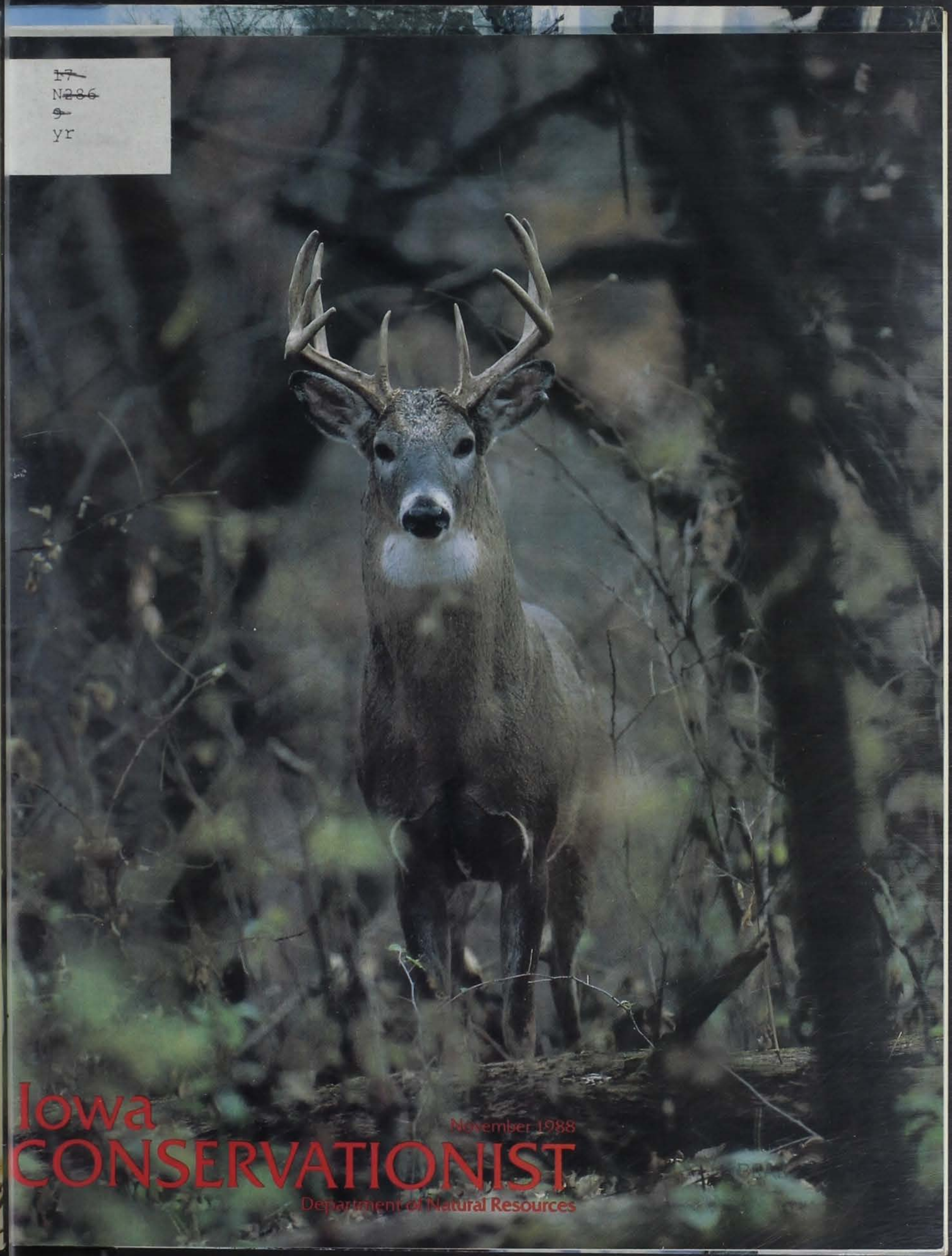

# Iowa CONSERVATIONIST

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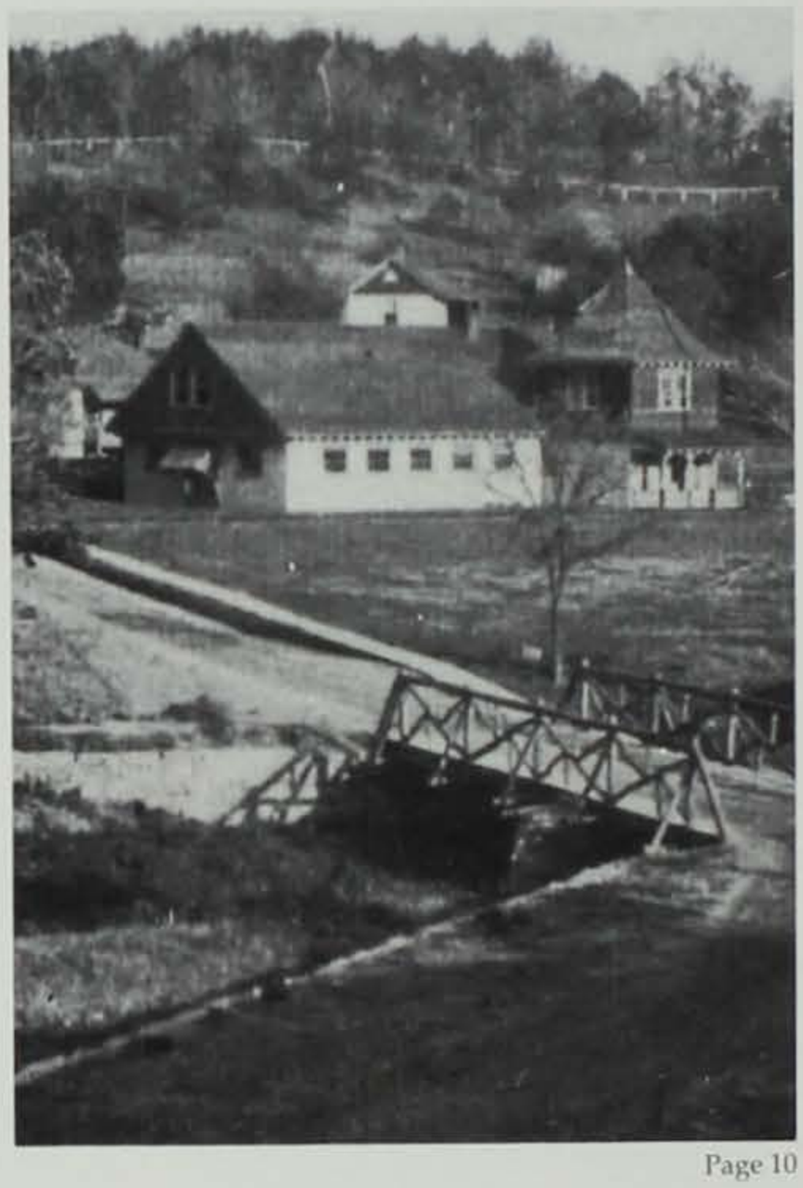

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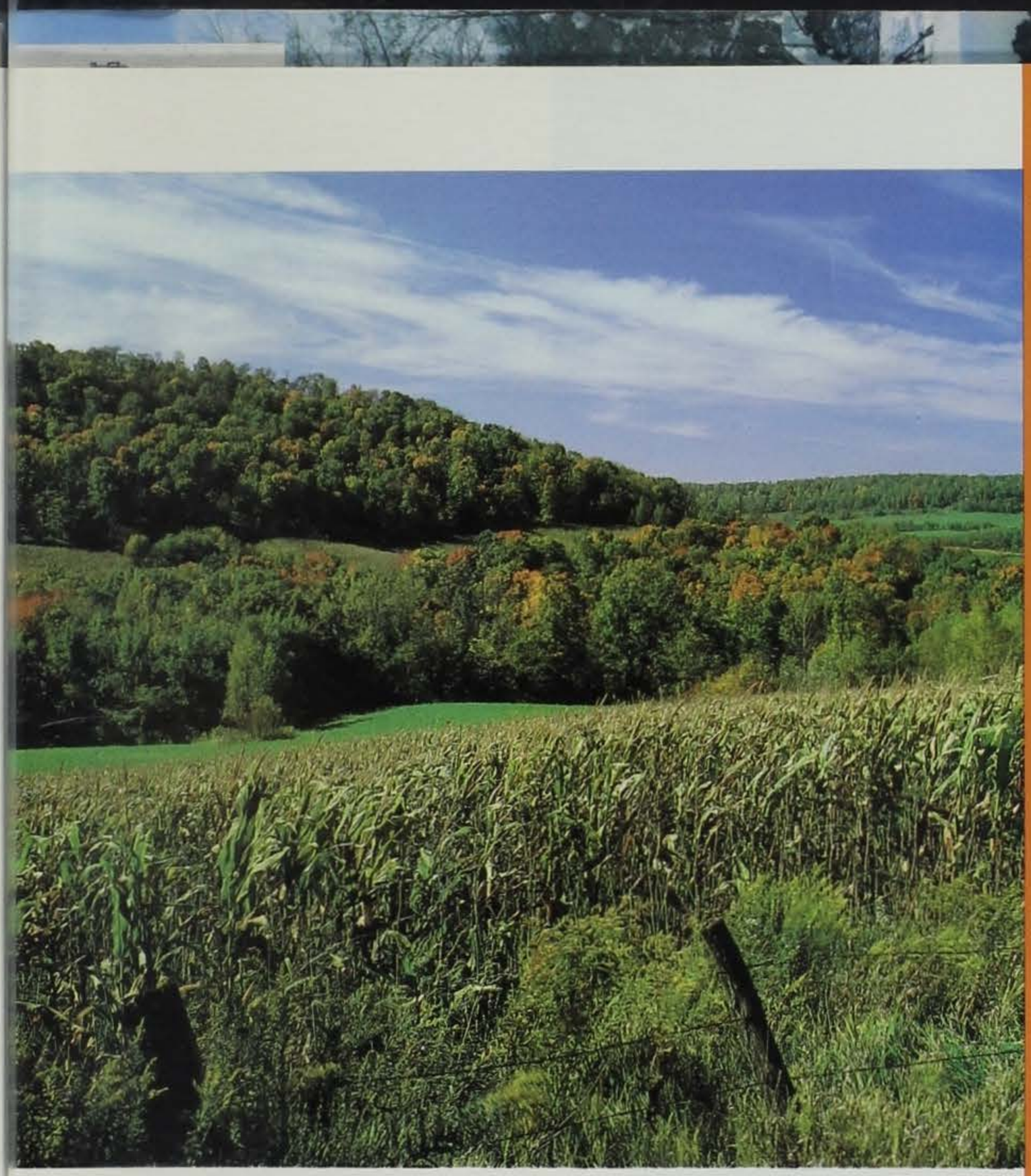
**COVERS:**
**Front** — White-tailed deer. Photo by Roger Hill. **Back** — Tufted titmouse. Photo by Ron Johnson.



