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Iowa CONSERVATIONIST

September 1991

Department of Natural Resources



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SEPTEMBER 1991

VOLUME 50, NO. 9

Iowa CONSERVATIONIST

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DNR Central Office, (515) 281-5145
Emergency Spill Response, (515) 281-8694
Telecommunications Device
for the Deaf, (515) 242-5967
Turn-In-Poachers (TIP), (800) 532-2020

Iowa Conservationist (ISSN 0021-0471) is published monthly by the Iowa Department of Natural Resources, Wallace State Office Building, Des Moines, Iowa 50319-0034. Second class postage paid in Des Moines, Iowa, and additional mailing offices. **Subscription rates: \$6 for one year or \$12 for three years.** Include mailing label for renewals and address changes. **POSTMASTER:** Send changes to the *Iowa Conservationist*, Department of Natural Resources, Wallace State Office Building, Des Moines, Iowa 50319-0034.

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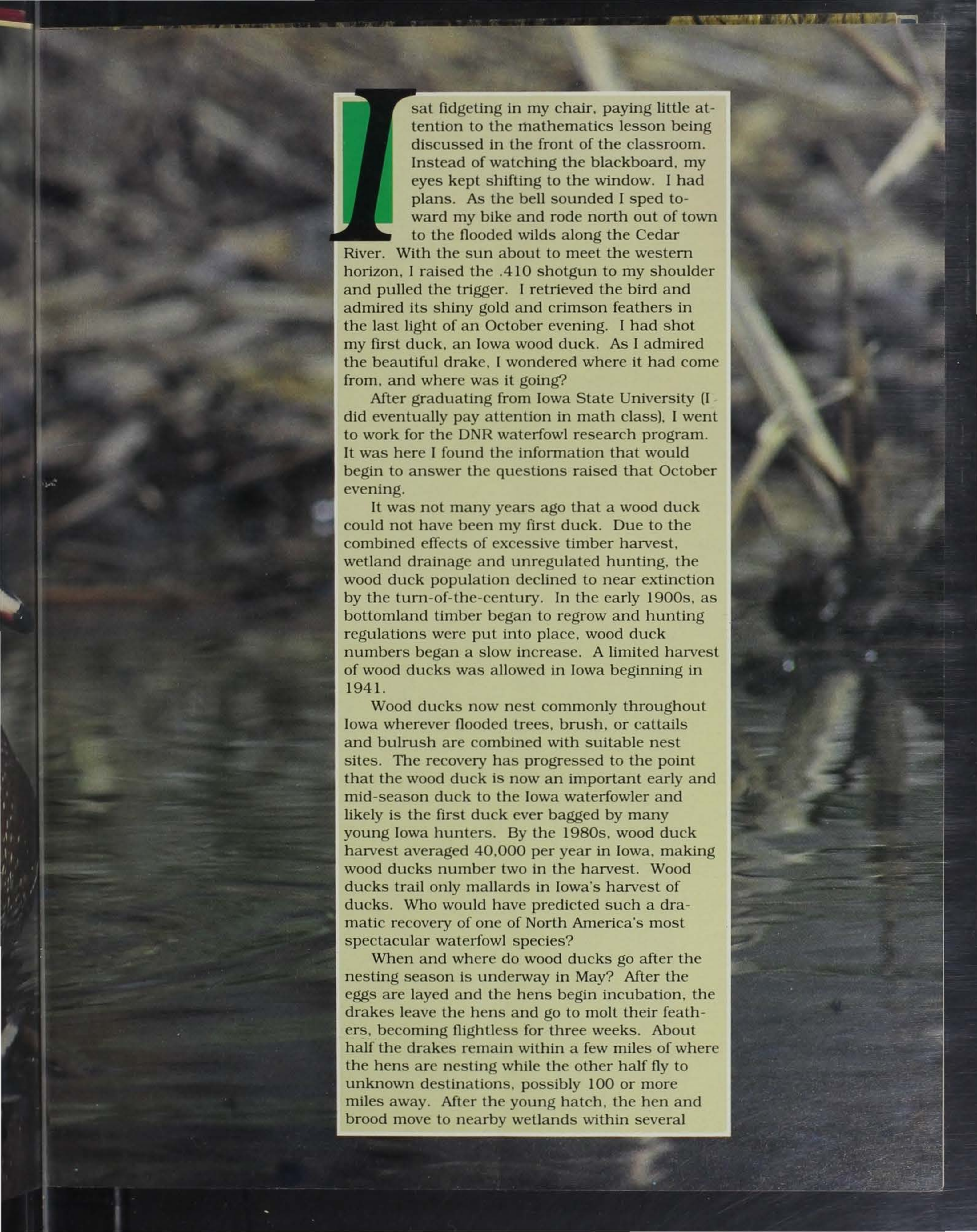
Article by Ted LaGrange
Photos by Lowell Washburn

Iowa's Wandering Wood Duck



Iowa banded more wood ducks than any other state in the 1980s. Hunter recoveries of these bands are key to helping understand the movements and survival of Iowa's wood duck population.





I sat fidgeting in my chair, paying little attention to the mathematics lesson being discussed in the front of the classroom. Instead of watching the blackboard, my eyes kept shifting to the window. I had plans. As the bell sounded I sped toward my bike and rode north out of town to the flooded wilds along the Cedar River. With the sun about to meet the western horizon, I raised the .410 shotgun to my shoulder and pulled the trigger. I retrieved the bird and admired its shiny gold and crimson feathers in the last light of an October evening. I had shot my first duck, an Iowa wood duck. As I admired the beautiful drake, I wondered where it had come from, and where was it going?

After graduating from Iowa State University (I did eventually pay attention in math class), I went to work for the DNR waterfowl research program. It was here I found the information that would begin to answer the questions raised that October evening.

It was not many years ago that a wood duck could not have been my first duck. Due to the combined effects of excessive timber harvest, wetland drainage and unregulated hunting, the wood duck population declined to near extinction by the turn-of-the-century. In the early 1900s, as bottomland timber began to regrow and hunting regulations were put into place, wood duck numbers began a slow increase. A limited harvest of wood ducks was allowed in Iowa beginning in 1941.

Wood ducks now nest commonly throughout Iowa wherever flooded trees, brush, or cattails and bulrush are combined with suitable nest sites. The recovery has progressed to the point that the wood duck is now an important early and mid-season duck to the Iowa waterfowler and likely is the first duck ever bagged by many young Iowa hunters. By the 1980s, wood duck harvest averaged 40,000 per year in Iowa, making wood ducks number two in the harvest. Wood ducks trail only mallards in Iowa's harvest of ducks. Who would have predicted such a dramatic recovery of one of North America's most spectacular waterfowl species?

When and where do wood ducks go after the nesting season is underway in May? After the eggs are laid and the hens begin incubation, the drakes leave the hens and go to molt their feathers, becoming flightless for three weeks. About half the drakes remain within a few miles of where the hens are nesting while the other half fly to unknown destinations, possibly 100 or more miles away. After the young hatch, the hen and brood move to nearby wetlands within several

miles of the nest site. Hens and broods readily move between wetlands during this time and prefer wetlands with a good cover of flooded trees, brush or cattails. As the brood approaches flight age, usually in later July, the hen begins her molt. Wood ducks are extremely secretive during the molt and little is known about their travels during this time.

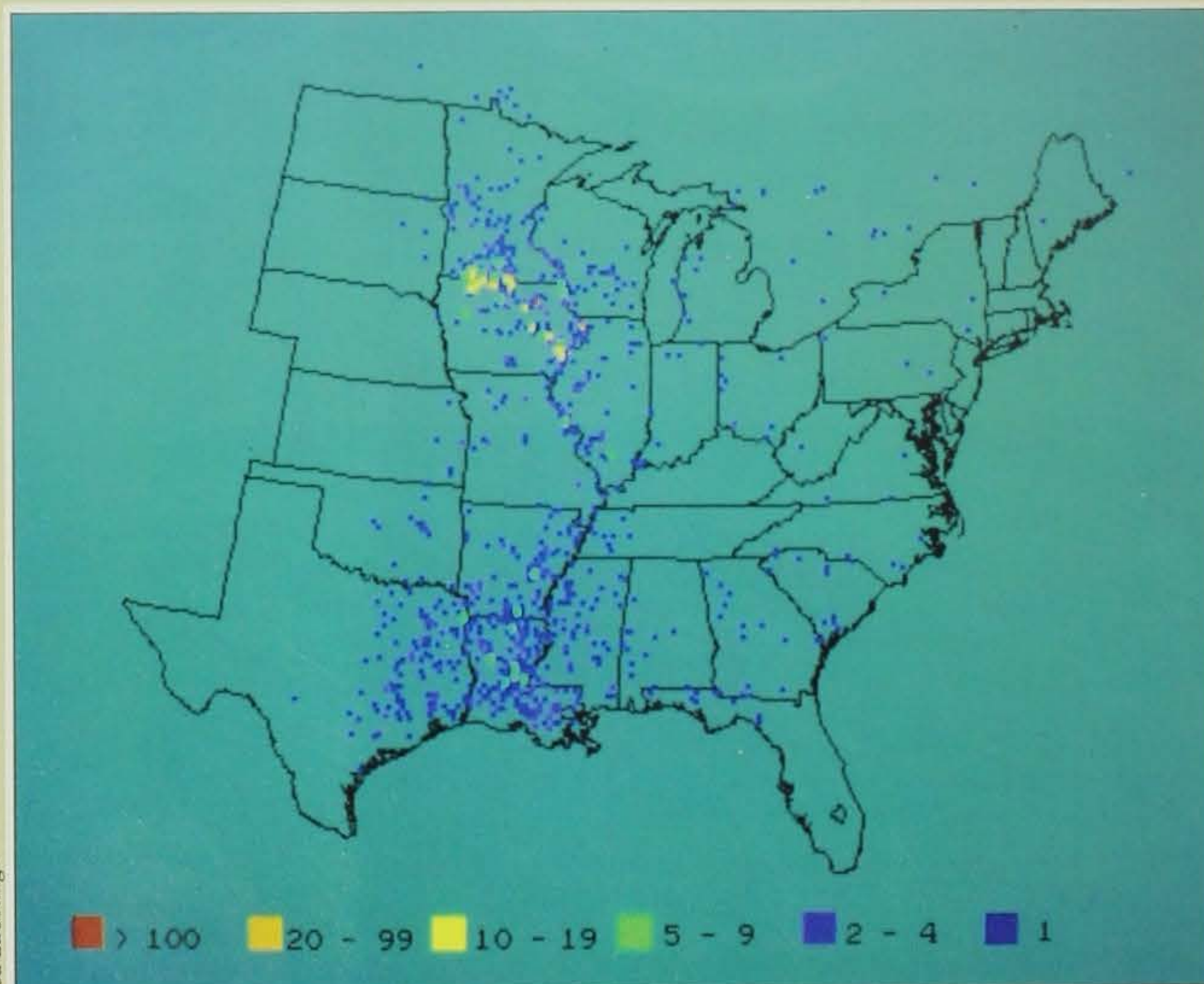
After the molt is complete, generally in August and September, wood ducks begin to form fall flocks. Membership in these flocks is not constant, with birds often shifting from flock to flock. Wood ducks spend the day dispersed and feeding on acorns, corn and other seeds, and then congregate at sunset into spectacular roosting flocks of birds, often numbering in the hundreds. After spending the night in flooded willows, brush, or cattails, the flocks depart for feeding areas. It is during this time that we begin to get a better handle on wood duck movements.

