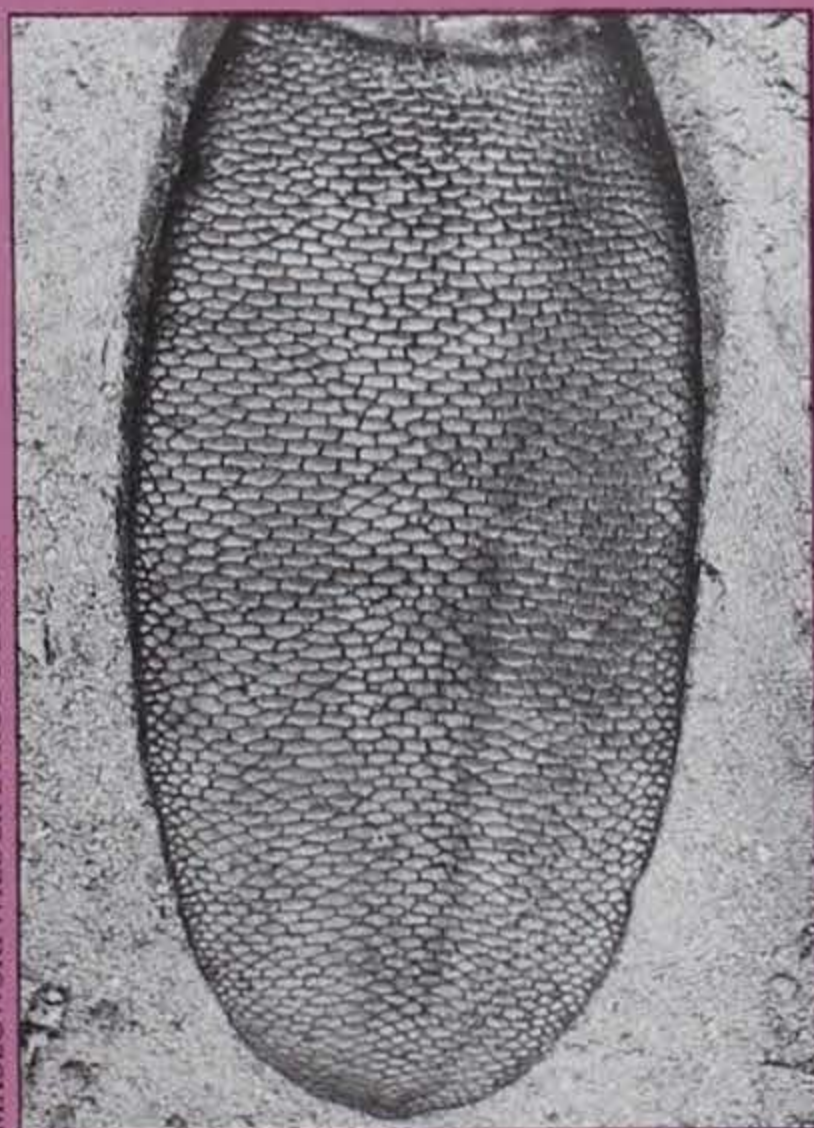
By the early 1900s, the beaver was nearly eliminated from Iowa, but today, through a successful wildlife management program, is a quite common and an important fur-bearing species. This large rodent is sought by trappers for its valuable fur. Other fur-bearing mammals like the muskrat and mink are also benefited by the beaver's dam-building activities. Marshy wetland habitats are created or enhanced by beaver dams. These wetland impoundments can serve as homes for many wildlife species. Waterfowl, shorebirds, amphibians and numerous fish species all benefit from the activities

of Iowa's largest rodent. Water storage, gully stabilization, and silt retention are soil and water conservation measure benefited by Iowa's "natural" engineer. Overall, the beaver remains an important resource in the wildlife diversity of Iowa's outdoors.

Michael P. Mahn is a wildlife biologist located at Lake View.



MASLOWSKI WILDLIFE PRODUCTIONS



MASLOWSKI WILDLIFE PRODUCTIONS

The beaver's hind feet are fully webbed to provide propulsion while swimming. The broad, flat, nearly hairless tail is the beaver's most notable physical feature.

Story by Lannie R. Miller
Illustrations by Tom
Roberts

In July 1988 I wrote an article for the *Iowa Conservationist* about fishing for carp and asked readers to send me their favorite doughball recipes. I thought it would be a great way to share some of the doughball recipes with other carp fishing enthusiasts.

I received a lot of interesting variations of doughball recipes, some simple, some complicated, but all guaranteed carp getters. Most of these recipes came through the mail. Others, like the one from

Adelbert Sjogren was obtained while watching him catch carp at Black Hawk Lake. He gets so many requests for his doughball recipe, he takes copies of it with him when he goes fishing. It was fun talking and comparing carp fishing techniques with him while sitting on the lake shore.

Do not limit your efforts to just these recipes. Use your imagination and come up with your own "secret" doughball recipe. By adding different spices, flavorings or ingredients, a standard recipe can become a super carp producer.

I would like to thank everyone who submitted a recipe. I am sure they are all good and hope they provide you with hours of carp fishing enjoyment.