RON JOHNSON

# The Big Spring Project

by Joe Wilkinson

**Agricultural practices can have a direct effect on the quality of Iowa's groundwater. Nowhere else in the state is this more evident than in northeast Iowa. Here, the unique geology of the area provides for an opportunity to monitor the effects of certain ag practices on this groundwater supply.**

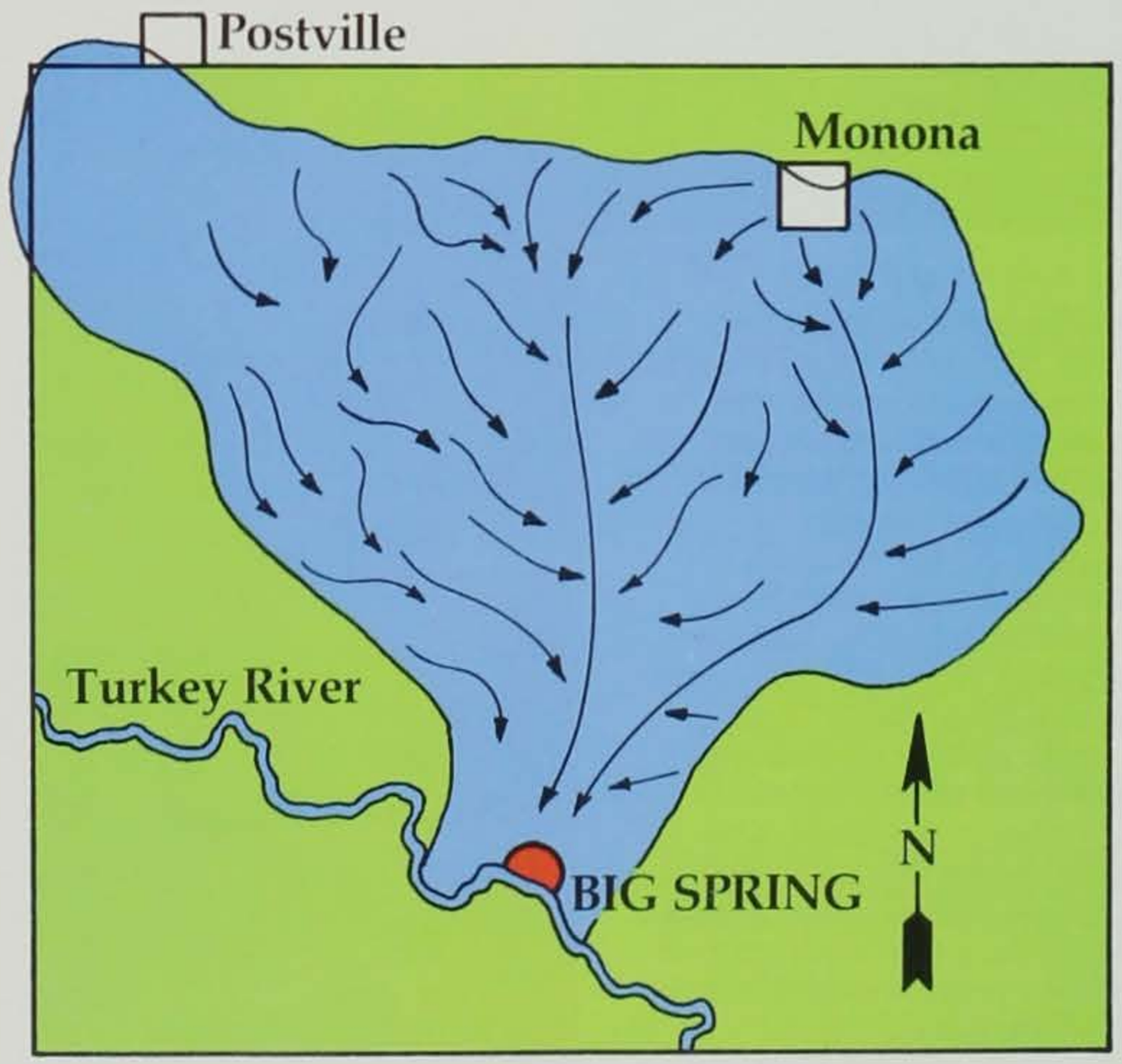
Imagine a large, one-acre outdoor laboratory. All the rainfall, all the snowmelt drains to a single outlet. Researchers could measure the water quality for every square inch of that acre. They could watch for changes in the way that acre was farmed over the years. Now, multiply that acre 66,000 times. You are looking at the Big Spring Basin demonstration project.

This 103-square-mile area in Clayton County is a unique, outdoor research center. It is unique in that virtually all the groundwater beneath these rolling, northeast Iowa hills discharges at a single point—Big Spring, just north of Elkader. This allows scientists and farm management specialists to examine all the contaminants that have seeped into the groundwater on the way to the Turkey River. More importantly, the researchers are now beginning to measure changes in those contaminant levels as the people who farm, and live, in the Big Spring Basin come to realize those contaminants often end up in their drinking water.

While the Big Spring Basin is a unique drainage system, the groundwater quality problem is a common one across Iowa and the rest of the cornbelt. Corn has been king for many years and the people who grow it have learned that heavy application of agricultural chemicals often means higher yields. Studies in the 1980s, however, have shown that more and more of those chemicals are slowly percolating deep into underground aquifers that provide most Iowans with drinking water.

Studies show more than 25 percent of the private water supplies tested in Iowa exceed acceptable nitrate levels set by the Environmental Protection Agency (EPA). They also show minute, but widespread, amounts of pesticides. The

R. RUNGE




*Recent studies show more and more agricultural chemicals are percolating into groundwater aquifers which provide most Iowans with drinking water. Groundwater beneath Big Spring Basin in Clayton County discharges at a single point — Big Spring, just north of Elkader. This makes the site ideal for monitoring groundwater quality and its relationship to agricultural practices in the 103-square-mile area.*

alarming levels of nitrates and other contaminants being found are by-products of the intensified world of farm production. For example, in the Big Spring Basin average nitrate levels held steady at about 13 milligrams per liter (mg/l) in the 1950s and into the 1960s. By 1983 though, the level had soared to 45 mg/l—the point determined by the EPA to be unacceptable. During the same time period, application of nitrogen fertilizer more than doubled. Researchers in the Big Spring project say that is not a coincidence. This real life experiment hopes to answer the environmental concern for safe water and tackle the economic reality of agriculture as we approach the 21st century.

The sheer magnitude of the project sets it apart from other water quality research. Dr. George Hallberg, of the Department of Natural Resources' geological survey bureau is the Big Spring project coordinator. "Most of the time, water quality research is limited to a single well . . . a two-inch wide hole in the ground," says Hallberg. "That doesn't allow you to look at the mass of water and nitrogen moving throughout the system. This project sheds a whole new light on the environmental problem and the economic loss."

Why all the concern?

Groundwater supplies the vast majority of Iowans with the water they drink. The presence of nitrates throws up a caution flag. High nitrate levels are known to cause a potentially fatal blood disorder in infants, called methoemoglobinemia. The long-term impact on other humans is unclear. Studies have suggested that problems ranging from cardiovascular disease to cancer have ties to high nitrate exposure over long periods of time. Likewise, the same questions are being asked about exposure to pesticides. There has not yet been a great deal of research done because these water-borne contaminants are relatively new. Modern farming has incorporated heavy pesticide and chemical fertilizer application in only the last 20 to 30 years. The

*ILLUSTRATION AND EXPLANATION TAKEN FROM IOWA GEOLOGY 1982*

information being compiled in northern Clayton County is at the cutting edge of research to help answer the question "how much is too much?"

Nitrates and pesticides reach groundwater after slowly filtering through the soil. When too much of these chemicals is applied, the crops cannot use them. When the blanket of soil between the surface and bedrock is thin—or when sinkholes or drainage wells serve as funnels—those contaminants gradually emerge in the aquifers beneath the bedrock. That is the picture that has developed in Iowa and across the Midwest. The threats posed by these contaminants become even darker when we learn that cleanup is extremely expensive . . . when possible.

Researchers estimate that half the nitrogen applied on Iowa farm fields is never used by the crop. This fact becomes the selling point when farmers in the Big Spring Basin are asked to adjust their farm management practices. Bob Libra, hydrogeologist for the DNR, says the combination of economics, environment and energy savings has commanded a lot of attention in Clayton County. "Right now, economic times are hard. Farmers know they should not be spending anymore than they need on fertilizer and chemicals. When prices for their crops were higher, they could do that. They didn't have to worry so much." The Big Spring demonstration is designed to show how farmers can use the best management practices to obtain the optimum profit return. The project helps farmers see the costs going into production.

Duaine Davis saw. He is one of the 200 farmers in the basin cooperating in the project. Davis has taken advantage of a cost-share program that helped him terrace some of the 130 acres he owns in the Big Spring Basin. He had already worked chisel plowing and other conservation tillage practices into his operation. He says he thinks about nitrate levels and production costs more often, as he makes management decisions for those 130 acres and another 660 acres he farms outside the basin. "It makes a lot of sense," he says. "You keep the chemicals in the soil, not in the water."

"The farmers are very interested," says Roger Koster. Koster is the project coordinator for the Iowa State University Extension Service. "They are looking at it from the standpoint of increasing their profits and improving their water. They depend on these farm wells for themselves, their families and their livestock. They are right on the firing line."

This past year, many of the Big Spring farmers moved into the nitrogen management phase of the program. The phase involves pinpointing how much nitrogen they actually need and the best times to apply it. Many are finding they were adding more than they thought. The result is that they do not have to blanket their fields with commercial nitrogen. Most fields are getting enough through routine practices like alfalfa rotation and manure spreading. "Nitrate levels

***Carbonate aquifers, as found in northeast Iowa, are composed of limestone or dolomite in which water moves through fractures in the rock. In addition, these carbonates are subject to chemical solution by the infiltrating groundwater. As the water dissolves away the rock, these fractures and other openings are enlarged, and the aquifer eventually becomes a series of inter-connected openings ranging in size from miscroscopic fractures to large caves. The water in these larger cracks is like that in a pipe. These systems also have the potential for direct connection with surface water.***

***The carbonate aquifer lends itself to the development of unique features collectively referred to as karst topography. One of the more important karst features is the sinkhole, a funnel-shaped depression on the land surface. These are generally developed from the callapse of rock and soil material into underlying caverns formed as carbonate rocks are dissolved. (see following page for further information on sinkholes.)***