Each year in August and September Iowa DNR wildlife personnel place about 2,000 U.S. Fish and Wildlife Service aluminum leg bands on wood ducks. On the average, Iowa banded more wood ducks than any other state in the 1980s. Hunter recoveries of these bands are key to



Carol Washburn

Distribution and number of hunter band recoveries for Iowa banded wood ducks, 1980-89.



Ted LaGrange

helping understand the movements and survival of Iowa's wood duck population. A majority of hunter recovered bands of Iowa wood ducks occurred in Iowa (54 percent), followed by Louisiana (12 percent) and Minnesota and Texas (6 percent). Upon leaving Iowa, wood ducks show a strong affinity to traveling down the Mississippi River to Louisiana and east Texas. On the wintering areas, hens pick up with new drakes and most return in the spring to the area they nested the year before. The scattering of band recoveries in the eastern U.S. likely represent Iowa drakes pairing up and moving out with hens hatched in the East.

While this information provides a partial answer to the questions -- *Where do wood ducks traveling through Iowa come from, and where are they going?* -- many unsolved mysteries remain. Somewhere, at this moment, there is a young student fidgeting in his or her chair, ignoring the lesson being taught, and glancing impatiently out the window, who one day will play a role in solving more wood duck movement mysteries.

Ted LaGrange is a wildlife research technician for the department at Clear Lake.



Where Do Tires Retire?

by Gaye Wiekierak

Each year, nearly three million of the tires that roll across Iowa's roads are discarded in landfills or in illegal stockpiles throughout the state. Waste tires not only mar Iowa's landscape, if they are not managed properly, they can also pose health and environmental problems. Fortunately, there are opportunities to turn the waste tire problem around.

Because of the tires' ability to hold water and warmth, outdoor stockpiles of waste tires provide the perfect habitat for disease-carrying mosquitoes and rodents. In fact, the eggs of the Asian tiger mosquito were first introduced to this country in shipments of waste tires from



Southeast Asia. Since then, the mosquitoes have moved to several parts of the country, including Illinois and Missouri. Although this mosquito has not been observed in Iowa, waste tire stockpiles increase the likelihood of this pest's introduction to our state. The mosquito is not only a vicious biter, it is capable of transmitting dengue fever and strains of encephalitis.

Along with breeding mosquitoes, stockpiles of waste tires can also "breed" fires — and once a tire fire starts, it is extremely difficult to extinguish.

It is likely that the "answer" to waste tire disposal in Iowa will be a mix of alternatives. The final result depends to some extent on further testing, and to a greater extent on market development.

Burning tires cause high heat, and the hollow holes in stockpiled tires can act as a "chimney" and keep the fire burning or smoldering persistently. Burning tires create heavy, noxious smoke that can sicken firefighters and residents. In addition, tire fires produce an oily ash that can destroy homes, crops and herds, and an oily runoff that can pollute the land and nearby streams. One tire fire in Virginia burned for nearly nine months. Comparable examples are all too frequent, and often occur because of arson.

Even if whole waste tires are placed in landfills, they never seem to go away. When whole tires are landfilled and covered, they keep "floating" to the top because their hollow shape, allows them to fill with landfill decomposition gases. When the tires fill with gases and a bulldozer is run over the landfill, the tires become unstable and literally rise to the top. Consequently, tires impair a landfill's ability to manage other wastes deposited. In some cases, they have also been known to injure both bulldozer drivers and machinery as they unexpectedly rise to the surface with force.

With these problems in mind, the Iowa General Assembly mandated that only processed tires will be allowed in landfills, effective July 1, 1991. According to administrative rules, "processed" means that a tire must be cut or shredded to a size no larger than 18 inches on any side. To meet this requirement, some landfills are

contracting with tire processors with shredding equipment.

This 1989 legislation also required that the Iowa Department of Natural Resources prepare a study on Iowa's tire problem and possible solutions. The study concluded that there are alternatives to landscapes filled with waste tires. Any alternative must, however, be evaluated in terms of several criteria, including environmental effects, economic and technical feasibility, and the numbers of waste tires that can be diverted from disposal.

One alternative — retreading — is not a new concept. Retreading diverts tires from landfills and also saves oil. According to the National Tire Dealers and Retreaders Association, about 75 percent of the oil used in producing a new tire is saved when the tire is retreaded. Most of the retread market is in heavy bus, airplane and off-road vehicle tires. The demand for retread passenger car tires has declined over the last decade, in part because of the advent of radial tires, which are more difficult to retread, and the increased price competitiveness of new tires. There is also a lingering consumer perception that retread tires are inferior, although the retreading technology has been greatly refined over the years. Even with the decline in passenger use, Iowa retreaders expect about 10 to 15 percent of Iowa's scrap tires will be retreaded and put back into use each year.

Nationally, several solutions have been explored and success-



Ken Formanek

►
There is a great potential to recycle shredded tires into leachate collection systems for landfills, alternative fuels and rubberized asphalt.



Ken Formanek

fully used. Whole tires have been used for artificial reefs, construction materials, and erosion control. A variety of products — from corn picker rollers to playground equipment, roads, recycling bins and fuel — have been made from shredded, ground or chemically processed waste tires. Some of the same properties that make tires a disposal nuisance also lead to successful recycling and fuel potential.

In Iowa, a great potential exists to recycle shredded tires into leachate collection systems for landfills. To protect our groundwater, all new landfills or landfill expansions must have leachate control systems. A drainage layer is one part of the system. Granular, permeable material such as clean sand is used for the drainage layer. In 1990, a demonstration project was funded through DNR's

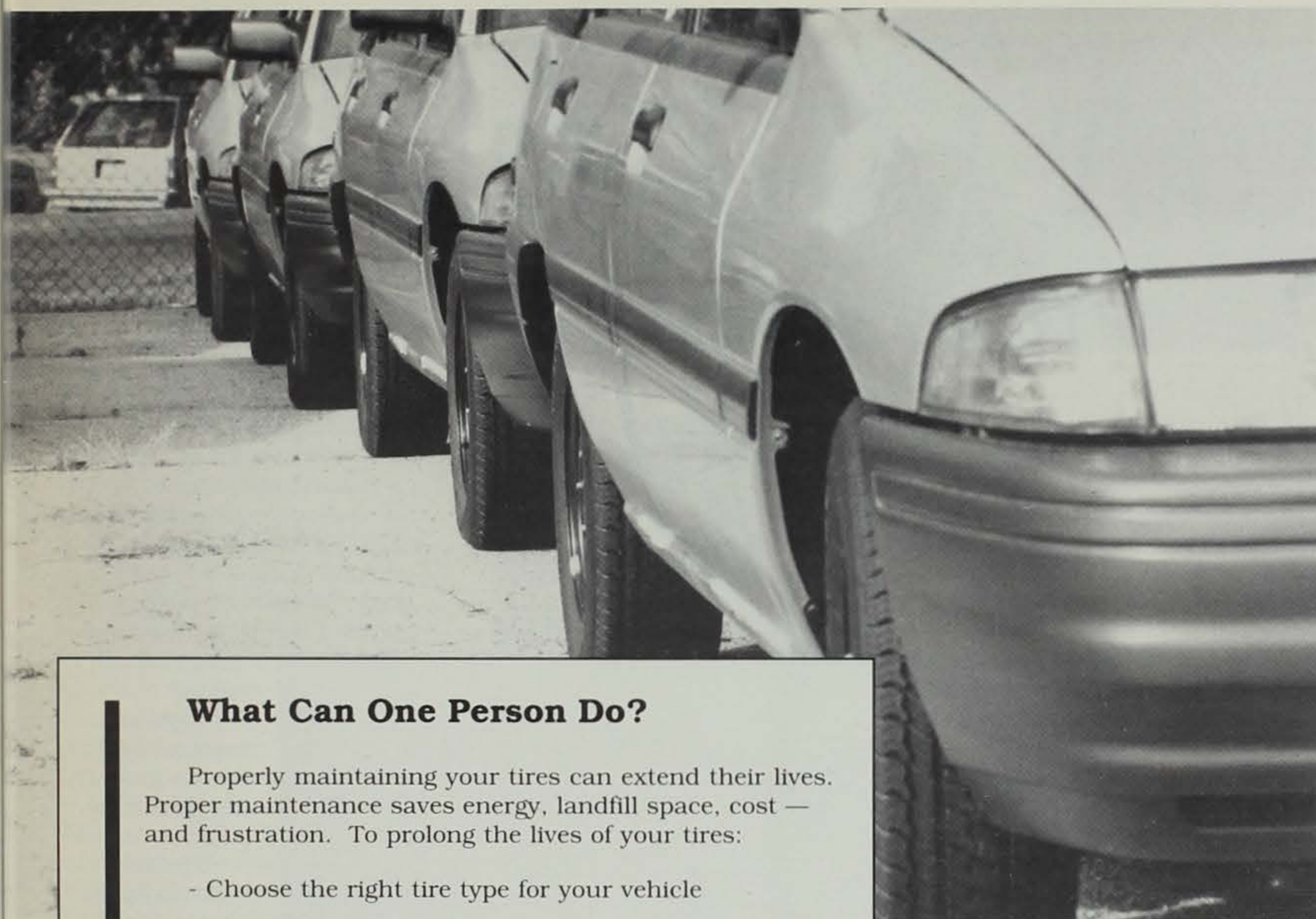
Landfill Alternatives Grants Program to test the use of shredded tires for leachate control. The test results were favorable. Using tires for leachate control could be an economic alternative to using clean sand and could use a large number of tires in a beneficial way.

Using waste tires as fuel is another promising alternative. Because tires have a high BTU value (typically, higher than coal), they can be an excellent fuel source. However, any use of waste tires as fuel must be carefully evaluated for smoke-stack emissions. In 1990, the University of Iowa was given a one-year permit to test burn a mixture of tire chips and coal in one of its stoker boilers. The facility is being carefully monitored for environmental impacts. If the long-term results are positive, about 400,000 tires

could be used for energy each year at that university alone.