All-Iowa Carp Bait Recipes

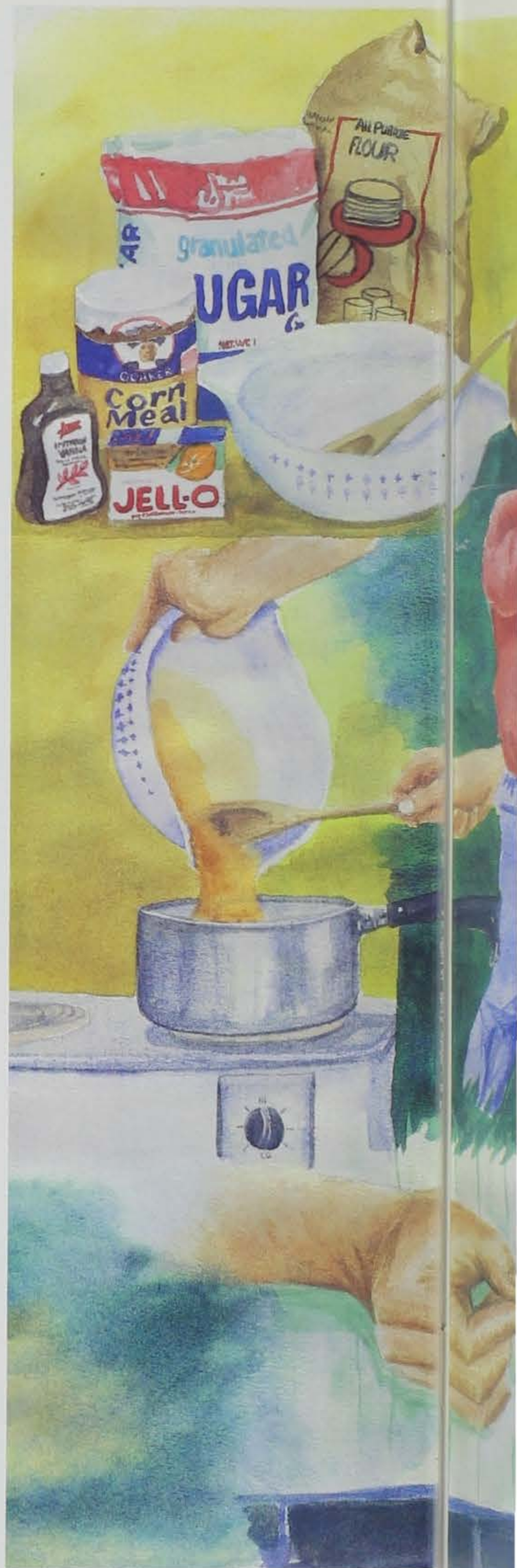


Pop's Carp Bait

- 1 cup flour
- 2 cups cornmeal
- 1 pint water
- 1 teaspoon vanilla extract
- 2 tablespoons sugar
- 1 package strawberry gelatin

Mix flour and cornmeal together. Set aside. Bring water to a boil, reduce heat to simmer and add vanilla, sugar and gelatin, stirring constantly. Ladle in some of the dry mixture until surface of liquid is covered. When a bubble appears, add more dry mix. Continue until all the dry mix has been used. Stir at least 2 minutes after all the dry mix has been added (very important!). Remove dough from pan, roll into ball, wrap in waxed paper and store in refrigerator. Do not freeze the dough.

- Mrs. Margaret Witten
Arthur, Iowa
- David Macumber
Manilla, Iowa





Klotz Carp Bait

Two parts of cornmeal and about 1-1/2 parts of white flour mixed with water to a stiff consistency. It is good for only one cast but it is cheap and easy to use. In hot weather we mix it dry at home and then add water at the river as we need it.

-- Don Klotz
Iowa City, Iowa

Adelbert Sjogren's Formula for Carp Bait

3 heaping cups cornmeal
1-1/2 heaping cups flour
1 pint water
4 tablespoons sugar
4 tablespoons vanilla extract
2 teaspoons anis seeds
2 packages gelatin (strawberry or blackberry)

In a bowl mix together cornmeal and flour. Set aside. In large saucepan mix together water, sugar, vanilla and anis seeds. Bring to a boil and simmer for 2 minutes. Add gelatin to mixture. This will foam up, and when it gets to the top of the kettle, remove from the stove and add the cornmeal/flour mixture. Stir and mix with a heavy spoon. It will seem too dry, but continue to work with the spoon until evenly mixed like putty. Divide into about 6 portions and wrap in waxed paper when cool. Place in refrigerator, but do not freeze. Use a #4 or #6 hook.

-- Adelbert Sjogren
Kiron, Iowa

Jansen Doughball

1/2 cup white flour
1/2 cup cornmeal
1/2 cup oatmeal
1-1/2 tablespoons syrup
1 pint water

Boil 15 minutes in double boiler. Then add enough cotton batting to make it stick.

-- Ed Jansen
Sioux Center, Iowa

Hintz Carp Bait

1-1/2 cups rye flour
1/2 cup cornmeal
1/2 cup plus 1 tablespoon molasses

Mix well. Keep in refrigerator.

-- Helen Hintz
Cushing, Iowa

Slechta Doughball

2 cups water
4 tablespoons dark corn syrup

Bring to a boil and add yellow cornmeal, stirring constantly. Lower heat and add cornmeal until stiff enough to stay on treble hook. Can add strawberry gelatin (or any flavor) to water if desired.

-- Junior Slechta
Denison, Iowa

Swartz Doughball

1 cup cornmeal
2 tablespoons oatmeal
1 tablespoons sugar
1 cup cold water

Stir the above in saucepan. Cook over medium heat for 5 to 7 minutes until dough is stiff. If too soft, knead in additional cornmeal.

-- Harvey Swartz
Jefferson, Iowa

Doughball Fishing Tips For Carp

- Use a #10 or #12 treble hook.
- When lake fishing, use no additional weight.
- Do not use a bobber or float.
- In early summer, fish shallow water; during mid- and late summer, fish deeper water.

Tom Roberts is an art teacher for the Lake View-Auburn School District and is a summer naturalist for Black Hawk State Park.

Lannie R. Miller is a fisheries management biologist stationed at Lake View.

CONSERVATION UPDATE

Drowning in Trash, We Begin to Discard Our Wasteful Ways

by Anne Schwartz

Americans throw away enough trash in one day to fill 63,000 garbage trucks, which placed end to end would reach from San Francisco to Los Angeles. This country produces more municipal solid waste per capita than any other -- about three and one-half pounds per person per day, and as much as seven pounds in some parts of the country.