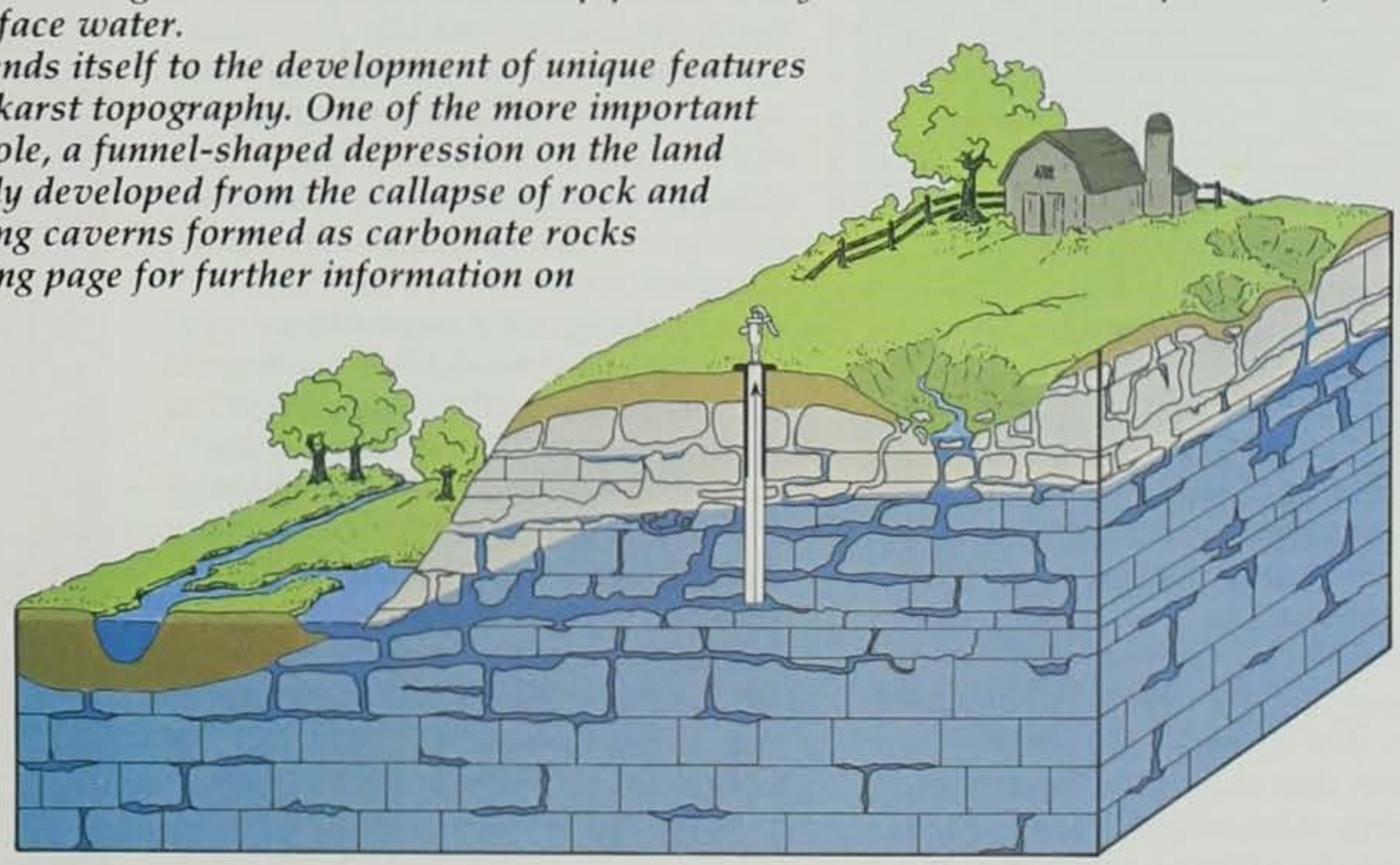


ILLUSTRATION AND EXPLANATION TAKEN FROM *IOWA GEOLOGY 1982*

# Sinkholes

by Joe Wilkinson

across the corn belt are high," says Koster "One of the major contributors is nitrogen that goes out of the root zone into our groundwater." He says by reducing the rates of application, farmers and researchers should see lower nitrate levels in the water. Figures from 1988 show Big Spring Basin farmers are applying about 10 pounds less nitrogen per acre.

Conservation tillage and better crop rotation practices have emerged within the basin. Terraced fields are in place, cutting erosion that otherwise sends soil and contaminants into the shallow bedrock aquifers of northeast Iowa. On test plots, farmers are banding pesticides rather than broadcasting over their fields. And before they turn to chemicals to control insect or weed damage, they scout their fields to see if it is justified. Often, a minor loss can become a net profit if the farmer does not spend unnecessary time, fuel and chemicals on a field.

Test plots and field demonstrations have helped convince farm operators and suppliers that environmental concerns, economics and energy savings do go hand in hand. "I think the fact we are doing demonstrations on the farm, using normal farm management operations, adds validity," says Koster. "It is not a test plot on a research farm."

Research in the Big Spring Basin has been underway since 1981. Currently, the project is in a five-year, $3.5 million phase. The Iowa Department of Natural Resources, the Iowa Department of Agriculture and Land Stewardship, the I.S.U. Extension Service, the University of Iowa, the EPA and the U.S. Department of Agriculture and the U.S. Geological Survey play major roles in funding the Big Spring Project.

In the next year, monitoring will continue. Four new sets of wells have been drilled to monitor long-term movement of water into deep aquifers. It can take groundwater decades to reach them. Researchers will watch to see if—or when—modern day chemicals reach these supplies. Also, scientists will begin to gage the amount of nitrates lost to surface streams. Such nitrates do not end up in the drinking water, but they still represent nitrogen lost from the farm field and may have a significant effect on the plants, insects, fish and other life in these streams.

The work initiated by Big Spring is not limited to the Clayton County monitoring area. "Big Spring is perhaps the cornerstone of projects underway statewide," says Hallberg. Hundreds of Iowa farm families are taking part in the integrated farm management demonstration program—an outgrowth of work begun in the Big Spring Basin. Field days and test plots dot the countryside as participants work to monitor Iowa's groundwater quality. "We are seeing changes on a small scale— changes in farm management and decreased nitrogen concentration in water," says Hallberg. "We hope over time—say in the next five years—that we can actually measure the improvements in environmental quality as we work with farmers to improve management practices." Hallberg says the program needs time to progress, so researchers can measure those results. "We hope we can make significant environmental improvements," says Hallberg. "Yet find a balance between farming and the environment."

GREG LUDVIGSON

*This Clayton County sinkhole opened suddenly one fall.*

The Delaware County farmer knew something was not right as he approached his recently filled pond. Reaching the top of the dike, he looked down into the muddy, empty pit. Swirls had been carved into the clay lining overnight, as thousands of gallons of water literally drained out of the basin. On a hunch, he drove down to a neighboring farm. There, he was met by a torrent of reddish, black water bursting from the pipe which normally supplied a trickle of clear, cold spring water . . . another sinkhole had been born.

Sinkholes are a northeast Iowa phenomenon, and they carry with them a northeast Iowa water quality problem, too. The unique karst topography with its shallow limestone and dolomite bedrock is susceptible to fractures. Water seeping into the underground aquifers follows these cracks, often enlarging them. When the overlying rocks and soil becomes too heavy, they collapse, and a sinkhole emerges. Although pockets of them are evident in other areas of the state, more than 12,700 sinkholes have been mapped in northeast Iowa. Most of them are concentrated in Allamakee, Winneshiek and Clayton Counties. In fact, Ludlow Township in Allamakee County lays claim to more than 1,000 of them — the Sinkhole Capitol of Iowa.

It is hard to tell when a sinkhole might develop. A Clayton County farmer was harvesting corn one night, several years ago. In the field ahead of him he noticed, through the tractor lights, that for several rows there was no standing corn. When he stopped his combine to investigate, he found that in the period from cultivation to harvest, a large sinkhole had swallowed a chunk of his field. Had he not noticed it in time, he could have driven right into it. During the sinkhole mapping project of the early 1980s several new ones developed before researchers were done mapping existing ones.

With little or no soil to act as a filter, sinkholes become direct routes to the bedrock aquifers, delivering sediment, agricultural chemicals and other contaminants along with groundwater. As these pollutants enter the well system, they become a localized, but very real problem. "If something really hazardous is put into the water, people are going to be at risk for a temporary period of time," says associate state geologist Bernard Hoyer. "Anything that can get into the surface water can show up."

In an era when groundwater quality has become a top concern among Iowans, sinkholes are a particular target. At one time, sinkholes were used as municipai and private dump sites. 'Out of sight, out of mind?' That is not the case with these natural drains anymore. "To a great extent, they have been cleaned up," says Hoyer, "but there are still a lot of them holding cans and household garbage."

State regulations now prohibit open dumping, but runoff from nearby facilities and fields has to be addressed. Studies show 5 to 10 percent of the agricultural chemicals in northeast Iowa groundwater enter through sinkholes. While that is not a large figure, the impact could be catastrophic in local water systems.

Hoyer says facilities such as feedlots, or others with significant runoff, need to take special precautions if sinkholes are known to be present. He points out that land use attitudes need to be adjusted. "Traditional conservation practices, filter grass strips for instance, or integrated pest management need to be adopted by individual farmers." He says management practices that recognize and steer clear of sinkholes are more common in Wisconsin and Minnesota. Through the Iowa DNR and farm-related agencies an effort is being made to educate local landowners about the problems with sinkholes and therefore alleviate a potential groundwater contamination problem.

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*Joe Wilkinson is an information specialist located at Iowa City.*

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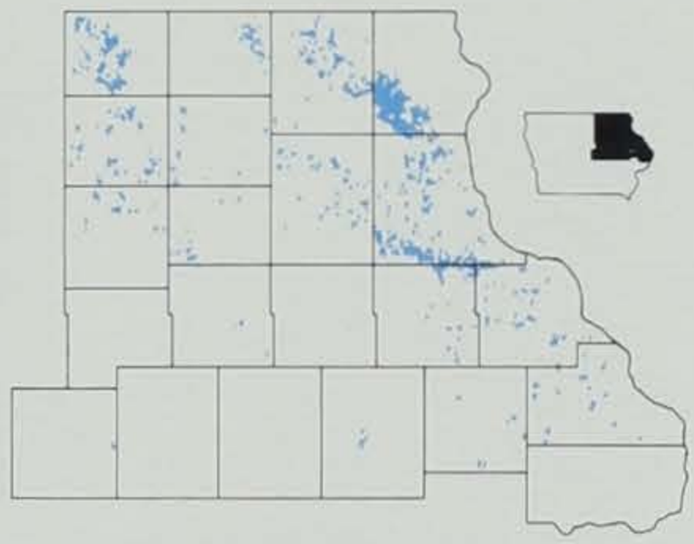

BERNARD HOYER

*Location of sinkholes in northeast Iowa. Ludlow Township in Allamakee County may be the Sinkhole Capitol of Iowa with more than 1,000.*

*A clump of trees may mark the location of a sinkhole.*

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# The "Spawning" of the Manchester Fish Hatchery