The life of a waste tire truly comes full circle when tires are used to create the roads they once rolled across. Chopped and ground waste tires have been used successfully in other states to produce asphalt pavement mixes and crack sealant for roads. Several advantages have been reported from states that have experimented with rubberized asphalt. The main drawback has been its relatively high initial cost, compared to conventional asphalt. However, as with any product, greater use can lead to lower cost in the long run. The Iowa Department of Transportation plans tests of asphalt rubber on some Iowa roads this year. If results are successful, Iowans could be traveling across roads made from their own tires.

It is likely that the "answer" to waste tire disposal in Iowa will be a mix of alternatives. The final result depends to some extent on further testing, and to a greater extent on market development. In each area, we are making progress, but more work needs to be done. In the meantime, illegal waste tire stockpiles will be further controlled through legislation passed in 1991. This legislation requires that administrative rules be developed to register waste tire haulers in Iowa. The waste tire hauler can assume a large part of the responsibility for legal or illegal disposal of waste tires. A few tire haulers will pick up tires from a generator for a fee, and will then dump the tires illegally. In many cases, neither the generator nor the landowner are aware of the tires' destiny. Further attention to haulers' activities should alleviate part of the dumping problem and the associated health and environmental prob-



Ron Johnson

What Can One Person Do?

Properly maintaining your tires can extend their lives. Proper maintenance saves energy, landfill space, cost — and frustration. To prolong the lives of your tires:

- Choose the right tire type for your vehicle
- Use the correct tire size
- Maintain proper air pressure
- Avoid sudden starts and stops
- Avoid excess speeds
- Avoid cornering at high speeds
- Rotate tires regularly
- Keep wheels aligned
- Keep wheels balanced
- Check tires often for damage
- Replace tires when there is 1/16" of tread left
- Avoid rough roads and potholes.

(For a "Tire Safety and Mileage Kit," including an air pressure gauge, a tread depth gauge, a set of four tire valve caps, and a 12-page consumer tire guide, send a check or money order for \$4.00 to the Tire Industry Safety Council, Box 1801, Washington, D.C. 20013.)

lems that accompany illegal stockpiles. However, regulating haulers will not solve Iowa's entire waste problem.

As long as there are vehicles, places to go and people to see, there will be waste tires in Iowa. Discarded tires can continue to pose problems — or they can be viewed as a resource potential, ready to be tapped.

Gaye Wiekierak is chief for the planning and grants bureau of the department's Waste Management Division in Des Moines.

GLACIAL BOULDERS IN IOWA

by Raymond R. Anderson
and Jean C. Prior

"Peculiar," "irregular" and "uncommon," are words used to describe one class of Iowa rocks -- glacial boulders or "erratics." Geologists define erratics as stones or boulders that have been carried from their place of origin by a glacier and then left

stranded by melting ice on bedrock of a different composition. In Iowa, glacial erratics are commonly observed where glacial deposits occur at the land surface, primarily in the north-central and northeastern parts of the state. In western and southern Iowa, erratics generally lie buried beneath wind-deposited silts (loess) that cover the glacial materials. In these areas, erratics generally are restricted to valleys, where



Paul VanDorpe

▲ **This 67-pound nugget of native copper, tinged with greenish oxides, is one of the most distinctive glacial erratics found in Iowa and probably originated from the Lake Superior area along the Upper Peninsula of Michigan. (Specimen is 15 inches long and nine inches wide.)**

streams have eroded through the loess and into the underlying glacial deposits.

The erratics seen in north-central Iowa are the most recent to arrive in the state. They are found on the Des Moines Lobe, the region last covered by glacial ice

14,000 years ago. The ice sheet entered Iowa from Minnesota and moved southward between what is now Mason City and Spencer, advancing as far as the capital city of Des Moines. This ice melted away about 12,500 years ago. Northeastern Iowa also has a significant concentration of boulders across the landscape (see photo, below right) and the greatest number of exceptionally large erratics. This

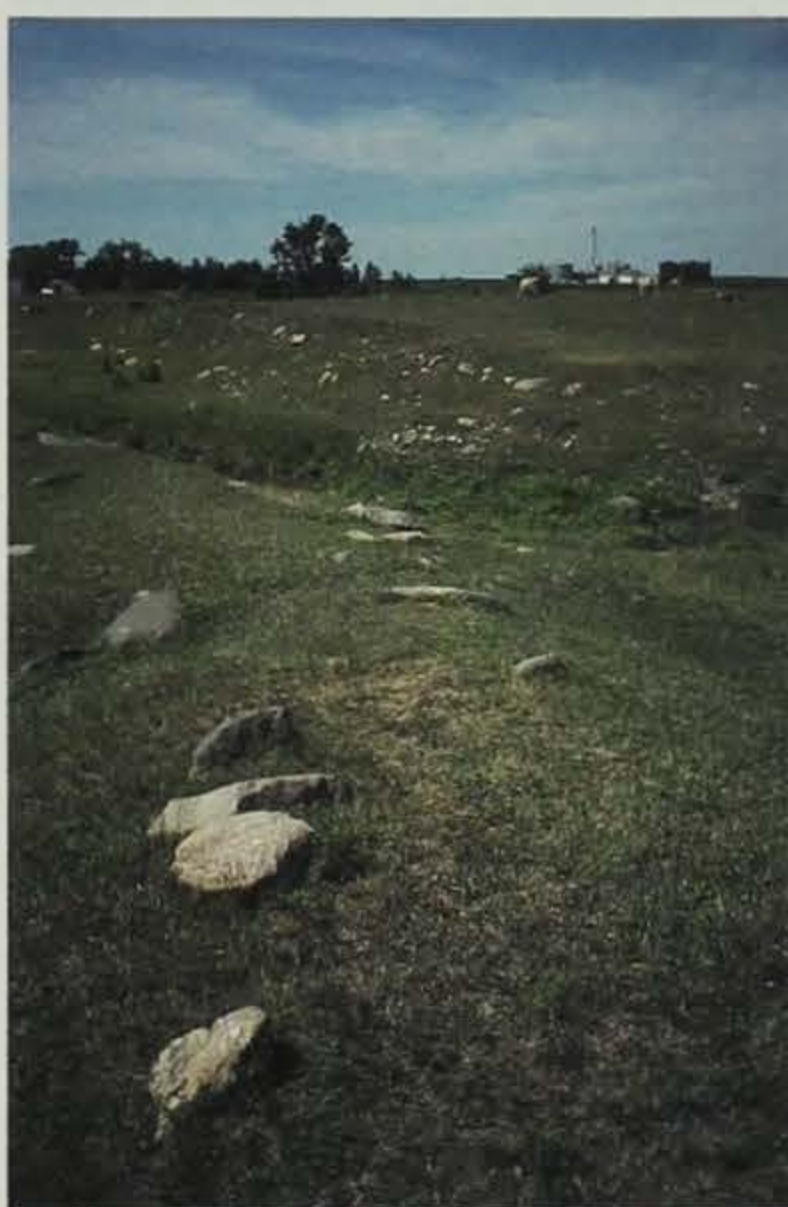
► Glacial grooves and striations inscribe the limestone bedrock exposed in a Des Moines County quarry. These sets of parallel furrows and lines were gouged by glacial boulders embedded in the base of a slowly moving ice sheet.

Holmes Semken



region, known as the Iowan Surface, was once much like southern Iowa, with loess deposits mantling steeply rolling terrain composed of glacial materials deposited in Iowa more than 500,000 years ago. About 20,000 years ago, extremely cold climatic conditions led to erosional beveling of this area and removal of much of the finer-grained glacial materials, thus concentrating the larger pebbles and boulders at the land surface.

When these areas of the state were settled, farmers were forced to clear fields of the rock obstacles in order to plow. Many of the erratics were used to build fences and foundations, while others were just piled along fence rows or into unused field corners where they are seen today. Clearing farm fields of glacial erratics is a frequent chore wherever glacial deposits are cultivated. Over time, seasonal freezes and thaws work these rocks upward from below the plow zone to the land surface. Smaller glacial erratics can be hauled out of the fields; larger ones are frequently blasted by dynamite and the pieces hauled away; some of the largest are just left in place and avoided. At the municipal park in Nora Springs (Floyd County), an adjoining city street actually narrows to accommodate an erratic protruding into the right of way.



Pat Lohmann

◀ This Black Hawk County field strewn with glacial erratics is typical of many pastures on the Iowan Surface of northeastern Iowa.

Glacial erratics in Iowa are not difficult to identify. The vast majority are igneous or metamorphic rocks, rather than the usual sedimentary rocks of sandstone, limestone, dolomite and shale that constitute the bedrock under most of Iowa. If you pick up a granite rock, composed of interlocking crystals of pink feldspar and glassy quartz, you can be sure it came from outside the state, most likely carried by glacial ice.

Most glacial erratics appear worn and rounded, and sometimes include beveled or faceted surfaces. During the course of their



Calvin Collection -- The University of Iowa

▲ A large, weathered and rounded boulder of granite in this turn-of-the-century photograph of a Mason City neighborhood is a monument to the massive glacier that brought it south more than 500,000 years ago. The nearest bedrock source of this erratic is central Minnesota.

journey, the rocks were jostled against other erratics or scraped against the underlying bedrock, rounding off corners and planing smooth surfaces. Glacial transport also caused some boulders to fracture, producing fresh angular edges. Rocks carried by rivers also undergo abrasion and become rounded in the process. In fact, most of the igneous and metamorphic rocks in Iowa's river valleys were originally transported into the general area by glaciers, then eroded from the glacial deposits and moved some additional distance by water.

Transportation by glacial ice produces some other features unique to this mode of travel. The most easily observed of these tell-tale signs are glacial striations, a series of parallel lines or fine grooves gouged across the beveled faces of erratics or inscribed on the underlying bedrock surface (see top photo, page 13). These glacial furrows are produced when an erratic, frozen firmly in the slowly moving glacial ice, grinds against another erratic

or against the bedrock surface over which the glacier is moving. Glacial grooves and striations can be used to identify the direction of ice movement.

The composition of glacial erratics can often lead to identification of their point of origin and thereby provide some specific information about the direction of ice movement. At times, a string of erratics of similar composition can be observed across a broad region. These "boulder trains" are defined as a series of erratics that have come from the same bedrock source, usually with some special characteristic that makes it easy to recognize their common origin. Boulder trains appear as long lines or fans of erratics extending outward from their source in the direction of ice flow. Erratics from a given area are nearly always more numerous near their source and diminish in number with distance.