Iowans discard nearly four pounds of solid waste per person per day. As landfills become full, alternative methods for disposal need to be devised.

In 1988, municipal solid waste amounted to about 160 million tons, according to the Environmental Protection Agency, which predicts that figure will rise to 193 million tons by the year 2000 if current trends continue.

At the same time, the country's capacity to dispose of all this garbage has dwindled. Eighty percent of our solid waste goes to landfills, but the EPA predicts that by 1993, a

third of all U.S. landfills will be full. Many of the country's landfills do not meet current environmental safety standards and are groundwater pollution hazards. Some states already face a crisis because so many landfills have had to close. It is almost impossible to get a community to accept a new landfill.

The waste-to-energy incinerators that were supposed to be the magic solution to the landfill shortage have run into extraordinary opposition from citizens. In Los Angeles, Detroit, New York and elsewhere, citizens are fighting to keep incinerators out of their backyards. Incinerators release toxic air pollutants; the ash that remains after burning is often hazardous (though not currently regulated as hazardous) and still needs a final resting place. Even so, many cities are pushing ahead with plans to build costly garbage-burners.

Manufacturers keep producing and consumers keep tossing out (though perhaps with a guiltier conscience), vast quantities of paper and plastic packaging, bottles, cans, fast-food containers, diapers and other fragments of our affluent lifestyle.

Change is Slowly Coming

But things are changing. Americans are coming to realize the environmental costs of the growing volume and toxicity of our trash. A poll taken in February

1988 for the National Solid Waste Management Association found that 53 percent of Americans believe that garbage disposal capacity is already a national problem. Local officials questioned in another survey ranked garbage disposal as the second most pressing problem they face.

A number of states and municipalities are turning away from the easy old solutions based on treating all refuse -- coffee grounds, milk jugs, household pesticides, old appliances -- in the same way. Support is growing for managing trash through various approaches, relying first on reducing waste at the source and recycling, and only then going to incinerating or land-filling with proper environmental controls. The EPA endorsed these approaches in its September 1988 draft report, *The Solid Waste Dilemma: An Agenda for Action*.

Large-scale recycling, once scorned by solid waste professionals has come into the mainstream. Sorting the trash is becoming a way of life for many Americans. Ten states and many hundreds of municipalities have established or are developing recycling programs. Manufacturers are figuring out new ways to reuse throw-aways, including plastic. And for the first time, governments, consumers and some manufacturers are thinking about how we can reduce the amount of trash we make

and how products and packages can be designed to be recycled.

(For more information on disposal of waste, please turn to the story, *Garbage Grants*, on page 8.

--From Audubon Activist, May/June 1989 Issue

Iowa Becomes Newest Addition To DU's Habitat USA Program

Beginning in 1985 with the development of DU Marsh in Clay County, Ducks Unlimited's MARSH program has positively impacted Iowa wildlife conservation efforts by providing funds for the completion of work on four habitat project sites. This year, DU's role will be further expanded through its Habitat USA program by providing hands-on assistance aimed at reclaiming and developing additional valuable wetlands.

Ducks Unlimited Executive Vice President Matthew B. Connolly, Jr., announced in May that Iowa will join four other key waterfowl production states as a member of DU's Habitat USA program, headquartered at the organization's Great Plains Regional Habitat office in Bismarck, North Dakota.

"Iowa has been identified by the North American Waterfowl

Management Plan as a valuable component of the Prairie Pothole Joint Venture," Connolly said. "This region is extremely important to the continent's waterfowl, and Ducks Unlimited will continue to do all that it can to enhance wetland habitat throughout the area."

To date, DU Great Plains office personnel have been instrumental in developing 160 project sites in the prime waterfowl production states of Minnesota, Montana, and North and South Dakota. The projects encompass 208,000 acres, of which more than 104,000 acres are wetlands.

Habitat USA is DU's "hands-on" habitat conservation initiative. The Great Plains office shares the latest in engineering techniques and a wealth of biological know-how with state and federal wildlife agencies in each of the five states.

Habitat USA's primary focus will be to work within a 35-county area located in the northwest and north-central portion of Iowa, which was once rich with wetlands. This year, DU will begin supplying materials required to recreate drained wetland basins and initiate surveying and designing projects.

"We have already begun activities directly involved with wetland habitat restoration. DU expenditures in Iowa will be determined in accordance with the budget provided the Great Plains office," Connolly said.

Otter Restoration Plans Delayed

Iowa will not be receiving Louisiana otters this year in a continuing campaign to reestablish the species, according to Iowa Department of Natural Resources' officials.

Louisiana's otter take was depleted this year due to unusually warm weather, and strong southerly winds kept tides higher than normal in the coastal marshes where river otters abound, according to Ron Andrews, furbearer resource specialist for the Iowa DNR. He said extremely depressed pelt prices substantially reduced trapping pressure which is essential to otter restoration efforts.

"If normal weather conditions occur next winter, we should be able to obtain the otters," said Andrews.

Although the initial DNR three-way trade of Iowa wild turkeys with Kentucky in exchange for river otters from Louisiana was completed in 1988, additional funds have been raised to purchase at least 40 more otters in 1990. Fundraising efforts by the Iowa Trappers Association, Iowa State University's Fisheries and Wildlife Biology Club, Iowa Fur Takers, the Mitchell County Conservation Board, Mason City Hardin Elementary School and others will help provide the funds necessary to purchase the 40 additional otters.



While the original agreement to receive river otters from Louisiana ended in 1988, additional funds have been raised to purchase another 40 otters. However, because otters are not available from Louisiana this year, the restoration effort has been delayed until 1990.

These groups have been selling otter T-shirts and sweatshirts to raise the money.