by Rick Martens

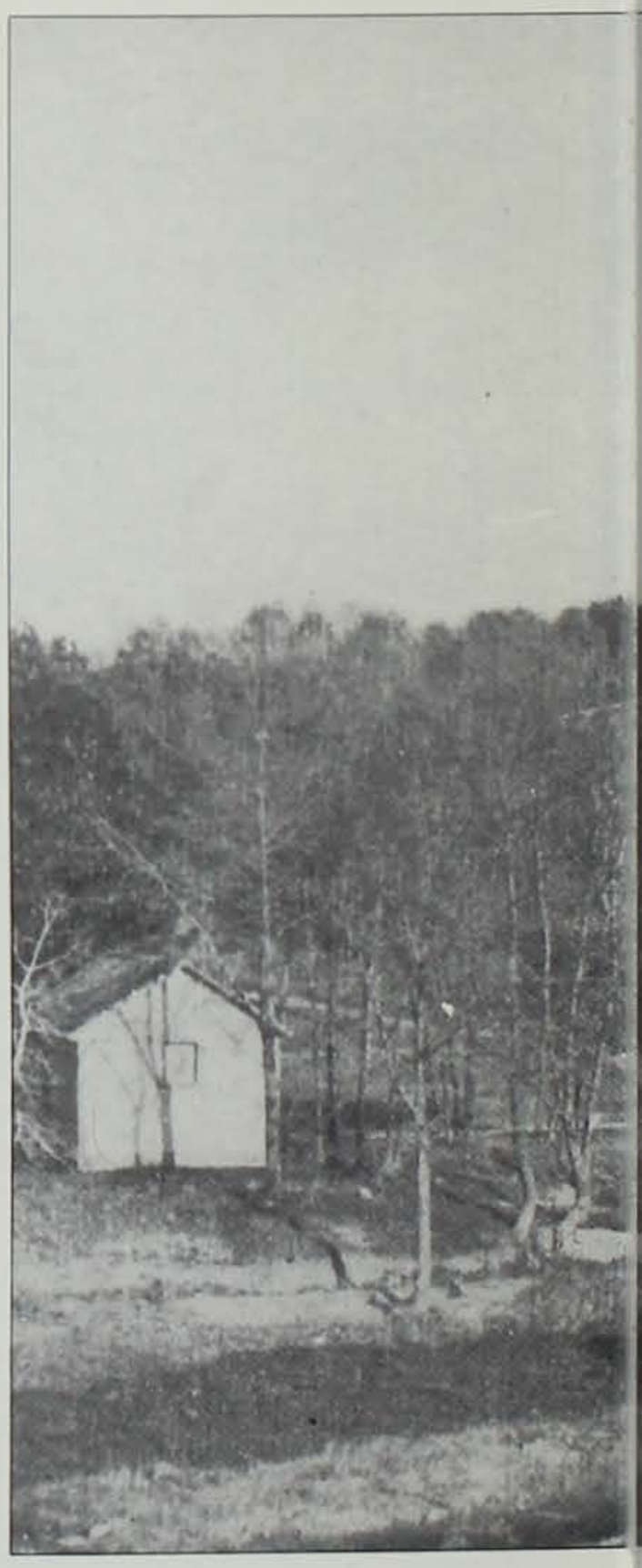
A horse-drawn lumber wagon bounced along the frozen road on its way to the United States Fish Hatchery near Manchester. The day was January 18, 1897, and the cold Iowa weather made the two passengers eager for their ride to end. The driver, Mr. Clark, had spent the last year on the hatchery's construction crew and would now become a laborer there. His passenger was Robert Sydney Johnson, the superintendent of the new hatchery, who anxiously awaited the beginning of his first day. For the next 13 years, Mr. Johnson would manage the hatchery on Spring Branch Creek and help pioneer the new science of fish culture.

The events that led to an Iowa fish hatchery began in 1892 when A. M. Sherwood of Manchester was on business in Cedar Rapids. His attention was caught by an article in *The Cedar Rapids Gazette* which reported the United States Fish Commission was searching for a site in the "Northwest" to build a national fish hatchery. Sherwood wrote to Professor Barton Everman, a commission official in Washington, D.C., inviting him to visit the springs near Manchester when he traveled west the following year.

Professor Everman visited Spring Branch and made tests of the three springs to determine their suitability for a hatchery. In his report to the commission, he wrote the following:

> "On what is known as Spring Branch, two and one half to four miles southeast of Manchester, are several good springs, indeed, they are among the finest and largest I found anywhere in Iowa. One of the best of these is known as Brayton Spring. Very soon after issuing from the ground, the stream from the spring averages nine feet wide, six inches deep, and flows one and one third feet per second. This gives about 2,100 gallons per minute. The temperature of the water at 2 P.M., July 17, was that of the air, 81°. This water would be suitable in every way."

Fifty-two other sites in Iowa, South Dakota and Nebraska were considered as locations for the fish hatchery. The United States fish commissioner recommended to congress that either Manchester or Decorah, Iowa, be selected. The citizens of Manchester exerted every effort to win the contest and enlisted the aid of a former Civil War colonel, D.B. Henderson, now their U.S. Representative. In a letter to the commissioner, Mr. Henderson made his choice clear:



*The newly finished Manchester Fish Hatchery.*

"I also want you to observe, if you kindly will, that I secured the $15,000 recommended by you, for an Iowa fish hatchery, in the Sundry Civil Bill, recently reported to the House. Two of the companies of my regiment were raised at Manchester, in Delaware County and we hold most of our quadrennial regimental reunions there. That city and county are full of my truest and dearest friends. I am watching this fish hatchery more closely than any fish-hawk ever watched a tempting bait in the stream, and as I know that it is one of the choicest spots on earth for developing what you and I are both believers in (the fish industry), I want to impress upon you all that I feel in regard to it."

The commissioner directed the architect and engineer to make a further examination of the two sites and Manchester was chosen for the prize. On October 30, 1894, a 25-acre tract of land owned by Thorpe Brothers and Company was deeded to the federal government. The citizens of Manchester donated $500 for the property containing the lower two springs and $1 for the perpetual water rights.

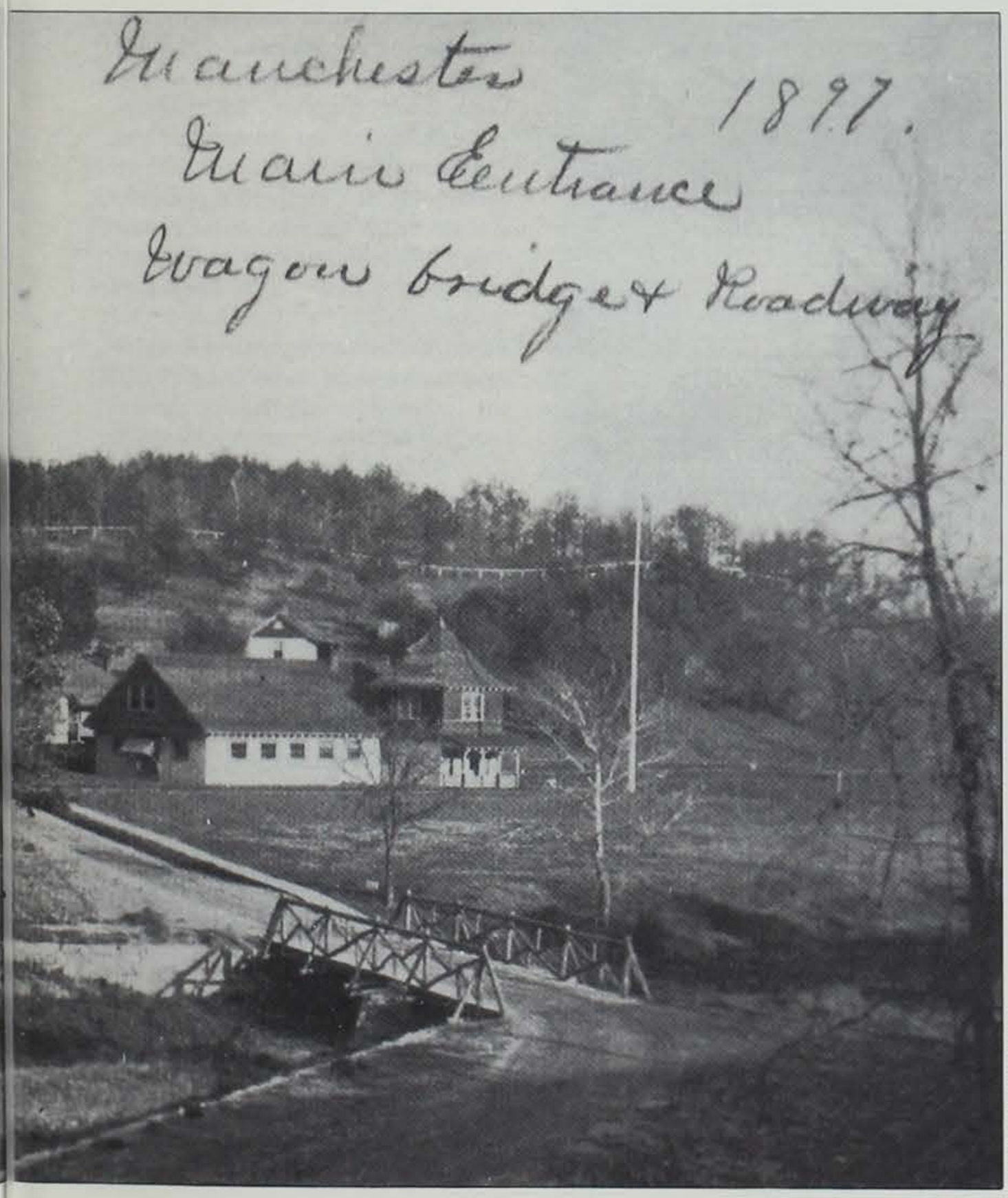
On his arrival that cold day, Superintendent Johnson was not warned that his new hatchery was without furniture. For the next two weeks, he lived in Manchester and continued his daily ride to work with Mr. Clark. His first report to the commissioner describes the newest hatchery:

> "On taking charge of the station I found that all work of construction had been discontinued on account of the cold weather. All the buildings on the reservation had been completed, namely — hatchery building, supt.'s dwelling, mess house, barn, ice house, carpenter shop and tool house . . . . The upper and lower springs had been walled up and the main 14-inch supply pipe was laid from the upper spring reservoir, along Spring Branch, connecting with the hatchery building the small rearing ponds and the 80-foot ponds and furnishing the main water supply to the station. The large stock ponds, X, Y and Z had been only partly completed. A rustic bridge had been built across Spring Branch and the reservation was enclosed with a barbed wire fence."

**"On what is known as Spring Branch . . . southeast of Manchester, are several good springs, indeed, they are among the finest and largest I have found anywhere in Iowa."**

The job of rearing fish began in less than a week with the arrival of 200,000 lake trout eggs. The federal hatchery at Neosha, Missouri, sent 46,700 rainbow trout eggs in February which soon hatched with good results.

In March came the first test of the hatchery and its crew. On a Monday afternoon, a warm rain began melting the heavy snow cover along Spring Branch. Within two hours, the stream flooded. The next day, 150 feet of the 14-inch pipeline was unearthed and an eight-foot section was torn away and washed downstream. Johnson




NATIONAL ARCHIVES

and his men carried water from the spring to the hatchery troughs to save the newly hatched trout fry. The eggs were placed on trays in a box which was then anchored in the lower spring. By 10:00 p.m., the water receded and, after working all night, the pipeline was repaired.

Having successfully met the challenge of the first flood, the hatchery staff found themselves facing new threats from other enemies. In the second year of operation, brook trout were brought into the hatchery and were immediately stricken with an unknown disease. A specialist was sent from Washington who eventually identified the disease as furunculosis. This bacterial disease resisted all treatment and continued to be a scourge of the hatchery until the introduction of sulfa drugs in the late 1940s. There were other diseases, mysterious die-offs, eggs that never hatched and fish that would not eat. Proper fish nutrition was poorly understood, as was the basis for many of these problems. Natural food organisms were often impossible to obtain in needed quantities so an artificial diet was prepared. A mush consisting of boiled beef liver became the standard hatchery meal.

At the turn of the century, a variety of fish were cultured at Manchester. Lessons were learned through trial and error. The warmwater species — largemouth bass, smallmouth bass, rock bass, crappie, calico bass (black crappie) and bream (bluegill) — were collected from surrounding water, placed in the large rearing ponds and allowed to spawn. The cold spring water, inadequate food for the fry, cannibalism and the difficulty of collecting young fish from thick vegetation often gave poor results.