A large-scale example of a boulder train that can be observed in Iowa is the distribution of glacial erratics composed of the distinctive Sioux Quartzite, a very hard, uniformly pink rock. Outcrops of this Precambrian-age, quartz-rich rock occur in the extreme northwest corner of Iowa and on across the border into southwest Minnesota, where they span an area from the town of New Ulm, westward to Mitchell, South Dakota. Since the glacial ice that moved through northwestern and north-central Iowa travelled generally southward, erratics of Sioux Quartzite are most common in the area west and southwest of Estherville (south of New Ulm, Minnesota) and are generally absent east of there. One of the largest examples of a

Sioux Quartzite erratic is known as Pilot Rock and is seen about three miles south of Cherokee, perched above the eastern edge of the Little Sioux River valley -- doubtless an important landmark for early travellers through the area. Another example of a boulder train involves rare diamonds recovered from some Midwest-ern glacial deposits.

Attempts to trace them back to a northern source area, however, have been unsuccessful.

Glacial erratics are known to have been transported great distances by the ice sheets that covered the midcontinent region.

An erratic composed of solid native copper, and probably originating from the Lake Superior region along the Upper Peninsula of Michigan, was recovered from glacial deposits in southern Illinois, more than 600 miles from its source. Native copper erratics also have been recovered in Iowa, a journey of about 500 miles. One such copper erratic weighing 67 pounds is on display in the "Minerals of Iowa" exhibit in Trowbridge Hall on the University of Iowa campus in Iowa City (see photo, page 12).

Glacial erratics range in size from pebbles to giant boulders. The greatest number of giant erratics are seen on the Iowan Surface of northeastern Iowa. They were described in a 1970 Iowa

Academy of Science article by Drake University professors Richard Dirks and Carl Busch, who noted that 80 percent of the giant boulders had a similar composition, a light-colored, coarse-grained granite. They concluded from the boulders' composition and the direction of glacial striations on the underlying

G

lacial boulders or "erratics" are stones or boulders that have been carried from their place of origin by a glacier and then left stranded by melting ice on bedrock of a different composition.

bedrock surface that these erratics probably originated in central and west-central Minnesota.

In another Iowa Academy of Science article in 1961, geologist Charles Gwynne of Iowa State University described the fate of a large Black Hawk County erratic near Waterloo. It originally measured 30 feet long, by 20 feet wide, by 27 feet high and was broken up in 1891; the pieces were used to construct the Boulder Church which housed the congregation of the First Presbyterian Church in Waterloo. This building was used as late as 1961 by the Salvation Army. The 1916 Annual Report of the Iowa Geological Survey described a boulder in Floyd

County, about three miles west of Nashua, as the largest erratic remaining in Iowa. Its dimensions then were 50 feet long by 40 feet wide by 11.5 feet above the ground, with a nearby fragment measuring 17 feet by 7 feet by 1.5 feet apparently broken from the larger rock. In 1961, this same erratic

was listed as being 40 feet by 30 feet by 12 feet. Other large erratics that can still be seen are St. Peter's Rock four miles southeast of Alta Vista in Chickasaw County, a granite specimen five miles west of Cedar Falls in Grundy County, and a granite boulder in Gram-

mer Grove Park in Marshall County.

Glacial erratics are an easily observed piece of Iowa's geological history (see photo at left). Each one has a story to tell about its original composition, its point of origin, its journey to Iowa, and its final resting place. Find some for yourself and see what they tell you.

--Reprinted from Iowa Geology 1990, Number 15.

Raymond R. Anderson is a geologist for the department at Iowa City.

Jean C. Prior is a geologist for the department at Iowa City. She is editor of Iowa Geology.

T

he walleye is an important fish to the anglers of Iowa, as well as the fisheries bureau of the DNR and many other state fishery programs.

Twenty-one states support a program of walleye stocking to maintain populations and 15 states have established new walleye fisheries where none previously existed. Nationwide, approximately four million anglers fished 79 million days in pursuit of walleye. The 1986 survey of Iowa anglers found that 16 percent of Iowa's 420,000 anglers preferred to fish for walleye, but walleye represented only about four percent of all the fish caught in Iowa. While this number may not seem impressive, it equals approximately 1.8 million walleye harvested from Iowa's waters each year.

Considering these facts, the question must be asked, "How do the waters of the state continue to produce the numbers of walleye to satisfy anglers?" The answer — With much help from the DNR's fisheries program. This help comes primarily from stocking walleye of various sizes and evaluating each population. Stocking is necessary because Iowa lakes lack suitable walleye spawning habitat. Fish stocked from DNR fish hatcheries maintain populations for anglers, establish populations in new lakes, and guarantee adult fish will be available for hatchery use in future years.

Walleye stocking is not a "hit or miss" operation, but instead, a system of guidelines that have been drawn up to insure the highest possible success of planted fish. The guidelines state only the following waters may receive walleye:

- suitable natural lakes (those protected from persistent winterkill)
- artificial lakes greater than 500 acres
- flood control reservoirs, and
- inland rivers with suitable habitat.

These stockings are not in the entire river, but in areas that may support walleye. (See map on page 18 for walleye stocked in 1991.)

Fisheries personnel routinely sample lakes and streams stocked with walleye. These surveys are used to determine how the walleye are doing and if stocking is improving the population. The size of fish stocked, number of fish stocked and time of stocking is often altered in an effort to improve survival of stocked fish. The size and number of fish stocked, and time of stockings are adjusted to match the available food supply and handle competition from other fish in the lake. Biologists may recommend fry walleye (newly hatched), two-inch fingerlings or six-inch fingerlings depending on the lake or stream to be stocked. In general, natural lakes greater than 1,500 acres are stocked with 3,000 to 4,500 fry per acre, while smaller lakes often receive 3,000 fry per acre. In artificial lakes and flood



Ron Johnson

by Alan Moore

WALLEYE FACTORY

control reservoirs, fry stockings seldom exceed 3,000 per acre and rivers are not stocked with fry. Research has shown fry will not survive in Iowa rivers but fingerlings will survive and grow rapidly, providing good fishing. Six-inch fingerlings survive much better than fry and, thus are stocked at much lower densities. Stockings of 10 fingerlings per acre usually provide good walleye angling in the better walleye lakes.

The source of all walleye used for stocking is the Rathbun and Spirit Lake hatcheries. Each spring DNR personnel collect, for spawning, adult walleye from Rathbun Reservoir, Big Spirit Lake, East and West Okoboji lakes, Storm Lake and Clear Lake. Eggs and milt are taken from the fish and the brood fish are immediately released, unharmed. Eggs are incubated in the hatcheries and, annually, more than 130 million fry walleye, 90,000 two-inch, and 400,000 five- to six-inch walleye are produced. Walleye fry are stocked in May and transported to the lakes and streams in plastic bags with water and oxygen added. Approximately 200,000 fry may be safely placed in each bag. Walleye used for two-inch stocking require an additional 45 days of growth. A portion of the fry produced are placed in hatchery

ponds, feed on plankton, and are harvested and stocked in mid- to late June. Some of these two-inch fish are further raised in large ponds and fed

minnows, or in tanks and fed pelleted feeds until they reach six inches. These walleye are distributed for stocking throughout the state in Sep-



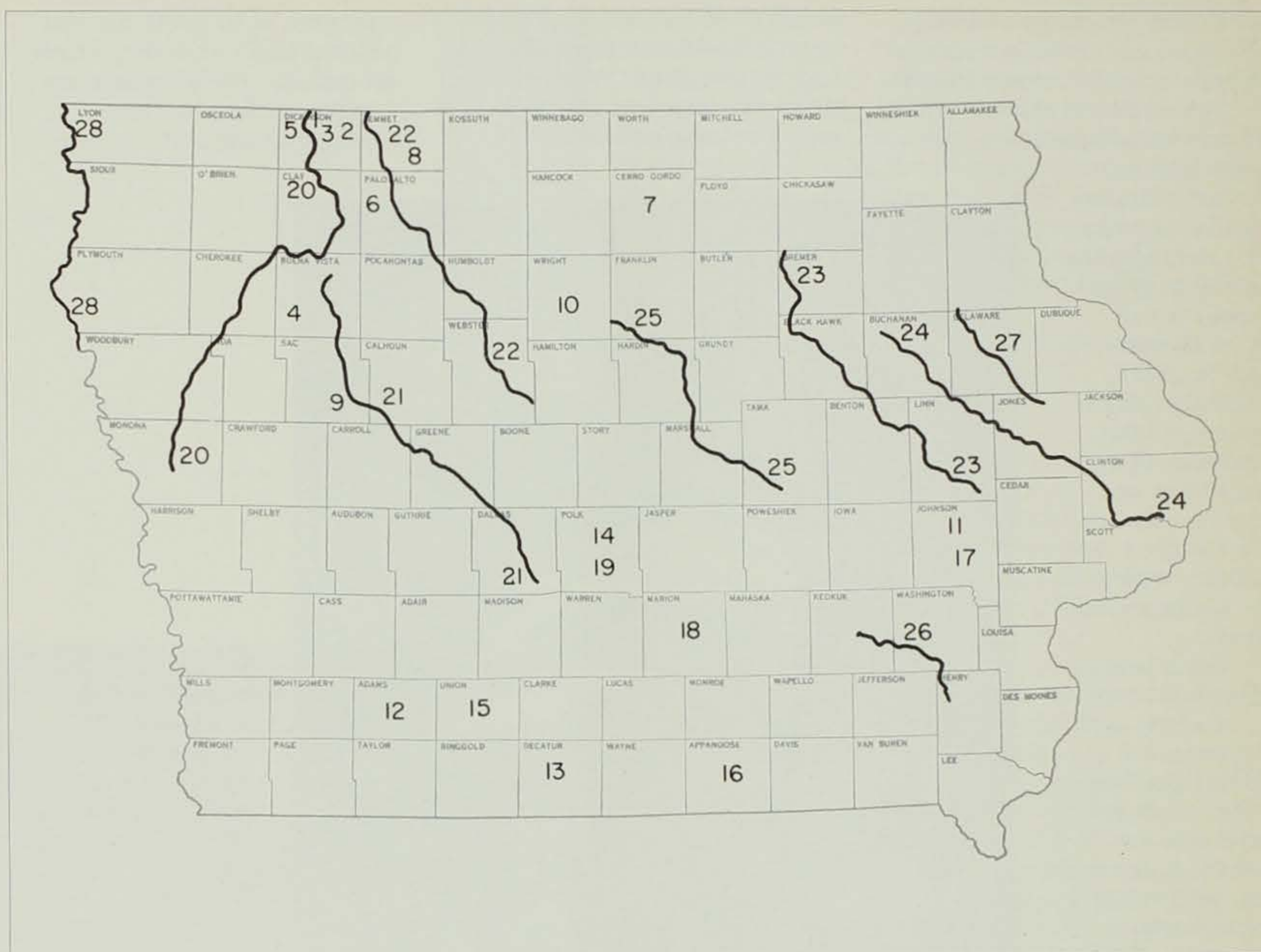
Ron Johnson

Research on egg fertility will help improve hatchery production (opposite page).