A blue and gold otter T-shirt can be purchased for \$7.50 by writing the Iowa Trappers Association, Project Otter, c/o Bernie Barringer, Iowa Trappers Association, Route 2, Box 153, Forest City, Iowa 50436. All youth sizes and small and medium adult sweatshirts are also available for \$15.

Since the trades with Kentucky and Louisiana began in 1985, 156 otters have been released throughout the state.

Editor's Note: At press time it was learned that eight otters were purchased, and released May 12 at the Cedar River near Otranto.

Peregrine Falcon Project To Begin This Summer

The Iowa Wildlife Federation is selling peregrine falcon t-shirts and sweatshirts to raise money for the Nongame Program's peregrine project. The peregrine is a federally endangered species which was completely eliminated from the eastern United States by 1964. In Iowa, peregrines used to nest along the cliffs above the Mississippi River and other suitable cliffs such as those at Palisades Kepler State Park. The pesticide DDT caused the birds to lay eggs with shells too thin to incubate. Thus with no young birds to replace aging adult falcons, the wild peregrine population plummeted.

However, during the last several decades, wildlife biologists developed techniques to restore peregrines to the wild. The method combines ancient falconry techniques with hi-tech science into a process called hacking. "Essentially, captive produced young birds are placed in a hack box where they are kept confined until they can fly. After they are released from the box, the young falcons still cannot kill their own prey, so they return to the box for a free meal and shelter," said Laura Jackson, nongame biologist for the Iowa Department of Natural Resources. "Meanwhile,



The sale of t-shirts and sweatshirts by the Iowa Wildlife Federation is helping fund Iowa's peregrine falcon restoration program. The program will begin this summer with the release of five young falcons in downtown Cedar Rapids.

while they are flying the local skies and developing, they are also being imprinted on the area. Three years later when the birds are sexually mature, some of the falcons may return to the hack site to nest."

Iowa's first peregrine release will take place this summer when five

young falcons will be hacked among the "canyons, sheer walls and ledges" of downtown Cedar Rapids. Urban releases have been very successful in other cities such as Minneapolis, Rochester, Chicago, Grand Rapids and Detroit. "We plan to release a total of 55

falcons during the next few years from several Iowa cities. This should help restore at least five peregrine nests to the state by the end of the century," said Jackson.

The peregrine project will cost about \$23,000 this year and will be paid for by the Nongame Program. The Nongame Program is funded through contributions to the Fish and Wildlife checkoff on the Iowa income tax form and through direct donations. The Iowa Wildlife Federation has contributed \$2,000 and will donate more as the t-shirt sales progress.

For more information on the peregrine project, contact Laura Jackson, Wildlife Research Station, Rte. 1, Ledges Road, Boone, Iowa 50036, (515)432-2823. Direct donations can be sent to the Nongame Program, attention Peregrine Fund, Department of Natural Resources, Wallace State Office Building, Des Moines, Iowa 50319-0034.

THE 1989 IOWA WILDLIFE FEDERATION - PEREGRINE FALCON SHIRT ORDER BLANK

NAME _____ ADDRESS _____
CITY _____ STATE _____ ZIP _____

Sweatshirts and T-shirts can be ordered in sizes small, medium, large, and x-large. For xx-large orders add \$2.00. Colors are white for sweatshirts and white or tan for T-shirts.

	Quantity	Size	Color	Price	Amount
Sweatshirt	_____	_____	White	\$12.00 @	_____
T-shirt	_____	_____	White	8.00 @	_____
T-shirt	_____	_____	Tan	8.00 @	_____

PLEASE SEND YOUR ORDER AND CHECK OR MONEY ORDER TO THE FOLLOWING ADDRESS:



IOWA WILDLIFE FEDERATION, INC.

Peregrine Falcon Program 1989
P.O. Box 1222
Cedar Rapids, Iowa 52406

Total _____
Tax _____
Shipping/handling \$2.00
Amount enclosed _____

Toxins Still Affecting Bald Eagles

"Although bald eagles have made a dramatic population comeback in the United States since the ban of organochlorine pesticides in 1973, we still need to pay close attention to pesticide use," said Bruce Ehresman, wildlife technician for the Iowa Department of Natural Resources.

On February 10, 1989, an adult bald eagle suffering a broken wing was sent to the Ames Wildlife Care Clinic (WCC). The bird apparently was seen flying into a road sign. Suspecting a toxin may have caused the bird to fly awry, a blood sample was taken for laboratory analysis. "As suspected, cholinesterase enzyme levels were inhibited, which is an indication of organophosphate or carbamate poisoning," said Ehresman.

Tissue and blood analysis of other raptors received at the Ames WCC through the fall and winter of 1988 indicate similar results of toxin affects on Cooper's and red-tailed hawks.

How are these birds picking up these toxins? Possibilities include pesticides which are used for control of insects or "nuisance" birds such as sparrows and starlings. Fenthion is the active ingredient in "rid-a-bird," which is often used in urban areas to poison pigeons, sparrows

and starlings. Avitrol is another chemical used for "bird control." When raptors such as bald eagles, red-tailed hawks, and great-horned owls feed on dead or dying birds which have been poisoned, they are affected also.

According to officials with the National Wildlife Health Research Center in Madison, Wisconsin, the toxin fenthion has previously been implicated in secondary poisoning of raptors. Officials mentioned a case where five bald eagles died near Bellevue, Iowa, and in a case at Springfield, Illinois, at least one bald eagle, as well as other raptors, died from the effects of fenthion.

"The bald eagle at the Ames Wildlife Care Clinic is more fortunate than these other raptors — it will live. It may even be released back to the wild," said Ehresman.

Funding from the Iowa Department of Natural Resources' Non-game Program is helping pay for the eagle's medical costs. According to Ehresman, nongame personnel should soon be receiving the eagle for pre-release conditioning at one of their flight pens at the Boone Wildlife Research Station.