The coldwater fish reared at Manchester in the early days included quinnat salmon (chinook), landlocked salmon (Atlantic salmon), lake trout, steelhead trout (a sea-run rainbow trout), grayling, brook trout, rainbow trout and Lock Leven (brown) trout. They were cultured in two ways. The eggs of salmon, lake trout and steelhead were shipped from collecting stations to Manchester. After hatching, fry were placed in milk cans and taken by horse-drawn wagons to the railroad for distribution. Adult brook, brown and rainbow trout were kept as brood stock in the holding ponds to provide a ready source of eggs. A *Chicago Record-Herald* reporter visited the Manchester Hatchery in 1903 and

NATIONAL ARCHIVES

*Loading fish transportation cans at the Manchester Fish Hatchery.*

NATIONAL ARCHIVES

*Fish car #4 delivering fish raised at Manchester.*

reported the trout spawning process:

"At the hatchery here Mr. Johnson has 8,000 brood fish, mostly brook trout, rainbow trout and bass of different varieties, which are kept in tanks for breeding purposes just as if they were cows or hogs. They begin to breed at four years old and continue until they are 10 years old. Each female rainbow trout will produce an average of 1,000 eggs and each brook trout from 300 to 500. 'When the female fish is ripe, as we say,' continued Mr. Johnson, 'we squeeze the eggs from her body into a dry pan and fertilize them by squeezing the "milt" from the male fish over them. They are then stirred with a feather for a few moments until they are thoroughly mixed and separated from each other and are then set away to settle. Next we wash them off carefully and put them on a wire tray in the hatching-house, where a current of cold water is continually passing over them. Every morning they are examined carefully. The dead eggs, which are white, are picked out, and the healthy ones, which are amber colored, are allowed to remain 36 to 45 days, according to their condition when they hatch out. The little fish drop down through the meshes of the wire trays into a trough. Each little chap has a food sac attached to his body, which contains rations for 14 days. He lies in a semi-dormant condition at the bottom of the trough until that supply is exhausted, when he is compelled to hunt for his grub. About 84 percent of the eggs produce healthy fish.' "

Millions of Johnson's coldwater fish were stocked in warm-water lakes and streams where their survival was impossible. The Manchester hatchery was responsible for stocking lake trout in Okoboji, Clear and Storm Lakes, as well as rainbow trout in Lake Okoboji and the Cedar River at Cedar Rapids. Other plants had a more beneficial result, leading to many of the successful stocking programs we enjoy today.

During his *Chicago Record-Herald* interview, Superintendent Johnson expressed his optimism for the role fish culture would play in a growing America:

"The farmers are beginning to make ponds and are raising fish for their own use. Many clubs are being organized in different parts of the Northwest which buy fishing preserves and take an interest in seeing that the game laws are enforced. I believe every farmer should and can raise all the fish he needs for the use of his family just as he raises chickens, and we are trying to teach them how to do so. The conditions are favorable all over this state, but few families have ever tried fish culture."

In 1910, Robert Johnson returned to Washington, D.C., to become assistant in charge of fish culture with the U.S. Fisheries Bureau. He left the hatchery with the same enthusiasm for fisheries that he arrived with that cold January day in 1897. In his new post, he supervised all the government hatcheries, including Manchester, until his death in 1916. As first hatchery manager at Manchester, Johnson blazed the trail for the 11 other federal managers that would follow. In 1976, the Federal Fish Hatchery era at Manchester ended when the State of Iowa assumed responsibility for the hatchery. Robert Johnson would not recognize his hatchery today, but he would see that his efforts were rewarded as Manchester continues its successful fish culture programs.

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*Rick Martens is a fisheries technician at Manchester Fish Hatchery.*

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RON JOHNSON

*Manchester Hatchery, 1988. Today, Manchester spawns the brown and rainbow trout reared at the three Iowa trout hatcheries and used for stocking northeast Iowa's streams. In 1987, the Manchester Hatchery produced 572,000 brown and rainbow trout.*

NATIONAL ARCHIVES

# 1989 Application for Seedlings

## Iowa Department of Natural Resources
## Conservation Tree Order Form

Tree and shrub seedlings for conservation planting on Iowa lands are available for purchase from the state forest nursery in Ames, and for the second year, the nursery is offering volume discounts.

Last year was a banner year with 3.7 million seedlings being distributed for conservation purposes. Due to a short seed crop, black walnut, red oak and white oak have already sold out. White spruce has also sold out. Therefore, it is important to order early for spring planting.

Numerous conifer, hardwood and shrub species are available from the nursery and must be ordered in units of 500 or more, unless you are completing last year's planting. Special wildlife and songbird packets are available and are exempt from the 500 minimum requirements.

For orders of more than 5,000 seedlings, the nursery will deduct 10 percent from the total cost. The discount was begun last year to help landowners reach a goal of 3,000,000 acres of forest cover in Iowa.

Do not include payment with your application. If the plants are available, they will be deducted from our inventory and you will receive a bill for the correct amount. This bill is an acknowledgement of your order. The bill must be paid within 15 days, or the order will be cancelled. If the nursery has insufficient stock, substitutions will be made.

Shipping orders usually begin during the month of April. However, unfavorable weather can cause delays, so there is no guarantee of availability on a specific date. For information about the spring shipping schedule and species available, call (515)281-4110.

If you have any questions, contact the State Forest Nursery, 2404 S. Duff Ave., Ames, Iowa 50010, (515) 233-1161, Monday through Friday, 8 a.m. to 4:30 p.m.

| GENERAL INFORMATION | | | | | | | |
|---|---|---|---|---|---|---|---|
| Species | Mature Size Range | Moisture | | | Light | | Remarks |
| | | Dry | Well Drained | Moist | Full Sun | Some Shade | |
| White Pine | 50-80' | | X | X | X | X | Intolerant of air pollutants. Good timber tree. Adaptable to most sites. Native to NE Iowa. |
| Scotch Pine | 30-60' | X | X | | X | | Hardy. Adaptable. |
| Red Pine | 50-80' | | X | | X | | Requires cool sites. Good timber tree. |
| Ponderosa Pine | 60-100' | X | X | | X | | Recommended for Western Iowa only. |
| Jack Pine | 35-50' | X | X | | X | | Hardy and adaptable. Good cover for coal spoil banks. |
| Red Cedar | 40-50' | X | X | X | X | | Tolerates poor, gravelly soils; prefers airy site. Very drought resistant. Good wildlife food and habitat. Native. |
| Norway Spruce | 40-60' | | X | | X | | Good wildlife habitat. |
| White Spruce | 40-60' | | X | X | X | X | Good wildlife habitat. |
| Black Walnut | 50-70' | | X | | X | | Valuable wood products tree. Good firewood. Requires deep, rich, well-drained soil. Native. |
| Green Ash | 50-60' | | X | X | X | | Valuable wood products tree. Very good firewood. Native. |
| White Ash | 50-80' | | X | | X | | Valuable wood products tree. Very good firewood. Native to all but NW Iowa. |
| Silver Maple | 60-80' | | X | X | X | X | Bottomland sites. Valuable wood products tree. Good firewood. Native. |
| Red Oak | 60-80' | | X | X | X | | Valuable wood products tree. Excellent firewood. Native to all but NW corner of state. |
| White Oak | 50-80' | | X | X | X | | Valuable wood products tree. Excellent firewood. Native to all but NW corner of state. |
| Bur Oak | 70-80' | X | X | X | X | | Adaptable to various soils. Excellent firewood. Staves and railroad ties. Native. |
| Mixed Oak | | | | | | | May contain red oak, white oak and bur oak in varying proportions. |
| Hybrid Poplar | 40-60' | X | X | X | X | | Mixed hybrids of cottonwood selected for Iowa. Good for fuelwood plantations. |
| Russian Olive | 12-25' | X | X | | X | X | Very hardy plant. Good food for wildlife. Drought resistant. |
| Autumn Olive (Cardinal strain) | 12-18' | | X | | X | X | Good wildlife food and habitat. Plant on protected site. |
| Tatarian Honeysuckle | 10-12' | X | X | | X | X | Very hardy. Dense growth. Good wildlife habitat and food for birds. Fruit available July-August. |
| Amur Honeysuckle | 12-15' | X | X | | X | X | Occasional winter killing of branches in northern Iowa. Fruit available September-November. Good wildlife habitat and food for birds. |
| Redosier Dogwood | 7-9' | | X | X | X | X | Produces cluster of stems from ground. Good wildlife food and habitat. Native to NE Iowa. |
| Gray Dogwood | 10-15' | X | X | X | X | X | Hardy. Forms large colony of plants from original. Good cover. Native. |
| Silky Dogwood | 6-10' | | X | X | X | X | Hardy multi-stemmed shrub. Good for wildlife food and cover. Especially good for wet, swampy areas. Prefers partial shade. |
| Common Lilac | 8-15' | | X | | X | | Hardy. Shrub border or in groupings. Good wildlife habitat. |
| Chokecherry | 20-30' | X | X | X | X | X | Hardy. Good food for wildlife. Native. |
| Wild Plum | 12-15' | X | X | X | X | X | Hardy. Forms thicket. Good wildlife habitat. |
| Osage Orange | 20-40' | X | X | | X | | More adaptable to southern Iowa. Withstands poor soil extremely well. Thorny, useful for wildlife habitat. |
| Ninebark | 5-9' | | X | X | X | X | Very hardy. Good wildlife habitat. Native to most of state. |
| Serviceberry | 12-20' | X | X | X | X | X | Large shrub or small tree. Excellent for wildlife food. |
| Nanking Cherry | 6-10' | X | X | X | X | | Hardy dense shrub. Good for wildlife food and cover. Flowers early; pink to white. Fruits are edible. |
| Wildlife Packet | | | | | | | 200 plants valuable to wildlife. 50 conifers, 50 hardwoods, 100 shrubs chosen by the nursery. |
| Songbird Packet | | | | | | | Mixed variety of 20 shrubs beneficial to songbirds. |

## Remember

### 10% discount on orders of 5000 plants or more

**1. Fill in the "number wanted" column.**
**PLANTS AVAILABLE**

Wildlife and songbird packets can be ordered separately.

| | Cost/ Packet | Code | Number of Packets | Office Use |
|---|---|---|---|---|
| Wildlife Packet | $22.00 | 96 | | |
| Songbird Packet | 12.00 | 95 | | |

| Species | Height | Cost/ Hundred | Code | Number of plants | Office Use Only |
|---|---|---|---|---|---|
| (Do not order less than 500 plants, and order in units of 100) | | | | | |
| White Pine | 6-12" | $12.25 | 30 | | |
| Scotch Pine | 5-12" | 12.25 | 20 | | |
| Red Pine | 6-14" | 12.25 | 17 | | |
| Ponderosa Pine | 5-12" | 12.25 | 15 | | |
| Jack Pine | 6-14" | 12.25 | 10 | | |
| Red Cedar | 6-12" | 12.25 | 16 | | |
| Norway Spruce | 6-12" | 12.25 | 13 | | |
| White Spruce | 6-12" | 12.25 | 43 | SOLD OUT | |
| Black Walnut | 10-18" | 12.25 | 24 | SOLD OUT | |
| Green Ash | 8-18" | 12.00 | 08 | | |
| White Ash | 8-18" | 12.00 | 28 | | |
| Silver Maple | 8-18" | 12.00 | 21 | | |
| Red Oak | 6-14" | 12.00 | 41 | SOLD OUT | |
| White Oak | 6-12" | 12.00 | 29 | SOLD OUT | |
| Bur Oak | 6-12" | 12.00 | 04 | | |
| Mixed Oak | 6-14" | 12.00 | 51 | | |
| Hybrid Poplar (rooted cutting) | 8" | 12.25 | 53 | | |
| Russian Olive | 8-16" | 11.75 | 19 | | |
| Autumn Olive (Cardinal strain) | 6-14" | 11.75 | 03 | | |
| Tatarian Honeysuckle | 8-16" | 11.75 | 23 | | |
| Amur Honeysuckle | 8-16" | 11.75 | 01 | | |
| Redosier Dogwood | 8-18" | 11.75 | 18 | | |
| Gray Dogwood | 6-12" | 11.75 | 07 | | |
| Silky Dogwood | 8-16" | 11.75 | 78 | | |
| Common Lilac | 6-12" | 11.75 | 47 | | |
| Chokecherry | 8-16" | 11.75 | 39 | | |
| Wild Plum | 10-18" | 11.75 | 31 | | |
| Osage Orange | 8-18" | 11.25 | 14 | | |
| Ninebark | 6-14" | 11.75 | 12 | | |
| Serviceberry | 6-12" | 11.75 | 46 | | |
| Nanking Cherry | | 11.75 | 79 | | |