Visual implant tags help monitor walleye populations.



DNR Photo



The following waters were stocked with walleye in 1991 (see map) — Big Spirit Lake (1), East (2) and West Okoboji (3) lakes, Storm Lake (4), Silver Lake (5), Lost Island Lake (6), Clear Lake (7), Ingham Lake (8), Black Hawk Lake (9), Lake Cornelia (10), Lake Macbride (11), Lake Icaria (12), Little River (13), Big Creek (14), Twelve Mile (15), Rathbun Reservoir (16), Coralville Reservoir (17), Red Rock Reservoir (18), Saylorville Reservoir (19), Little Sioux River (20), Raccoon River (21), Des Moines River (22), Cedar River (23), Wapsipinicon River (24), Iowa River (25), Skunk River (26), Maoketa River (27) and Big Sioux River (28).

tember and October.

Who would think that Iowa, with its productive farmland, could also be a major producer of walleye? Annually millions of walleye are hatched and stocked in waters across the state. Iowa's waters are productive and the fish grow very well. The 1990 list of large fish caught by anglers contained 13 walleye weighing eight pounds or more. DNR fisheries research and hatchery personnel know walleye fishing in Iowa can be even better and are working on developing new methods to produce and rear more walleye for less money. Projects include evaluation and improvement of egg fertility during spawning, investigation of feeding fry artificial feed, evaluation of

feeds to grow walleye faster and larger, and visual implant tagging to evaluate walleye populations in lakes and streams. This research is already paying dividends and will continue to help improve walleye angling in Iowa. And remember, you don't have to leave Iowa to catch the sporty and tasty walleye, and take pride in the fact that your fishing license money makes it possible.

Alan Moore is a fisheries biologist for the department at the Rathbun Fish Hatchery.

WARDEN'S DIARY

CHUCK HUMESTON

HOW TO WALK ON WATER

I was sitting in the sheriff's office doing paperwork when one of the deputies walked in and said, "Tell me if I did right."

"Sure," I said. "What happened?"

"Well," he began, "I got a complaint about a sick fox east of town, so I drove out there, and here was this fox. It was frothing at the mouth. It appeared it couldn't see, it was pathetic, so I got my shotgun out of my car, and I shot it."

"Sounds good," I replied. "It was obviously very sick. I would have done the same thing."

"I thought so," he said. "Everything seemed pretty clear to me under State law and our policy. But then this bystander started yelling at me, accusing me of shooting everything I see, and how I don't have to kill everything, and threatened to call the sheriff. Then she told me the fox was only blind."

"How was the fox supposed to survive if it couldn't see?" I asked. "You did what you had to do. Between the two, you were the one showing mercy."

Sometimes I don't understand this attitude. I've had comments thrown at me in the past about the supposedly cruel, inhumane sport of hunting. Yet these same com-

mentators would let a blind, sick animal suffer and starve. That's caring and concern?

I spend a lot of time in the outdoor world, and as in any law enforcement job, I've seen a lot of hard-core reality both in the wild and human worlds. One thing I've found is some people live in a dream world when it comes to their perception of nature. In my years at this job, I have yet to walk in the woods, and see all the little animals chatting and having a tea party together. I hear a lot of talk about nature. The truth,

The group of officers present had a walk that matched their talk when it came to concern about wildlife.

hard as it may be to face, is nature can be cruel and abusive.

Animals die in the wild. I realize many don't want to face the fact, but many times they die horribly at the slashing of the fang, the piercing of the talon, or the suffering of disease. The good news is nothing is ever wasted. This cycle has been repeated since the beginning. Once in a while we get to witness this truth, and for many

it is a bitter pill to swallow.

In late March, I walked into the Clear Lake District Office and the phone was ringing off the wall with calls about three deer stranded out on the deteriorating ice. The deer would occasionally break through the ice and have to crawl up on the slick surface again. Callers were requesting a "rescue operation."

How? The ice would not support a deer, much less a human being. Our orders were no officer would put himself at risk of drowning or hypothermia in an attempt to rescue the deer. The theory was, if let alone, the deer would make it off the lake on their own.

Finally, the call came in criticizing us for not attempting to save the deer and accusing us of not caring. The group of officers present had a walk that matched their talk when it came to concern about wildlife, yet were criticized for not caring. We decided the risk to human life did not outweigh any possible benefits. We have yet to figure out how to walk on water.

We stuck to our decision. No officers were hurt. However, a few of the concerned mounted a rescue by finally getting to one of the deer, wrestling it around the neck and dragging it to shore.

The result? The two deer left alone made it off the lake on their own. The "rescued" deer died. And the humans, for one moment, received the rare opportunity to witness the reality of the wild.

CONSERVATION

UPDATE

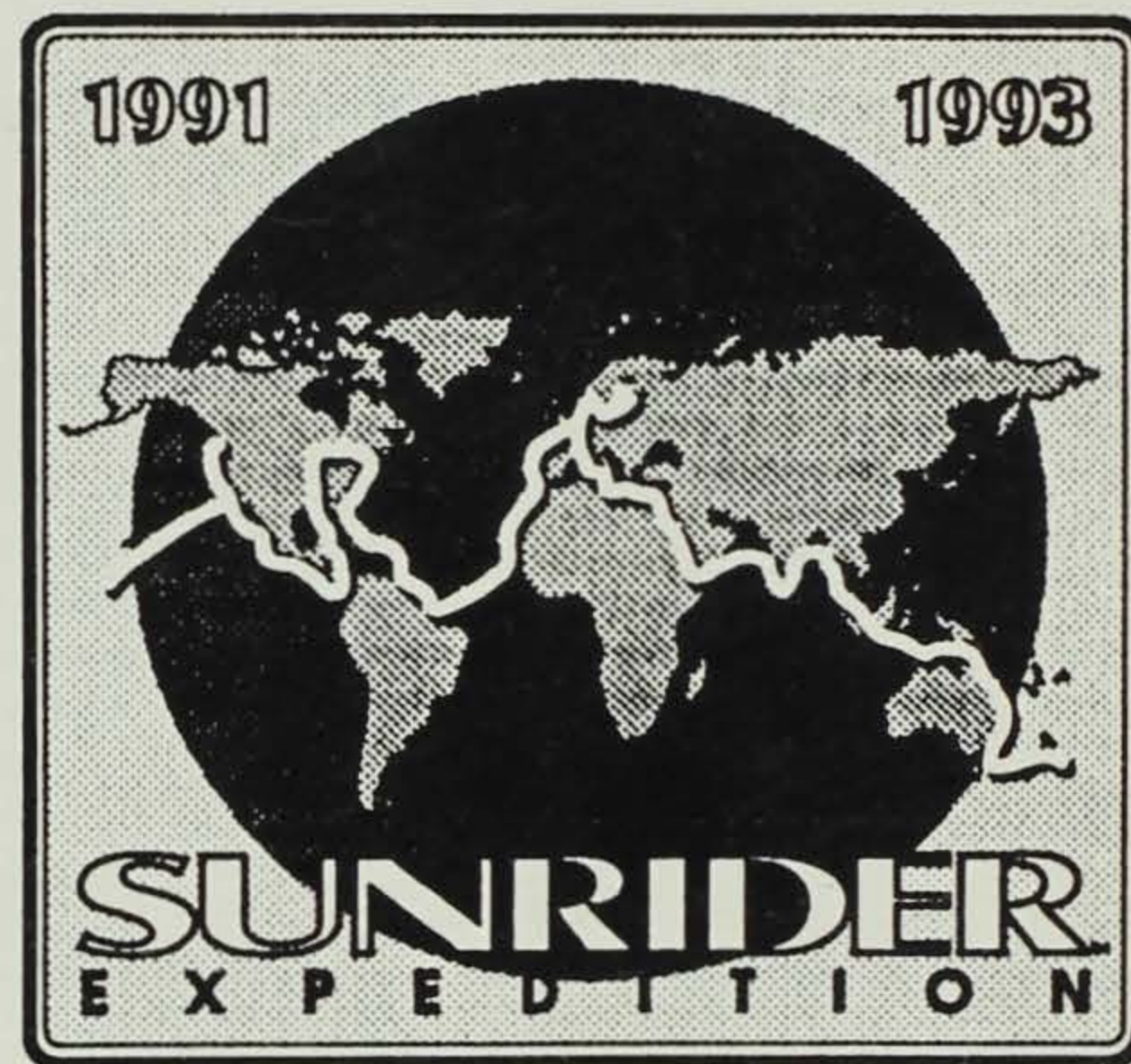
AROUND THE WORLD ON VEGETABLE OIL AND SUNLIGHT

by Eric Best, energy
information intern

The quest for environmental consciousness will thrust Iowa into the spotlight this summer. Through a project tabbed the Sunrider Expedition, an Iowa resident will attempt to educate people about the use of alternate energy sources.

The Sunrider is a boat that will be used to embark on a 52,000-mile trip around the globe powered only by vegetable oil and sunlight. The trip will last two and one-half years during which the Sunrider will be a global classroom to educate people around the world about alternate energy sources and environmental problems.

Bryan Peterson will pilot the boat and add to his list of environmental achievements. Peterson, a resident of Fairfield, Iowa, spent



nine months producing *Earth 1990, A Guide to Positive Environmental Action*. It opened the door for future projects such as the Sunrider.

Because Peterson resides in Iowa, it is a chance for Iowa to serve as a leader in energy conservation. According to Scott Parks, coordinator of a live-broadcast launch event in Des Moines, "This is a unique opportunity for Iowa. We have a chance to not only show the nation that Iowa is taking the lead in environmental issues, but a chance to show the whole world."

The Sunrider will be powered by canola

oil and solar panels. Canola oil is a vegetable oil used in cooking. The oil was tested as a fuel at the University of Idaho. Because it is not an Iowa-based product, the Iowa Department of Agriculture and Land Stewardship (IDALS) is trying to incorporate soybean oil as fuel instead of canola oil. This would draw more attention to Iowa and our agriculture.

"Nothing is definite yet, but we are testing it to see whether it would be cost-effective," said Steve Pedersen, IDALS marketing director. "It (soybean oil) has been chemically tested to

see if it is compatible with the system. But, at this late date, I think it will be hard to switch."

The launch of the Sunrider will take place in San Francisco, California, but a launch date has not been set yet, according to Parks.

Fund-raising efforts are continuing for this expedition. Sunrider has attracted international co-sponsors such as Zodiac International, which built the actual boat Bryan Peterson will be using. More than 30 corporations and associations have committed to the expedition so far. The expedition is looking for environmentally aware companies and associations to help.