Three thousand acres of tropical forest are destroyed every hour; 28 million acres of forest -- an area the size of Pennsylvania -- are destroyed around the world every year.

-- National Wildlife Federation



Classroom Corner by Robert P. Rye

How long will you live or could you live? These are difficult questions to give exact answers to, but we do have average lifespans. The same is true for wildlife. Wild animals die young because they are subject to natural controls. Examples of natural controls are weather, disease, parasites and predators.

This information is used in maintaining each species' population. It is primarily obtained through tag and release studies. See if you can match the animal with its average and potential lifespans.

Species	Average/Potential
1. Rainbow Trout	a. 9 months/8 years
2. Channel Catfish	b. 24 months/12 years
3. Pheasant	c. 19 months/12-1/2 years
4. Raccoon	d. 5 years/13 years
5. Mallard Duck	e. 5 months/14 years
6. Gray Squirrel	f. 7 years/15 years
7. Cottontail Rabbit	g. 22 months/16 years
8. Little Brown Bat	h. 15 months/20 years
9. Wild Turkey	i. 13 years/30 years
10. Golden Eagle	j. 24 months/30 years

ANSWERS:

1. d 2. f 3. a 4. g 5. h 6. c 7. e 8. j 9. b 10. i

COUNTY CONSERVATION BOARD FEATURE

Exploring the Inkpaduta Canoe Trail by Dawn Snyder



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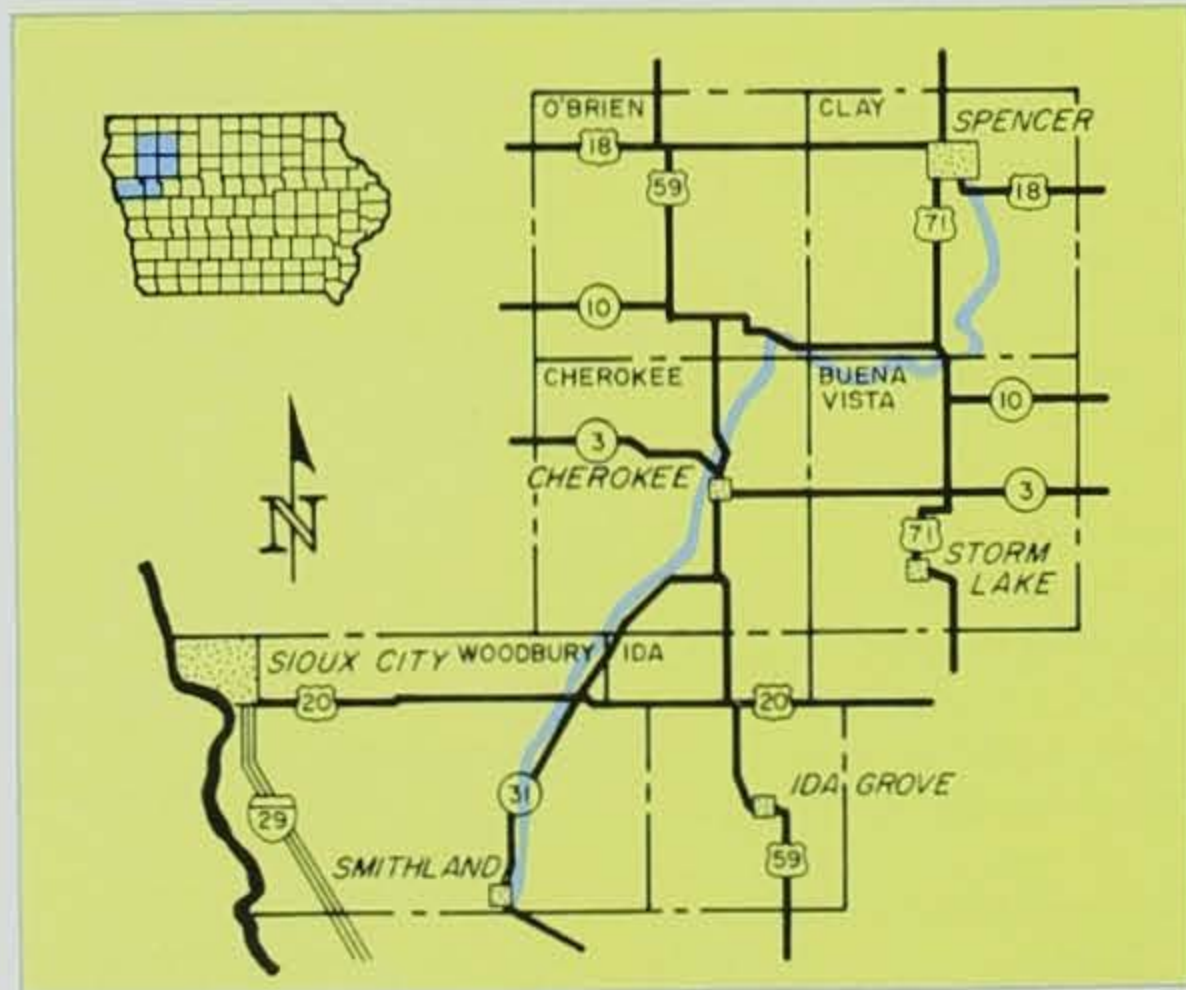
What do a Sioux Indian chief and the Little Sioux River have in common? The answer is a canoe trail. Five county conservation boards in northwest Iowa have joined forces to create the Inkpaduta Canoe Trail along a 130-mile stretch of the Little Sioux River.

Beginning at Spencer in Clay County the trail meanders through Clay, Buena Vista, O'Brien, Cherokee and Ida counties before it reaches its endpoint at Smithland in southern Woodbury County. The river trail boasts 28 public access sites that are well marked with wooden signs.