## 1988-89 ORDER FORM

SPRING
PLANTING 1989

**2. ADDRESS**

(Please Print)

(LANDOWNER NAME — **PLEASE PRINT**)

(MAIL ADDRESS)

(CITY) (STATE) (ZIP)

( )
AREA CODE PHONE NUMBER

**3. Check pick-up or ship box.**

☐ **I will pick up my order at the nursery when notified.**

☐ **I want my order shipped to the address above or to the nearest county conservation board.**

**SHIPPING ADDRESS**
(If different from above)

(NAME — **PLEASE PRINT**)

(MAIL ADDRESS)

(CITY) (STATE) (ZIP)

( )
AREA CODE PHONE NUMBER

**4. Please Answer Each Question**

1. These trees are to be planted in _____ County.
2. Are you a tax-exempt government? Yes ☐ No ☐
3. Did you purchase plants from the Nursery last year? Yes ☐ No ☐

**Volume Discount**
**10% for orders of 5000 plants or more**

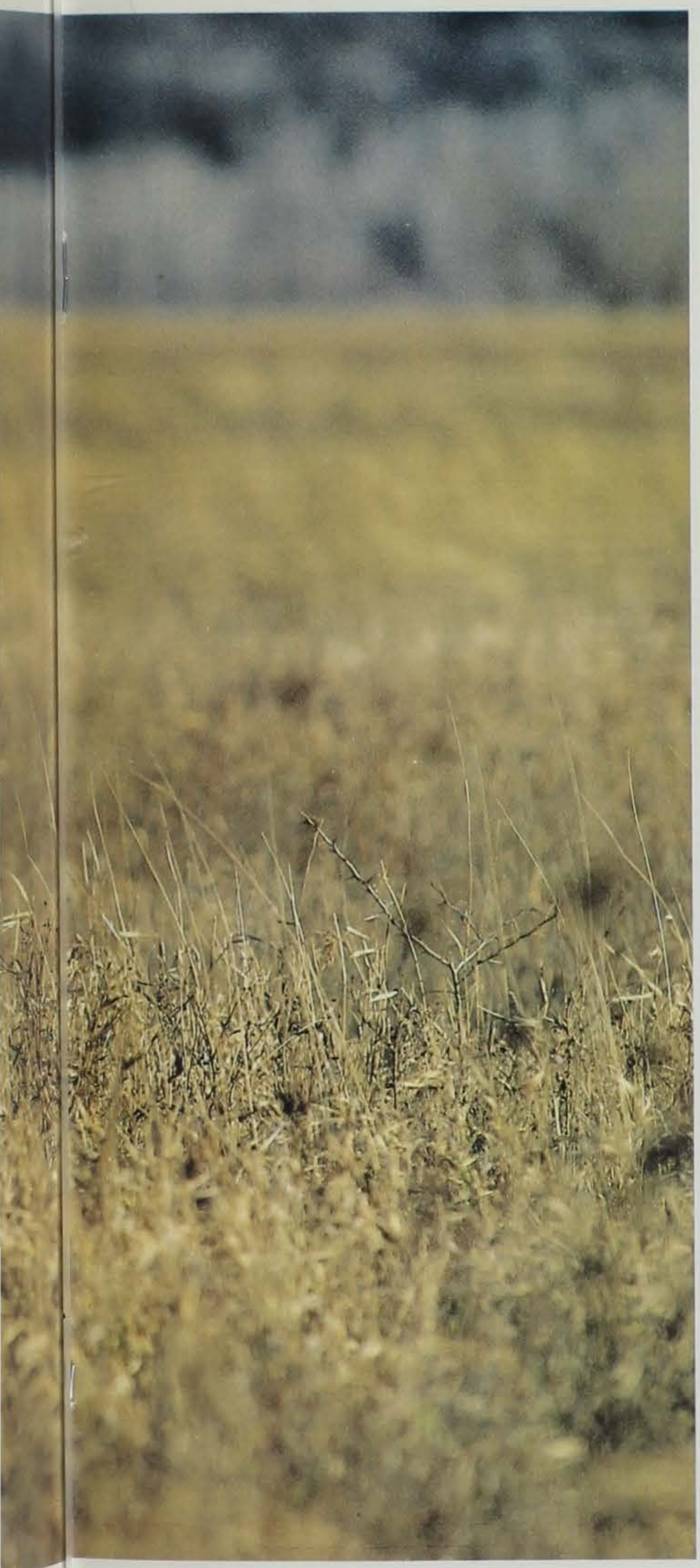
The *Iowa CONSERVATIONIST,* the DNR's official magazine, is published monthly. Written for the outdoor enthusiast, it is packed with articles and illustrations on forestry, fishing, hunting, camping, boating and natural resource issues.

Subscribe **now** to the *Iowa CONSERVATIONIST* magazine.

Yes — please bill me later for:

☐ 1 year (12 issues) $6
☐ 3 years (36 issues) $12

I am a ☐ new subscriber.
☐ renewal.



# Ne'er the Twain to Meet?

Story by DeWaine Jackson
Photos by Roger Hill

Research can be broadly defined as the collection of information and interpretation of facts about a particular subject. An equally broad definition of management is the judicious use of facts and information to accomplish an end. Although quite different in purpose, these two vital aspects of wildlife science mesh together like the teeth of two cogwheels—each requiring support from the other to accomplish tasks.

One of the tasks at hand, at least for the Iowa Department of Natural Resources' wildlife bureau, is to manage Iowa's deer herd to provide maximum benefits for all wildlife enthusiasts while minimizing the negative impacts of high deer populations.

Deer herd management depends on decisions, and each decision may be classified as good or poor depending on your own personal criteria. I am sure, however, everyone would agree that decisions made without the facts produce poor decisions. This is where research supports management—by providing the facts, explanations and predictions for informed and rational decision making.

*Tagging and radio-collaring deer is one way to successfully record the animals' movements and habits.*

# 1988 Record Deer Racks

Editor's Note: This is a list of deer racks scored between October 1987 and September 1988.

## SHOTGUN TYPICAL
*(Minimum Qualifying Score - 150 points)*

| Name | Address | Year | County Taken | Total Score |
|---|---|---|---|---|
| *Harold Dickman, Sr. | Woodbine | 1964 | Harrison | 200 2/8 |
| Jack Van Nice | Blue Grass | 1986 | Muscatine | 177 |
| Scott Carnes | Thurman | 1987 | Fremont | 175 6/8 |
| Art Daniels | New Virginia | 1986 | Warren | 175 5/8 |
| Caryl Dachenbach | Humeston | 1986 | Decatur | 174 6/8 |
| Gordon Ryrebeck | Ankeny | 1987 | Des Moines | 174 4/8 |
| Merlin C.H. Rusch | Denison | 1981 | Crawford | 173 7/8 |
| Kelly Pool | Creston | 1984 | Adams | 173 5/8 |
| Greg Bordignon | Cedar Rapids | 1987 | Winneshiek | 172 6/8 |
| Rick W. Elliott | Pleasant Hill | 1987 | Mills | 172 2/8 |
| Jim Jessen | Coon Rapids | 1987 | Carroll | 171 4/8 |
| Paul Hagist | Brighton | 1986 | Jefferson | 168 6/8 |
| Allen Davidson | Ottumwa | 1987 | Wapello | 168 6/8 |
| Rodney Wittich | Mount Pleasant | | Henry | 168 2/8 |
| Alan Garin | Cedar Rapids | 1986 | Allamakee | 168 1/8 |
| Orville Hunemuller | Indianola | 1968 | Clarke | 167 6/8 |
| Terry Dudley | Corydon | 1985 | Wayne | 167 5/8 |
| Steve Carter | Washington | 1987 | Henry | 166 6/8 |
| Patrick Burkle | Dyersville | 1987 | Clayton | 166 3/8 |
| Doug Mains | Dexter | 1986 | Guthrie | 166 |
| Joe Adam | Fairfield | 1982 | Jefferson | 165 1/8 |
| Terry Larson | Chester | 1984 | Howard | 165 |
| Ron Murray | Missouri Valley | 1987 | Harrison | 164 5/8 |
| Steve Pollock | Humeston | 1987 | Wayne | 163 6/8 |
| Terry Lundquist | Corning | 1987 | Taylor | 163 6/8 |
| Steve Cox | Albia | 1985 | Monroe | 163 4/8 |
| Charles Adam | Fairfield | 1985 | Jefferson | 163 4/8 |
| Rick Rouse | Tipton | 1983 | Cedar | 163 1/8 |
| Rod Williamson | Albia | 1986 | Monroe | 162 7/8 |
| Scott Rexroth | Oskaloosa | 1987 | Van Buren | 162 7/8 |
| David H. Kessler | Riceville | 1987 | Howard | 161 3/8 |
| John Mullen | Cresco | 1987 | Winneshiek | 161 2/8 |
| Wayne Wasson | Villisca | 1987 | Montgomery | 161 1/8 |
| Charles D. Potts | Independence | 1972 | Buchanan | 161 |
| Gary Goering | Lucas | 1987 | Lucas | 161 |
| John Earl Kuhns | Drakesville | 1987 | Davis | 160 7/8 |
| Randy Kessler | Lime Springs | 1987 | Howard | 160 6/8 |
| Tom Markussen | Fredericksburg | 1987 | Tama | 160 5/8 |
| Dewayne Conner | Muscatine | 1987 | Muscatine | 160 5/8 |
| Rod Benton | Audubon | 1967 | Guthrie | 160 1/8 |
| Douglas Einck | Cedar Rapids | 1987 | Fayette | 160 1/8 |
| Bill Brimeyer | Dubuque | 1987 | Clayton | 160 1/8 |
| John Shaw | Johnston | 1981 | Wapello | 159 4/8 |
| David Gearhart | Oelwein | 1986 | Fayette | 159 3/8 |
| Jean Kelly | Afton | 1987 | Union | 159 3/8 |
| Tom Gullion | Lovilia | 1984 | Marion | 159 |
| Michael M. Brenden | Whiting | 1987 | Monona | 158 6/8 |
| Kirk Uhl | Danbury | 1987 | Woodbury | 158 5/8 |
| Larry Sivill | Chariton | 1987 | Lucas | 158 1/8 |
| Jane O. Hohl | Independence | 1972 | Buchanan | 157 6/8 |
| Dan Thole | Strawberry Point | 1986 | Clayton | 157 6/8 |
| Ray Hartz | Atalissa | 1987 | Muscatine | 157 2/8 |
| Ray Kinney | Minburn | 1987 | Dallas | 157 2/8 |
| Steve Kerper | New Vienna | 1987 | Clayton | 157 |
| Ron Cota | Harpers Ferry | 1987 | Allamakee | 157 |
| Jim Furland | Denver | 1983 | Allamakee | 156 6/8 |
| James Boyer | Cedar Rapids | 1987 | Linn | 156 2/8 |
| Scott McIntire | Seymour | 1986 | Wayne | 156 2/8 |
| Ayron Teater | Moulton | 1987 | Appanoose | 156 |
| Jim P. Oldham | Reasnor | 1987 | Jasper | 156 |
| Art Eckheart | Arlington | 1987 | Clayton | 155 7/8 |
| Chris Borcherding | Strawberry Point | 1987 | Delaware | 155 5/8 |
| Terry W. Massick | Knoxville | 1987 | Marion | 155 4/8 |
| Don Vande Noord | Pella | 1987 | Marion | 155 |
| John Schlumbohm | Oelwein | 1987 | Winneshiek | 154 7/8 |
| Kerry Brouse | Council Bluffs | 1987 | Cass | 154 6/8 |
| Howard York | Dallas Center | 1987 | Madison | 154 6/8 |
| Gregg Vander Holt | Parkersburg | 1987 | Butler | 154 6/8 |
| Tom Ulrickson | Albia | 1987 | Monroe | 154 3/8 |
| David Swartz | Corning | 1987 | Adams | 154 2/8 |
| Jim Landon | Brighton | 1976 | Jefferson | 153 6/8 |
| Roger Larson | Nevada | 1987 | Winneshiek | 153 6/8 |
| Mark Boggess | Ames | 1987 | Page | 153 4/8 |
| Bob H. Evans | Knoxville | 1987 | Van Buren | 153 4/8 |
| David Keller | Saint Charles | 1987 | Warren | 153 3/8 |
| Donald Williams | Cedar Falls | 1987 | Black Hawk | 153 3/8 |
| Tim Ehlert | Woodbine | 1987 | Harrison | 153 2/8 |
| Francis Forret | Adel | 1970 | Dallas | 153 2/8 |
| David Wilcox | Des Moines | 1987 | Polk | 153 |
| Charles Lemley | Kirksville, Missouri | 1971 | Des Moines | 153 |
| Glen Adams | Agency | 1981 | Davis | 152 4/8 |
| Bob Moore | Pomeroy | 1981 | Henry | 152 1/8 |
| Phil Imboden | Earlham | 1985 | Madison | 151 7/8 |
| Mark Opat | Cresco | 1987 | Howard | 151 6/8 |
| David Harris | Sioux City | 1987 | Woodbury | 151 6/8 |
| Norm Thomas, Jr. | Honey Creek | 1987 | Pottawattamie | 151 5/8 |
| Ron Engelke | Mapleton | 1985 | Monona | 151 4/8 |
| Rick Stevens | Ottumwa | 1987 | Wapello | 151 1/8 |
| Jeff Koch | Hampton | 1987 | Franklin | 151 |
| Steven Hansen | Exira | 1984 | Audubon | 150 6/8 |
| Steve Odson | Ankeny | 1987 | Adams | 150 5/8 |
| John Shaw | Johnston | 1985 | Wapello | 150 4/8 |
| Lynn Hoch | Lacona | 1987 | Lucas | 150 4/8 |
| Mike Klonglan | Des Moines | 1987 | Wayne | 150 4/8 |
| Brian Sothman | Cumberland | 1987 | Cass | 150 3/8 |
| Dave Cota | Harpers Ferry | 1987 | Allamakee | 150 1/8 |
| Robert Clarke | Reinbeck | 1987 | Franklin | 150 1/8 |
| Jim Lockard | Johnston | 1986 | Madison | 150 |