The trip will cover thousands of miles, reaching out to countless numbers of people for the cause of environmental concerns and alternate energy sources. This project began in Iowa and with the support of the people of this state and the people around the world, Peterson is hoping that his message will be heard loud and clear.

--Reprinted from the
Iowa Energy Bulletin,
July/August 1991

Videotape on Improving Lake Water Quality and Recreation Available

A new videotape on how to improve water quality and recreation of Iowa's lakes is now available for public use from the Iowa DNR. "Lake Restoration: An Investment That Pays Off" is a 20-minute videotape that identifies the major problems affecting lakes and describes costs and benefits of maintaining and improving lake water quality and recreation.

"Soil erosion is the major source of pollution of Iowa's lakes," said Allen Farris, administrator of the DNR's fish and wildlife division. "Lakes can be improved and restored, but reduced sedimentation and turbidity are the key factors which determine lake life and quality of recreation."

The video features examples of restoration accomplished on several Iowa lakes. These examples include restoration methods and costs of restoration which are weighed against the economic benefits of improved water quality and recreation. Farris feels education of

Iowans in controlling and preventing non-point source pollution of lakes is critical.

The video is available for groups interested in improving a public or private lake. It can be used as an educational tool for high school students through adults. The tape was produced by the Iowa Department of Natural Resources in cooperation with the U.S. Environmental Protection Agency and the Carroll County Conservation Board.

To borrow the lake restoration video, contact any DNR office or Kim Coulter, Iowa Department of Natural Resources, Wallace State Office Bldg., Des Moines, Ia., 50319-0034, (515) 281-8395. The video will also be distributed through the Carroll County Conservation Board and area education agencies. There is no rental charge.

Three States Now Boast More Than A Million Hunters

According to the National Shooting Sports Foundation (NSSF) another state has been added to the ranks of those with

more than a million hunters. From numbers just released by the U.S. Fish and Wildlife Survey, Michigan joined Texas and Pennsylvania as states with more than a million licensed hunters. In fact, Michigan took over second place on the list, behind Pennsylvania and just ahead of Texas. Pennsylvania had 1,168,137 paid hunting license holders in 1990, Michigan filled the second position with 1,148,163 hunters, while Texas was third with 1,138,011.

Paid hunting license holders in the state of Michigan increased by a whopping 22.3 percent between 1989 and 1990, with an additional 209,660 hunters buying licenses. Other states with notable increases in hunting license holders were:

*Virginia--*439,738 hunters--an increase of 6.6 percent

*North Dakota--*91,102 hunters--an increase of 4.9 percent

*Iowa--*271,663 hunters--an increase of 4.8 percent

*Indiana--*317,486

hunters--an increase of 4.7 percent

*Massachusetts--*116,300 hunters--an increase of 3.9 percent

*Washington--*268,653 hunters--an increase of 3.6 percent

*Connecticut--*90,709 hunters--an increase of 3.4 percent

Overall hunting numbers were down fractionally (0.3 percent) on the national level. Adding together the revenue from the sales of licenses, permits, tags and stamps, hunters spent almost \$422 million versus \$400 million in 1989.

"It should be noted that the \$422 million spent on licenses, permits, tags and stamps is used to directly fund state wildlife programs. These programs benefit not only game animals such as deer, pheasant and turkey, but also songbirds, eagles and numerous nongame species," said Bob Delfay, executive director of NSSF. "Hunters helped start the conservation movement more than 100 years ago, and they are the ones who are still putting their money where their beliefs are."

CONSERVATION UPDATE

Upcoming NRC, EPC and Preserves Board Meetings

The dates and locations have been set for the following meetings of the Natural Resource Commission, Environmental Protection Commission and the Preserves Advisory Board of the Iowa Department of Natural Resources.

Agendas for these meetings are set approximately 10 days prior to the scheduled date of the meeting.

For additional information, contact the Iowa Department of Natural Resources, Wallace State Office Building, Des Moines, Iowa 50319-0034.

Natural Resource Commission:

--Oct. 3, Guttenberg

--Nov. 7, Corydon

Environmental Protection

Commission:

--Sept. 16-17, Des Moines

--Oct. 21-22, Des Moines

State Preserves Advisory Board:

--Sept. 10, Des Moines

Wild Turkey Harvest Declined in Spring 1991 Season

Wild turkey harvest during the April and May 1991 season declined three percent from the record harvest set in 1990. Wild turkey gun harvest for spring 1991 was estimated at 7,838 bearded birds according to DeWaine Jackson, forest game research biologist with the Iowa Department of Natural Resources. A four-season format with a quota of 4,420 licenses available during the first three seasons and an unlimited license quota for the fourth season resulted in a record 28,603 resident shotgun licenses issued, a four percent increase over spring 1990. An additional 1,161 archery-only licenses were issued, a slight increase over 1990. Nonresident hunters had their second year of spring turkey hunting in Iowa. Although 450 nonresident licenses were available, only 306 were issued.

"Even though we issued a record number of licenses, I expected the harvest to decline more than just three percent from 1990's harvest," said Jackson.

"Iowa has experienced poor turkey brood production the last three years, and we expected hunters to be less successful in harvesting a turkey than they were. We had expected the very poor turkey production that occurred in 1988 and 1989 to significantly reduce the number of adult (two- and three-year-old) gobblers available. This was the third year the entire state was open to spring turkey hunting and hunters are distributing their hunting efforts over more area than in years past. Based on information provided by hunters on the location of harvest, many areas are being hunted for the first time. These new areas with their reservoir of gobblers and favorable weather during the hunting season allowed hunters to be more successful than we anticipated."

Shotgun hunters that used their licenses did have excellent success with more than 34 percent harvesting a turkey. "Iowa turkey hunters have one of the highest harvest success rates in the Midwest," said Jackson. "Iowa's small tracts of timber and high turkey densi-

ties allow hunters to quickly locate and call in gobblers. However, harvest is not the most critical factor of our turkey management. One way we gauge whether a season is successful or not is by hunter interference rates, which are an indication of the quality of a turkey hunt," explained Jackson. "Our management goal is to prevent hunter interference rates (the percent of hunters that were disturbed while hunting by another hunter) from exceeding 33 percent." As in previous years, interference rates did not exceed the DNR's goal and were lower on private land than on public land.

Insect zappers: Researchers have discovered that many plants have insect-zapping capability. National Wildlife magazine reports members of the sunflower family, including daisies and marigolds, produce chemicals that are poisonous to insects. When these chemicals sop up sunlight, they become highly toxic. But their poison loses its punch in the dark. One plant pesticide is more toxic to mosquito larvae than the outlawed chemical DDT.

Donations

Dave Wheeler Granger	Suet valued at \$115 for wildlife at Ledges State Park
Hill Top Greenhouses, LTD. Ogden	Flowers valued at \$75 for landscaping at Ledges State Park
Boesen's Boone Greenhouses Boone	Flowers valued at \$105 for landscaping at Ledges State Park
Black's Popcorn Co. Ames	Popcorn and equipment valued at \$135 for special event at Ledges State Park
Wal-Mart Boone	Microwave oven and BBQ grill valued at \$127 for special event at Ledges State Park
Boone and Scenic Valley Railroad Boone	10 passes valued at \$100 for special event at Ledges State Park
Dairy Queen Boone	Gift certificates valued at \$113 for special event at Ledges State Park
Kentucky Fried Chicken Boone	Gift certificates valued at \$67 for special event at Ledges State Park
Hy-Vee Food Store Boone	Soda pop valued at \$68 for special event at Ledges State Park
Fareway Stores, Inc. Boone	Candy bars valued at \$62 for special event at Ledges State Park
Mark Roberts Madrid	Grain screenings valued at \$90 for wildlife at Ledges State Park

CLASSROOM CORNER

by Robert P. Rye

A visit to one of Iowa's wetlands can be exciting, whether a marsh, river, lake or pond. As you look around this important habitat, you can see unique and special plants. Do you recognize the following plant characteristics, and can you match them with the species they describe?

- | | |
|---------------------|--|
| a. Arrowhead | 1. Has a limp stem, round leaf and white flowers that float on water. |
| b. Sedges | 2. Grows to nine feet with brown, closely packed flowers that look like hotdogs on a stick. |
| c. Rush | 3. Smallest flowering plant that often covers the surface of a pond. |
| d. Waterlily | 4. Has triangular stem, seed/fruit used by waterfowl. |
| e. Smartweed | 5. Leaves are sword-like from a thicker stock, most common flower color is blue. Muskrats will feed on root. |
| f. Cattail | 6. Plants of various sizes, leaves are arrow-shaped. Eaten by waterfowl and muskrats. |
| g. Iris | 7. Plants are long, green threads which can be floating mats or attached to rocks or debris. |
| h. Duckweed | 8. Has thread-like forked leaves and branches tapered to resemble a raccoon's tail. |
| i. Coontail | 9. Has jointed stems, oblong leaves, pink flowers and is eaten by waterfowl. |
| j. Filamentus Algae | 10. Stems found in shallow water. Grows out of water (emergent). Some seeds eaten by waterfowl. |

ANSWERS:

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

COUNTY CONSERVATION

FORESTRY TODAY AND INTO THE FUTURE

by Pete Engman

Massive oak and walnut trees reach towards the sky, towering up to 100 feet in their quest for sunlight. These huge trees have witnessed a great deal in their lifetimes. A few isolated pockets remain untouched by the incredible change that surrounds them.

After years of neglect and abuse, Madison County's timbered ridges and valleys are beginning to show signs of improvement. Initially blessed with more than 70,000 acres of woodlands, that figure was reduced to a low of 25,000 acres. For the first time since Madison County was settled, the total number of acres of forest lands are again increasing.

Spread throughout Madison County's densely wooded river valleys, majestic limestone bluffs and rolling grasslands are 1,420 acres of county forest land. These eight tracts range in size from 40 acres up to 715 acres. Touring these woodland parks may expose one to carpets of wildflowers in the spring, deep solitude, woodlands set ablaze with fall color, and a tremendous variety of native wildlife. It has been a priority of the Madison County Conservation Board to protect the remaining woodlands and their



Ron Johnson

▲ For the first time since Madison County was settled, forest acres are increasing.

infinite array of natural beauty. Each woodland park has a specific forest management plan detailing its unique future management needs. These forest management plans may include projects to improve wildlife habitat, plant seedling trees, conduct timber stand improvement, protect unique natural areas, and provide income through the sale of forest products.

The importance of woodlands located on private lands has not been overlooked. An aggressive forest management program has been started to assist private landowners. In the early stages of this pro-

gram, 10 landowners have signed up more than 1,000 acres. This program provides interested landowners with easy access to a professional county forester. Forest management plans are developed which address any unique need that the individual landowner may have. In addition to the plan, contractors are located to do the work, contracted work is inspected to make sure it is done properly, and cost-share funds are sought from numerous sources to lower the total cost.