The \$2,500 estimated cost of the project was covered by a cost-share grant through the Marine Fuel Tax Fund. The Iowa Department of Natural Resources provided 75 percent of the cost of the project through the fund, while the other 25 percent was divided among the five counties involved in the trail project. The trail officially opened June 1.

The Inkpaduta Canoe Trail has a lot to offer visitors. For example, the Little Sioux River is the largest interior stream within the Missouri River watershed in Iowa, and it is well-known as an excellent catfish stream. The high mud banks and rolling hills offer scenic beauty, and glacial erratics tell the tale of its geological past. The river also boasts a 1987 release site of river otters near Peterson in Clay County. A quiet canoe float may be your best opportunity to view these shy Iowa mammals.

The story of human habitation



A brochure describing the canoe trail and history of the river valley is available free of charge to the general public. The brochure also includes a map highlighting the access points, approximate distances between points, and the facilities available at each site. A



ISURECSERVICES

canoe float of two to three hours or a canoe-camping trip of two to three days can be planned with the aid of the canoe checklist and safety tips. The natural history of the Little Sioux River is also featured in the brochure. To obtain a copy of the brochure, send a self-addressed, stamped envelope to Lon Allan, Director, Cherokee County Conservation Board, Route 2, Box 7, Cherokee, Iowa 51012, (712)225-5959.

in the Little Sioux River valley began thousands of years ago. Archaeologists have established the existence of the Mill Creek Indian culture from 1200 A.D. north of Cherokee. At the time of the early French traders, the river was important in the fur trade and was a route of the Plains Indians to the pipestone quarries of Minnesota.

But perhaps the most colorful story is that of the Sioux Indian, Inkpaduta, the canoe trail's namesake. The trail marks the approximate path the infamous Chief Inkpaduta and his band of Indians traveled enroute to one of the most memorable chapters in Iowa history — the Spirit Lake Massacre.

According to the *History of the Counties of Woodbury and Plymouth*, Inkpaduta and 22 other Indians came to Little Sioux Township near Smithland during the late fall of 1856. The Indians were apparently outcasts from the Sioux and Winnebago tribes. The band stayed in the Smithland area and hunted elk and traded with the settlers until March 1857. Historical accounts say the Indians were "never cordial," but, due to one settler's friendship toward them, they maintained a peaceful relationship with the settlers.

However, the harsh winter of 1856-57 led to the deterioration of the Indian-settler relationship in the Smithland community. When a militia of approximately 20 settlers formed to disarm and drive the Indians out of the settlement, the angry Indians left the area and headed north for their revenge. One settler was quoted as saying, "The people made a fearful mistake when they drove them away, for this was the direct cause of the Spirit Lake Massacre."

The Inkpaduta Canoe Trail serves as a reminder of the events of more than a century ago. A historical marker indicates Inkpaduta's camp near Smithland in Woodbury County, and Gardner's Cabin, the home of an Okoboji family slain in Inkpaduta's raid, still stands in Dickinson County.

Today, the only hint of the troubled past of the now peaceful and beautiful river is the name of the canoe trail. Come see for yourself what the Inkpaduta Canoe Trail has to offer you.

Dawn Snyder is a naturalist with the Woodbury County Conservation Board.

CALENDAR

JULY 1

Fourth of July Celebration. Fireworks at Red Haw State Park, Lucas County. For more information, contact Bob Schierbaum, Red Haw State Park, Rte. 1, Box 212, Chariton, Iowa 50449, (515)774-5632.

JULY 1-4

Wapsipinicon Rendezvous. Buckskinners, craft demonstrations, pistol shoot, knife throw and craft demonstrations at Wapsipinicon State Park, Jones County. For more information, contact Mike Brewer, Wapsipinicon State Park, Rte. 2, Anamosa, Iowa 52205, (319)462-2761.

JULY 4

Fourth of July Celebration. Fireworks at Lake of Three Fires State Park, Taylor County. For more information, contact Ron Jones, Lake of Three Fires State Park, Rte. 4, Box 14, Bedford, Iowa 50833, (712)523-2700.

JULY 15-16

50th Year of Fishing. Tagged bluegill worth \$10,000, fishing clinics for kids, country/bluegrass music, crafts and historical booths at Red Haw State Park, Lucas County. For more information, contact Bob Schierbaum, Red Haw State Park, Rte. 1, Box 212, Chariton, Iowa 50449, (515)774-5632.

JULY 15-16

Black Hawk Water Carnival. Carnival, street parade, water float, fireworks and 10k run at Black Hawk State Park, Sac County. For more information, contact Dean Hall, Black Hawk State Park, P.O. Box 7, Lake View, Iowa 51450, (712)657-8712.

JULY 22-23

Bellevue State Park Buckskinners Rendezvous. Buckskinners, black powder shoots, knife throws, period crafts and bluegrass music at Bellevue State Park, Jackson County. For more information, contact Don Carrier, Bellevue State Park, Rte. 3, Box 184, Bellevue, Iowa 52031, (319)872-4019.



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The Back Forties

Through proper farming practices, timber can become a profitable investment. And the payback may not take as long as you think.

by David W. Countryman and Gary Beyer

Iowa is famous for bountiful crops. The many long hours of hard work are rewarded when we harvest what the land has brought forth. Yet many landowners do not use all of their land. The "back forties" are overlooked and neglected. This land can also produce a crop — timber!

Timber is a crop that continues to grow year after year, adding value like a savings account. All it takes is proper management, just like it does for corn and beans.

Timber is actually a very important crop to the state of Iowa. Not just in the trees produced off the land, but also the money generated in log production, erosion control, wildlife habitat and recreation opportunities.

Iowa is one of the leading states in the nation in the export of walnut veneer. The walnut industry alone adds \$5 million annually to the state's economy. Iowa also grows some of the highest quality red oak, white oak, ash and elm in the world. The harvest of mixed hardwood species in the state produces another \$5 million per year.