## SHOTGUN NONTYPICAL
*(Minimum Qualifying Score - 170 points)*

| Name | Address | Year | County Taken | Total Score |
|---|---|---|---|---|
| *James Fine | Moulton | 1987 | Davis | 222 4/8 |
| Orlin Sorber | Perry | 1973 | Boone | 212 7/8 |
| Marv Schmidt | Blue Grass | 1987 | Scott | 203 2/8 |
| Robert McFadden | Muscatine | 1986 | Louisa | 202 2/8 |
| Jason Gapinski | Davenport | 1987 | Louisa | 201 7/8 |
| Merl D. Jackson | Corning | 1987 | Adams | 201 6/8 |
| Paul Crawford | Arlington | 1987 | Clayton | 199 6/8 |
| Steve Shanks | Derby | 1987 | Lucas | 196 4/8 |
| Ivan D. Byczek | Lockridge | 1987 | Henry | 196 3/8 |
| Jerry Lahmann | Chariton | 1987 | Lucas | 193 4/8 |
| Russell Hill | Mount Pleasant | 1987 | Henry | 193 4/8 |
| Quentin Goodman | Malvern | 1987 | Mills | 190 3/8 |
| Dale Whipple | Thurman | 1986 | Fremont | 190 3/8 |
| Robert Greiner | Reinbeck | 1987 | Davis | 190 |
| Joyce O'Connell | Fort Dodge | 1987 | Webster | 189 1/8 |
| Randal E. Foster | Deep River | 1987 | Poweshiek | 188 6/8 |
| Buck Pettyjohn | Knoxville | 1987 | Marion | 184 |
| Allen Hall | Malvern | 1987 | Mills | 182 6/8 |
| Mike Kessel | Fairfield | 1985 | Jefferson | 180 6/8 |
| Thomas Miller | Cedar Falls | 1987 | Hardin | 179 4/8 |
| Gary Hunter | Sloan | 1987 | Woodbury | 179 2/8 |
| Mary Nissen | Corwith | 1987 | Wright | 178 7/8 |
| John Engle | Moravia | 1986 | Monroe | 178 6/8 |
| Mike Boothe | Des Moines | 1986 | Clarke | 173 5/8 |
| Roy Bear | Weldon | 1987 | Clarke | 171 5/8 |

| | | | | |
|---|---|---|---|---|
| Randy Scott | Council Bluffs | 1975 | Mills | 171 3/8 |
| Dave Marsh | Adel | 1987 | Dallas | 170 5/8 |
| Scott Atkinson | Des Moines | 1987 | Allamakee | 170 |

## BOW AND ARROW TYPICAL
*(Minimum Qualifying Score - 135 points)*

| Name | Address | Year | County Taken | Total Score |
|---|---|---|---|---|
| *Glen Thompson | West Burlington | 1987 | Des Moines | 177 5/8 |
| Marlin Derby | Pleasant Plain | 1987 | Washington | 174 3/8 |
| Lee Lundstrom | Des Moines | 1987 | Clarke | 171 7/8 |
| Rick Foreman | Cedar Rapids | 1985 | Linn | 162 6/8 |
| Dave Hainzinger | Lehigh | 1987 | Webster | 162 5/8 |
| Stephen L. Cink | Webster City | 1987 | Hamilton | 159 5/8 |
| Tom Arpy | Carlisle | 1987 | Madison | 159 4/8 |
| Daniel R. Kennedy | Dubuque | 1987 | Allamakee | 159 1/8 |
| Larry Pillard | Albia | 1987 | Monroe | 158 |
| Terry Larson | Chester | 1987 | Howard | 156 6/8 |
| Larry Hermanstorfer | Cedar Rapids | 1987 | Johnson | 156 5/8 |
| Steve Anderson | Mapleton | 1986 | Monona | 155 3/8 |
| Todd Prichard | Des Moines | 1978 | Madison | 152 1/8 |
| Tim Quigley | Tama | 1987 | Tama | 152 |
| Jim Arney | Marshalltown | 1987 | Marshall | 151 |
| Chris Ruckman | Centerville | 1987 | Appanoose | 150 7/8 |
| Robert J. Becker | Manchester | 1987 | Delaware | 149 5/8 |
| Charles Mass | Council Bluffs | 1969 | Harrison | 148 6/8 |
| Mark D. Slining | Dows | 1987 | Wright | 148 3/8 |
| Robert E. Morterud | Urbandale | 1987 | Polk | 148 2/8 |
| Dave Steffens | Mount Pleasant | 1987 | Henry | 147 6/8 |
| David Boysen | Morning Sun | 1987 | Louisa | 146 5/8 |
| Leonard Grimes | Pella | 1986 | Marion | 145 5/8 |
| Dennis Cavin | Clarinda | 1987 | Page | 144 2/8 |
| Gary P. Cole | Mason City | 1987 | Allamakee | 143 7/8 |
| Todd Lust | Ankeny | | Clarke | 143 6/8 |
| Ron Holden | Marshalltown | 1987 | Tama | 143 5/8 |
| Tom Markussen | Fredericksburg | 1986 | Bremer | 143 5/8 |
| Francis Winter | Waterloo | 1986 | Clayton | 143 3/8 |
| Dwight Swenson | Soldier | 1987 | Monona | 143 2/8 |
| Albert A. Weidenbacher | Dubuque | 1987 | Clayton | 143 1/8 |
| Chris Barton | Shenandoah | 1987 | Page | 142 5/8 |
| Steven Van Hamme | Brooklyn | 1978 | Poweshiek | 142 4/8 |
| Dave Sullivan | Waterloo | 1986 | Bremer | 142 3/8 |
| Jerry Reynolds | Thompson | 1987 | Winnebago | 142 1/8 |
| Brad Wiggins | Prairie City | | | 142 1/8 |
| Billy R. Custer | Soldier | 1987 | Monona | 140 7/8 |
| Darin De Jong | Hospers | 1987 | O'Brien | 140 6/8 |
| Dan Carl | Corning | 1987 | Adams | 140 4/8 |
| Dave Rimathe | Slater | 1987 | Dallas | 139 2/8 |
| Mark Shelton | Otho | 1987 | Webster | 139 |
| Rod Purdum | Unionville | 1986 | Appanoose | 138 5/8 |
| Lloyd W. Clark | Woodward | 1986 | Boone | 138 4/8 |
| Paul Crawford | Arlington | 1987 | Fayette | 138 2/8 |
| Dan Brimeyer | Dubuque | 1987 | Allamakee | 138 1/8 |
| Clarence Mincks | Cresco | 1988 | Howard | 137 5/8 |
| Bob Sauvain | Woodbine | 1987 | Harrison | 136 6/8 |
| Robert Turner | Atlantic | 1962 | Cass | 136 4/8 |
| Bruce A. Christensen | Audubon | 1984 | Audubon | 136 3/8 |
| David Bacon | Otho | 1984 | Webster | 136 1/8 |
| Donald Stuefen | Cedar Rapids | 1984 | Jones | 135 5/8 |
| Tom Hanks | Ackworth | 1986 | Warren | 135 |

## BOW AND ARROW NONTYPICAL
*(Minimum Qualifying Score - 155 points)*

| Name | Address | Year | County Taken | Total Score |
|---|---|---|---|---|
| *Joe Rettenmeier | Dubuque | 1987 | Dubuque | 204 1/8 |
| Denny Webb | Burlington | 1987 | Des Moines | 192 2/8 |
| Robert Williams | Cedar Rapids | 1987 | Linn | 179 4/8 |
| Thomas Miller | Cedar Falls | 1987 | Hardin | 179 4/8 |
| William E. Webster | Newton | 1987 | Jasper | 173 2/8 |
| Steve Collins | Sidney | 1987 | Fremont | 158 |

*New *Top 10* entry. See page 24 for the list of the *All-Time Top 10 Racks*.

However, research by itself cannot manage Iowa's deer herd. Appropriate decisions must be made on research findings and actions must be carried out on those decisions. This is where management supports research—by using the findings to make decisions and to implement them. The combined efforts of both research and management guide the conservation of Iowa's deer herd.