Economic and recreational use of the woodlands in Madison County abound



with opportunity. The proper management of our forest resources is more important to us now than ever before. By realizing the benefits our forests provide us, our woodland heritage has a bright future indeed.

Pete Engman is a forester for Madison County.

▲ **Madison County owns eight tracts of timber ranging from 40 to 715 acres. Each season brings unique beauty to these areas.**

CALENDAR

SEPTEMBER 28 AND 29

Fort Atkinson Rendezvous. Buckskinners, period costumes, food and craft, military drills and theatrical production within the historic fort walls. For more information, contact Volga River State Recreation Area, Rte. 1, Box 72, Fayette, Iowa 52142, (319) 425-4161.

SEPTEMBER 8 - 15

Prairie Heritage Week

SEPTEMBER 28

National Hunting and Fishing Day

OCTOBER 12 AND 13

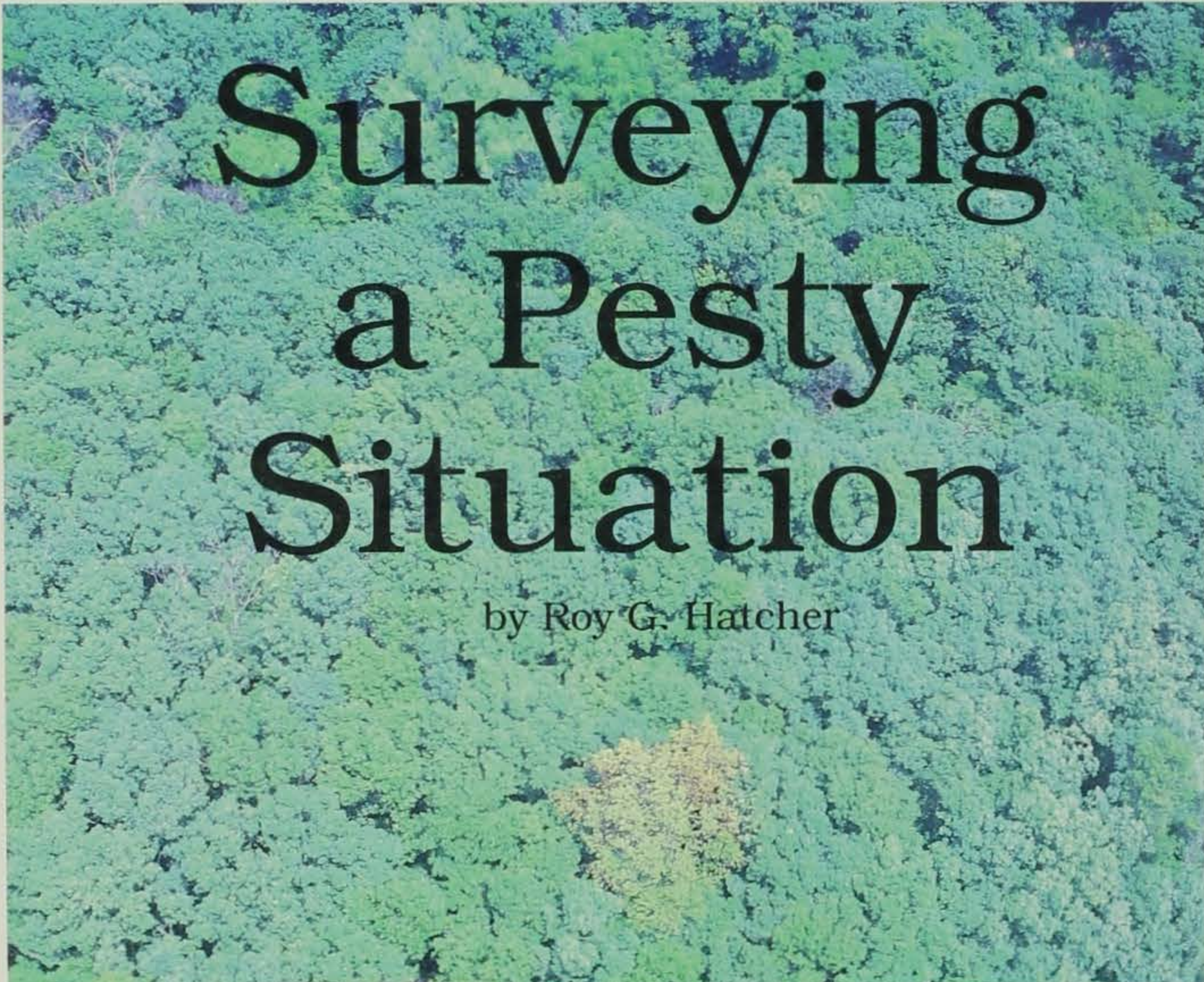
Forest Crafts Festival.

Lacey-Keosauqua State Park is the location for wood crafts and demonstrations, buckskinners and an operating sawmill. For more information, contact Lacey-Keosauqua State Park, Box 398, Keosauqua, Iowa 52565, (319) 293-3502.

OCTOBER 26 AND 27

Halloween Night Hike.

Nature hikes with educational skits about the environment and natural resources. For more information, contact Todd Van Ehwegen, Sac County Conservation Board, Rte. 3, Box 96A, Sac City, Iowa 50583, (712) 662-4530.



Surveying a Pesty Situation

by Roy G. Hatcher

Pest surveys, done by the DNR's Forestry Division, are used to determine if a certain pest is impacting Iowa's forest resource to a point that the resource is in danger of being destroyed.

Currently, the concern over gypsy moth outbreaks in Iowa has drawn attention to pest surveys and their importance. Each year, since the mid-1970s, the DNR has been involved in a gypsy moth survey directed by the state entomologist of the Iowa Department of Agriculture and Land Stewardship and the Plant Protection and Quarantine Division of the USDA Animal, Plant Health Inspection Service. Traps are set every year in the forest and recreational areas of Iowa.

The gypsy moth threatens to become a major tree pest in the Midwest in the 1990s. It eats leaves on most trees and may kill them. It is currently abundant in Michigan's lower peninsula and the eastern U.S. and Canada. Until recently, only three gypsy moth infestations had been found in Iowa and were eradicated. Two possible infestations were found in 1990 and will be scrutinized in 1991 for additional moth activity. Several traps are put out on DNR lands each year looking for this pest.

Recent outbreaks of the moth have occurred in two major areas of the state -- the Des Moines/central Iowa area and Clear Lake area in north central Iowa. Both these infestations

have occurred through the sale of contaminated nursery stock from Pennsylvania. The state entomologist is heading up a statewide effort to eradicate this recent outbreak.

Prior to 1974 there was no formal kind of forest pest survey being done by anyone in Iowa. In that year the DNR signed an agreement with the U.S. Forest Service to conduct a pest management program on Iowa's forests. Federal funds were made available to the DNR to be

matched with state appropriations to provide this service.

One of the first projects to be carried out under this program was an aerial survey of the Iowa forests to look for the impact of oak wilt. Oak is one of the major species in Iowa's forests. The project consisted of flying over the most concentrated areas of timber in the state. Aerial photographs were taken using both color and infrared film.

After the flights were made the film was developed and taken to the Iowa geological survey bureau for photo-interpretation. The results were then transferred to topographic maps and the areas ground checked for oak wilt. Subsequent surveys were done annu-

DNR Photo

ally through 1977, filming the progress of oak wilt in Iowa.

In 1979 the DNR changed to a survey called aerial sketch mapping. This method of aerial surveying consisted of a three-person crew, one navigator and two observers. Forest areas were flown over at about 1,000 feet above ground and any signs of pest damage were marked on a topographic map then followed up with a ground check. All of the state forests plus the Amana Colonies' forests and the forest cover in western Iowa from Monona County to Fremont County were flown, thus giving a good representative sample of Iowa's forest resource. This method of surveying was much more economical than photography and gave a good indication of what pest problems were active in Iowa. This method is still used today.

In addition to the aerial sketch map survey, the DNR's Forestry Division cooperates with adjacent state forestry agencies and the U.S. Forest Service on special pest surveys affecting the resource in the Midwest. In the past several years pest problems with black walnut, butternut and ash declines, basswood thrips and some conifer needle cast problems have been studied.

In 1990 a special survey was done on the decline of white and green ash. This decline, called ash yellows, is a relatively new disease and not yet fully understood. It is responsible for the decline and death of both green and white ash as well as some other ash species not native to Iowa. The problem, in Iowa, was first noticed in 1985 in the northeastern part of the state. Since then, it has been found throughout the

DNR Photo



entire state. This particular survey also included the states of Minnesota, Missouri, Illinois and Wisconsin. The ash yellows problem has been found in all five states. Further research is being done to look for an answer to this specific problem.

Another type of pest survey -- a permanent plot survey -- started in 1983. At the time 240 permanent survey plots -- woodlands, conifer and hardwood plantations and windbreaks -- were established over

▲ **Walnut dieback.** In the past several years pest problems with black walnut and other species have been studied.

► Ash yellows cause decline among Iowa's ash species. The disease was first discovered in Iowa in 1985. In 1990 a special survey was conducted to evaluate the problem in the Midwest.

▼ Recent outbreaks of the gypsy moth have drawn attention to pest surveys and given cause for concern for Iowa's forest resources.



DNR Photo



Iowa Department of Agriculture and Land Stewardship/Entomology

the state. Each forester had 20 plots to survey twice each summer to look for any pest problem that might pose a threat to the forest resource. Observations were made in June and August to catch both the early pest activity and the late summer pest activity. This information was then compiled by the state's protection forester and used to identify trends of certain pest activity throughout the state. This information could then be used to inform the public on pest problems and possible control measures that might be taken. This survey program was discontinued in 1988 due to limited available time to district foresters.

Today, each district forester, in conjunction with the aerial sketch map survey, files two pest observation reports on any activity occurring in their forest district. One is filed in July and the other in September. With the information from both surveys, the DNR can look at trends of forest pest problems occurring in the forest resource in Iowa.

Pest surveys provide a picture to the forest land manager as to what is going on in the forest relating to forest pests. It is the goal of the DNR to keep abreast of any pest activity which might threaten Iowa's forest resource. One way to do this is to participate and conduct various kinds of surveys.

Roy G. Hatcher is the protection forester for the department in Ames.

Leave It To Beaver

Beaver Lake, central Iowa's newest state-owned lake was filled in June 1990. The lake is located on the Beaver Lake Wildlife Area in Dallas County one mile north of the town of Dexter and about two miles north of Interstate 80. Beaver Lake is 35 surface acres, has an average depth of nine feet and a maximum depth of 50 feet.