Iowa has timber cover on 2.4 million acres of its fertile soil, with 1.5 million acres classified as commercial forestland. Commercial timberland is four percent of the

total land area and interestingly, the timber industry generates five percent of the state's total gross product. Forest industries employ 12,200 people, who receive more than \$210 million in annual payrolls. An additional \$473 million is added to the state's economy by manufacturing. This includes lumber, pulp and paper, and furniture industries.

Some benefits of timber to the state's economy are often overlooked, but their absence would be devastating to Iowa. Deer, grouse, turkeys, squirrels and raccoons are all animals that depend on forested land for their survival. Fish in our streams and lakes require wooded slopes to filter their water supplies. The harvest of these species returns an estimated \$17.7 million every year to Iowa's economy just through hunting and fishing licenses and fur sales. Equipment, meals and motels for hunters and anglers provide even more income for Iowa.

Trees also provide valuable erosion control. Erosion losses from timberland are negligible. A well-managed timber's loss can be measured in teaspoons per acre as compared to rowcrops measured in tons per acre — in many cases greater than 30 tons per acre. To stay eligible for the benefits of the

USDA Farm Programs, the 1985 Farm Bill state that farmers will no longer be able to farm highly erodible land without a soil and water conservation plan by 1990 and must have all of the required and needed soil conservation practices applied on the land by 1995.

Trees are an excellent alternative. They control erosion, can result in a property tax exemption under the forest and fruit tree reserve law, and provide many other benefits.

When everything is added up, timber provides about \$712 million to the Iowa economy every year. That comes to \$474 for each of the 1.5 million acres of commercial forest -- quite a good result for a "few trees." Add to that the scenic beauty and tourism it brings in.

Timber is not only an important crop to the state of Iowa but can be an excellent investment for private individuals. In fact, 90 percent of the state's woodland is owned by individuals. The challenge for these individual owners is to make their timber produce the best trees it can.

This is where forestry comes in. Forestry is the art and science of managing timberland to maximize benefits to the landowner. Foresters are trained to care for trees in

... landowners and investors have overlooked the "back forties," forgetting for too long that trees are one of Iowa's most valuable crops.



the same way as a farmer would corn or beans. The objective with any crop is to maximize growth and quality and return a profit. Iowa forests can do that.

Trees are very similar to savings bonds. The investment grows and increases in value over the years. At some point the investment matures and can be withdrawn, just as trees are harvested when they reach maturity. The value added by timber growth over the years is not taxed until harvested.

Good management is the key to success in a timber investment. In the 1950s, Mel Pacovsky planted 50 to 100 walnut trees throughout the woods he owns in Chickasaw County. Now he has trees that are worth at least \$500 each, and approximately half of them are in the 20- to 22-inch-diameter size. Many people think it takes a walnut 50 to 100 years to grow to a harvestable size and yet Mel has done it in 37 years. Mel's timber was managed like a corn or bean operation.

Trees are not an annual crop like corn or beans. They need more time. This means that any investment is normally locked in

for 20 years or more. Also, since harvests do not occur yearly, cashflow is infrequent. In these ways, trees act very much like savings bonds.

With these slight drawbacks considered, timber can still be an excellent investment. Trees gain value growth every year and that value is not taxed until the trees are harvested. As trees increase in size, each volume unit of wood becomes more valuable, resulting in a value increase of 10 to 20 percent per year on good quality trees. Timberland that is not grazed will qualify for the forest and fruit tree reserve, which results in a property tax exemption. You also have the opportunity to market your timber wisely, as it does not deteriorate in storage. The trees are simply not cut until sold. In addition to these advantages, owning a woodland is very satisfying. You can actually use and enjoy your investment while it continues to draw interest.

In 1971, Larry Duval purchased a 270-acre farm in Monona County, of which only 50 acres were tillable. Since he has owned the farm, Duval has made three sales of trees from the farm. The first sale, in 1979, netted approximately \$21,000,

which went to retire the debt on the farm. In 1981 and 1984, he made other sales totaling approximately \$11,500. Larry likes to keep the farm as full of trees as he can because his family enjoys the woods on weekends.

Betty Hicky inherited a property in Winneshiek County from her father who had inherited it from his father. Her father had not done anything with it except hold on to it. When she received it, she had no idea there was any value in the timber. The district forester walked through the property with her and marked the trees that were ready for sale. The marked trees were sold for approximately \$10,000. Part of the money was used to replant more trees, with the intent of passing the property on to her daughter as a valuable inheritance. Betty believes is better than money.

Iowa's fertile soil has always been its greatest natural resource. If you care for the land now, it will care for your children and their children for generations to come. Trees protect the soil, and benefit the state's economy through exports and jobs created in the wood industry. Hikers, campers, anglers and hunters depend on the

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BASSWOOD

Gift of the Bottomlands

by Bonnie Callan

The air is scented with sweet perfume and the hum of bees can be heard a hundred feet away. June is here and the basswood trees are in bloom. Dark grey furrows reach skyward and green valentines dance in the breeze. It is hard to miss a basswood tree or mistake it for anything else.

The giant of the bottomlands, soaring 60 to 100 feet in the air and reaching four feet in diameter, was an important tree to native Americans. Basswood bark, both flexible and strong, was used in winter for toboggans, sleds and skates.

In spring when the sap was rising, the bark was cut from the tree in long strips. These were soaked for several days at the lake's edge until soft. The inner fibers were woven into cloth for storage sacks and clothing, or fashioned into fish nets and traps. Mats of basswood bark were used to strain impurities from maple sap at sugaring time. Boiled and twisted, the fibers became strong ropes for numerous uses. This soft inner bark was also eaten — a hunter's emergency ration.

The wood is white and close grained, a favorite of woodcarvers. Its rapid growth and spreading shape make the basswood a perfect tree for home and city shade. It is often used for pulpwood and veneer. The next time you receive a fragile object packed in excelsior, think of the basswood — a renewable, decomposable resource.