Development of the lake and surrounding wildlife area has been in process for more than 20 years. The first land for the Beaver Lake complex was purchased during the 1960s. However, not until the mid-1980s was sufficient ground available for lake and pond construction.

Development of Beaver Lake and the Beaver Lake Wildlife Area was unique in several aspects. Prior to the construction of the lake a lake classification system, devised by the fisheries research section of the Department of Natural Resources, was used to examine fisheries potential for the lake. Calculations showed the proposed lake fell

"Golly, Wally!
From fishing to
hunting to
nature walks,
Iowa's newest lake
-- Beaver Lake --
has it all."



by Dick McWilliams

into the high quality category, and indicated the proposed lake would provide an excellent fishery.

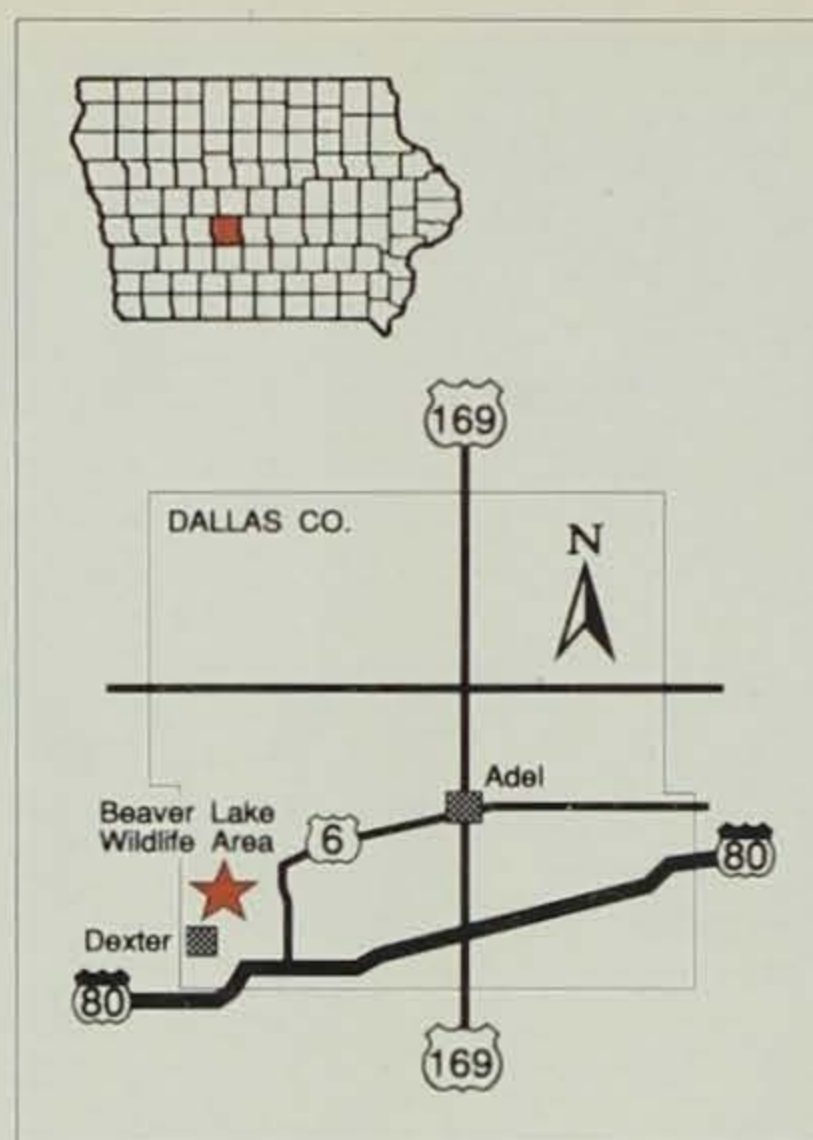
To enhance the fishing potential, planning and work was done prior to construction to use the existing land characteristics and vegetation to provide fish habitat. For example, selected trees were left standing to provide shallow and deep water cover for fish, rather than clear-cutting across the basin as done years ago. Drop-offs and sharp sloping shoreline areas were constructed to provide additional structure and habitat for fish and have the additional benefit of helping control growth of nuisance vegetation. More than 1,700 tons of native fieldstone was used to construct rock reefs and rock piles to provide mid-water habitat throughout the lake. Wind-swept shorelines were then rip-rapped to control shoreline erosion.

Angler access around the lake is provided by five fishing jetties, which provide additional structure and habitat for fish. A handicap acces-

► In addition to the lake, wildlife habitat was also developed on the area. A variety of native prairie grasses and shrubs were planted throughout.

sible fishing pier is located adjacent to the dam, on the southeast portion of the lake. A boat ramp located on the south portion of the lake provides boating access.

One of the most important aspects of the lake development was watershed control to prevent silt from entering the lake. Experience has shown soil and sediments, left unchecked, can quickly and seriously impact the fishery in any lake. To prevent soil and sediment entry into Beaver Lake, three, two- to two-and-one-half-acre retention ponds were built on the major drainages. One of the most unique aspects of the watershed control was the cooperation among governmental agencies and private landowners. The



Soil Conservation District, Soil Conservation Service, the DNR, and most importantly, private landowners worked on and implemented a variety of soil management plans for the watershed. These included terracing, grass waterways and sediment control structures, where necessary; and, in some instances, changes in tillage practices. Most of the watershed control work was completed during 1990. The

present watershed control will provide protection for the lake for years to come.

Wildlife habitat was also developed on the area. A variety of native prairie grasses and shrubs were planted throughout the area. Within the lake, five small islands were built in the west portion of the lake to provide nesting cover for waterfowl and other birds. Similarly, a nesting island was developed in each of the retention ponds. These islands provide protection from predators during the critical nesting periods of many birds.

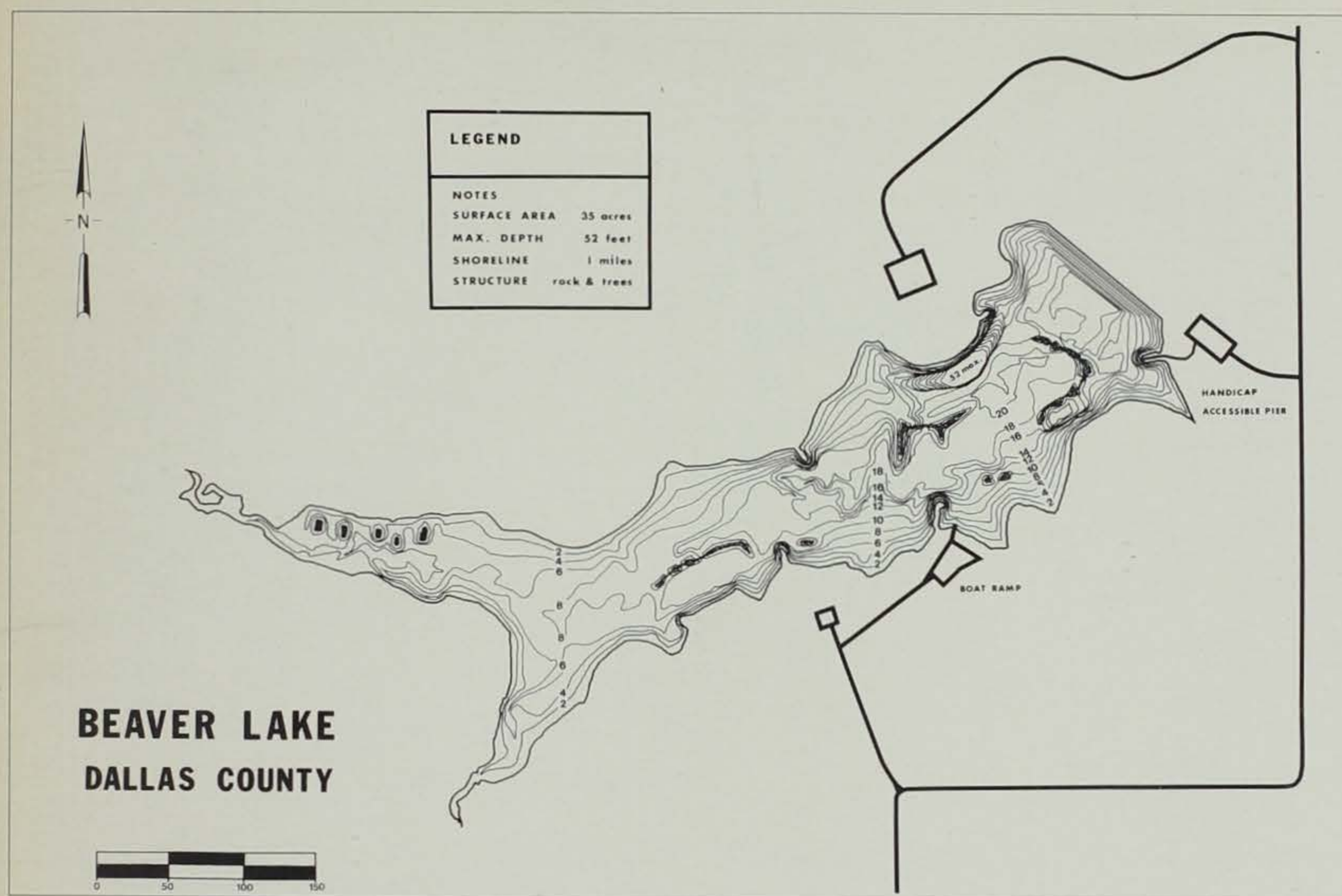
The lake was first stocked in October 1989 with 3,400 two-inch channel catfish and 35,000 bluegill fingerlings. About 3,500 largemouth bass were stocked during June 1990. A second stocking of largemouth bass was made during June 1991. The channel catfish population will be maintained through stocking. Growth of bluegill and largemouth bass during 1990 was excellent. Bluegill up to six inches and largemouth bass from eight to 10



Dick McWilliams
Thomas Putnam



▲ Native fieldstone (left) was used to construct rock reefs and rock piles to provide mid-water habitat throughout the lake. Angler access around the lake is provided by five fishing jetties, which provide additional structure and habitat for fish. A handicap accessible fishing pier (right) is located adjacent to the dam, on the southeast portion of the lake.



inches were found throughout the lake. Bluegill are expected to be seven to eight inches by this fall and largemouth bass should be 12 inches, with the possibility of a few legal-sized largemouth bass. Black crappie were stocked this past summer.

Beaver Lake is open for public use 24 hours a day. Whether you like to fish or hunt, or just enjoy a walk through a native prairie, Beaver Lake and the Beaver Lake Wildlife Area are beautiful places to visit to enjoy the outdoors around central Iowa's newest lake.

Dick McWilliams is a fisheries management biologist for the department at Boone.

Lowell Washburn



One of the first species to be stocked in Beaver Lake was the channel catfish.