The creamy-white to golden flowers can be eaten fresh or dried and used for tea. The woodland tribes felt this tea had medicinal powers to relieve nervousness, insomnia and cramps. They can also be added to bath water for a soothing perfumed soak. Because the flowers are full of nectar and so attractive to bees, a tree can often be heard before it can be seen. The honey produced is light in color and delicately flavored. Until the early 1900s, it was used as cough syrup and in compounding medicines. Today it can be bought from some private apiaries and is sought by the honey connoisseur.

The flowers are borne in clusters on a leaf-like bract. They mature into dry nutlets, which at one time were ground as a substitute for chocolate.

When the icy grip of winter chills the woodland and the snow lies crisp and white, nature's ice boats, the seed bracts, sail away from the basswood tree. Over the icy crust of the snow they slide, away from the shade of the outstretched branches to find their own place in the sun. Many seeds are eaten by squirrels and mice, others by songbirds but a few will survive to germinate in the spring and renew nature's gift of the bottomlands.

Bonnie Callan is a naturalist for the Polk County Conservation Board.



RON JOHNSON

timber for recreation. And the investment return potential for a well-managed woodland compares very favorably with, and often exceeds, other investments.

To keep investments sound, you contact a competent stockbroker to buy stocks, or a commodity broker to buy commodities. In the same way, any investment in forestland should be made on sound information developed by a professional forester. They have the training and expertise to evaluate stands of timber, measure past growth and predict future yields.

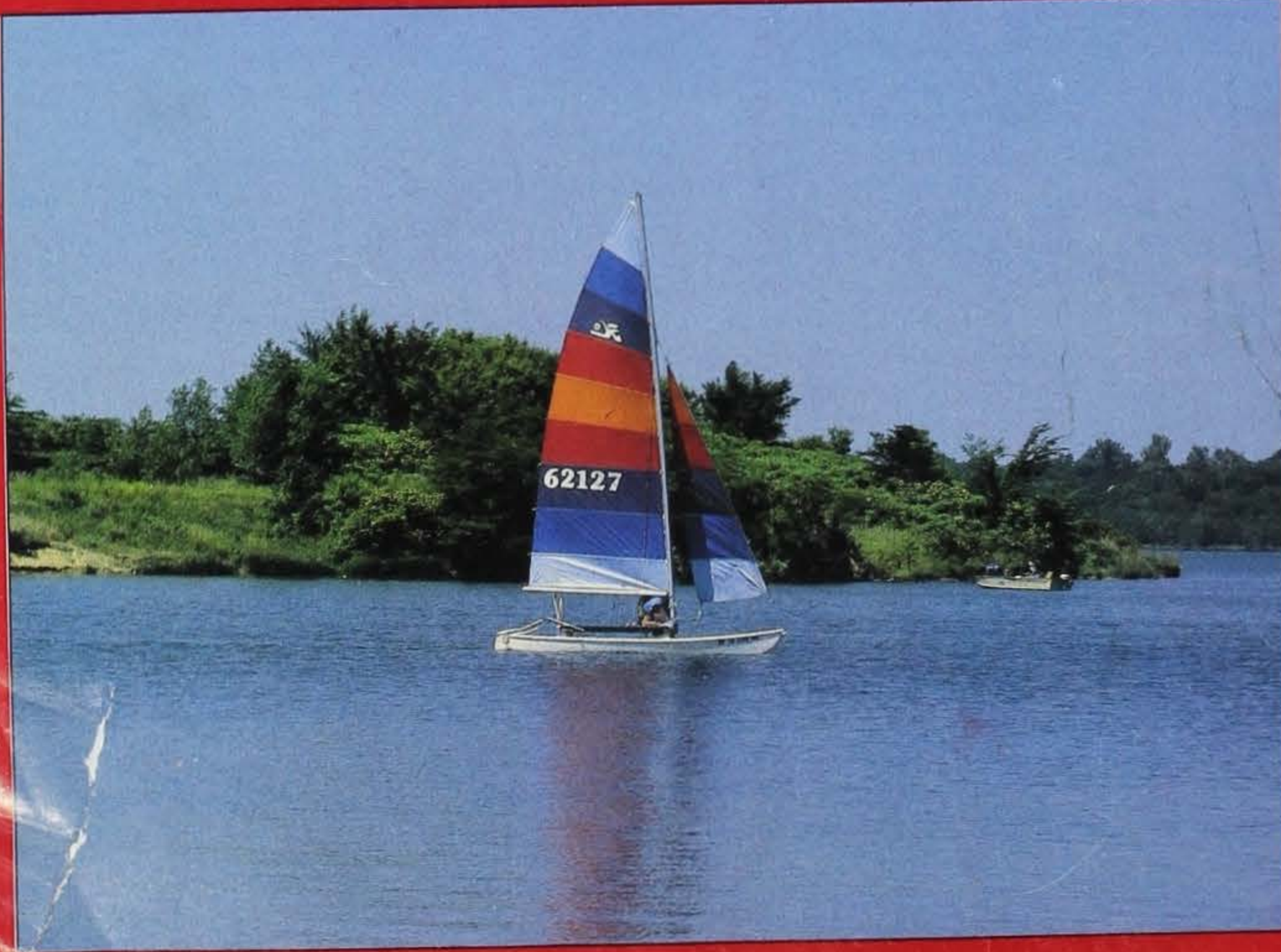
Iowa landowners and investors have overlooked the "back forties," forgetting for too long that trees are one of Iowa's most valuable crops. You can help change that. Contact your forester to find out how. Trees are good for Iowa . . . as good as money in the bank.

David W. Countryman is a professor for the department of forestry at Iowa State University.

Gary Beyer is a district forester for the DNR located at Charles City.

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