Since 1953 (the first year of a deer hunting season in Iowa), the Department of Natural Resources has been actively involved in deer herd management. Research has provided deer population trends and sex and age characteristics from the harvest—information needed for determining hunting seasons and license quotas. Modern herd management, however, requires more information, particularly when managing the herd by hunting zones. This detailed data is only available through intense research efforts.

Intensive research on Iowa's deer was first initiated in 1969. Objectives of a study at Pilot Knob State Park were to determine daily, seasonal and annual deer movement and how crop harvest, weather and hunting pressure affected movement patterns. This information was required for effective deer management in an agricultural area. But most importantly, it provided data on the appropriate time to conduct annual winter aerial deer population surveys.

In 1971, a second major research effort was started at Ledges State Park. This study was designed to find out habitat requirements and movements of deer in central Iowa. The DNR objective at this time was to increase the herd statewide. It was unknown if deer could survive concentrated hunting pressure in small islands of habitat or whether large refuge areas, such as state parks, could provide a source for repopulating these "habitat islands."

It was found through this study that young deer dispersing from the park could repopulate surrounding areas. Therefore, it was unnecessary to stock deer or be overly concerned about unoccupied quality habitat. These were encouraging results, but the DNR remained concerned about deer herd growth and factors influencing it.

Poaching has a negative impact on deer populations, but the magnitude of its impact was unknown until a research project was started in 1974. Appropriate management requires knowing the number of animals removed from a population each year and whether they are removed legally or not. Results of the study conducted in 1974 and 1975 indicated that the number of deer poached could have been 40 to 80 percent of the legal harvest during those years. Not only did this provide justification for increasing penalties for deer poaching, but it also allowed the DNR to manipulate license quotas to compensate for poaching loss.

Although poaching turned out to be a very important factor in setting license quotas, another possible mortality factor was yet to be documented. This was crippling loss—deer wounded and not recovered by the hunter. In the late 1970s, compound bows were gaining popularity as deer hunting weapons. Management biologists and the concerned public expressed a desire to

know archery crippling losses and success rates, and the effects of hunter experience, number of days actually hunting and bow type used (compound versus recurve or long bow). As with poaching, without a good estimate of archery success rates and number of deer lost through crippling, management biologists could not determine license quotas accurately. Therefore, in 1976 a research team began to collect data on success rates, crippling loss and compound bow use.

During the three-year study (1976 to 1979) the percentage of archers using compound bows increased from 32 to 73 percent. Additionally, the research team found compound bow users were more successful in harvesting deer. Regardless of the bow type used, 14 percent of the archers crippled at least one deer per year. With this data in hand, management personnel were able to evaluate harvest information and correctly formulate hunting regulations. Particular attention was given to evaluating bow season length (crippling rate might be reduced by shorter seasons) and the impact of high success and crippling rates.

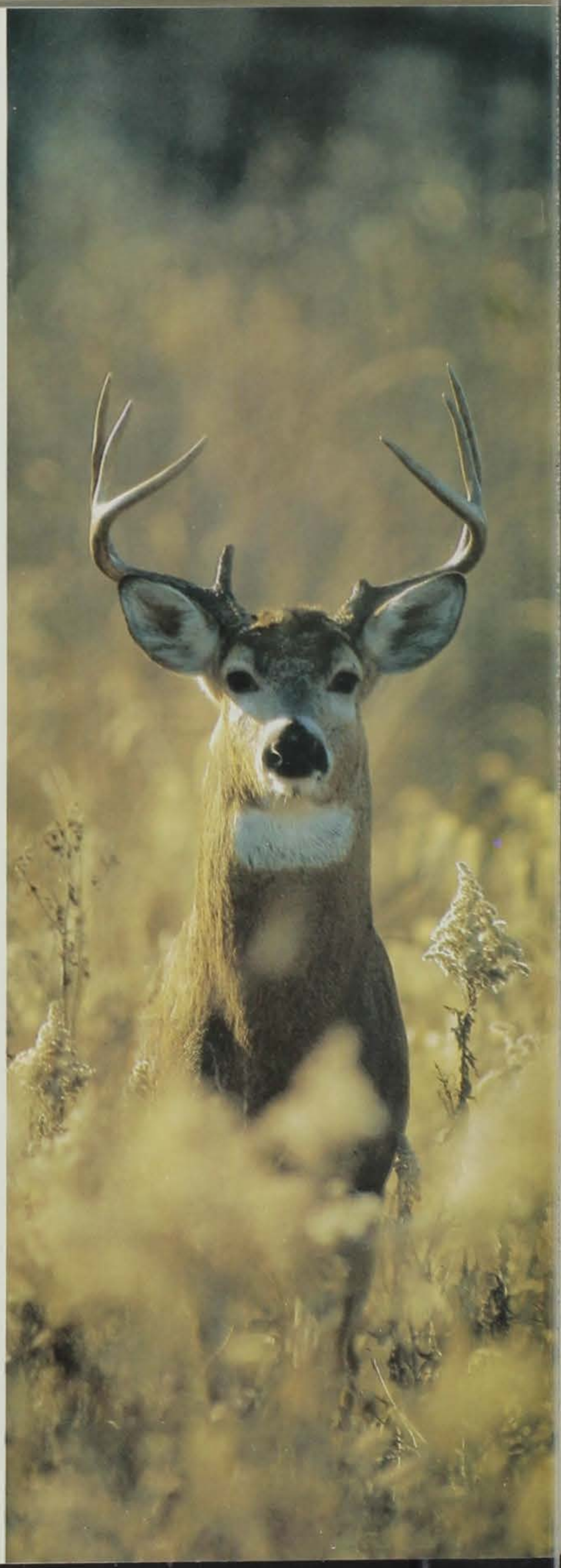
Important factors in any animal's population dynamics are natality (birth) and mortality (death) of individuals within the population. Management personnel now had estimates of the main mortality factors in Iowa's deer herd—harvest, road kills, illegal kills and crippling losses. But there was very little known on the deer herd's reproductive biology. Thus, in 1978, a research project was initiated to gather reproductive data from road-killed does.

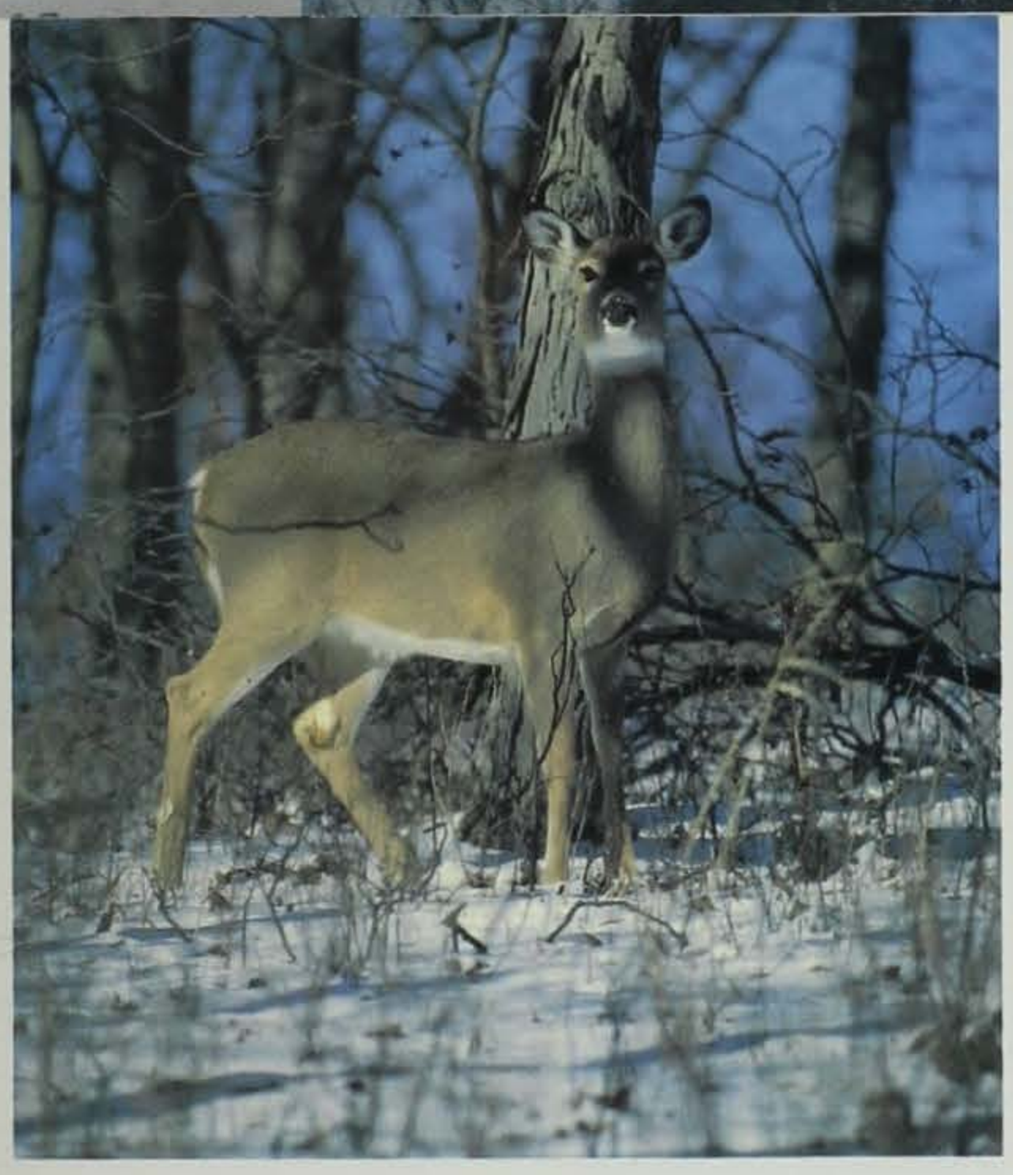
This project found that does produced 1.3 fetuses on the average. Between 89 and 97 percent of the adult does and, surprisingly, 69 percent of the yearlings were pregnant. With this information and an assumption that 52 percent of the herd are does, a potential annual increase of the population was calculated at 69 to 80 percent. Combining this information with additional information provided by the project on peak breeding activity allowed management personnel to correctly determine license quotas and hunting season dates.

In 1978 a research team began evaluation of a winter aerial population census technique that provided a bench mark to the deer herd status (increasing, decreasing or stable). Documenting accuracy of the data, potential effects of different observers, times of day, weather conditions, and developing an expansion factor for estimating total populations were the project's objectives. A mass of technical results evolved from the study detailing to management biologists specific criteria for obtaining accurate aerial counts. Results were used to develop and standardize the aerial survey that could be used for determining deer population trends.

By 1979 the number of road-killed deer was becoming a concern of the public and the Iowa Department of Transportation (DOT). Research personnel responded

***In 1976, research biologists began to collect data on archery hunters' success rates and crippling losses to help management biologists accurately determine license quotas.***





*In the early 1980s, fawn mortality rates were studied. These rates, along with causes of death derived from the study, assist biologists in accurately managing herd size.*

to this concern by experimentally testing the effect of roadside reflector systems on deer-vehicle accident rates. Although reflectors are expensive and require continual maintenance, they are effective in reducing deer-vehicle accidents. Road segments with reflectors had 51 percent fewer deer killed than road segments without reflectors. With these results, recommendations were made to the DOT to use reflector systems in high deer-vehicle accident areas if funding for installation became available.

In the early 1980s research efforts again turned to deer mortality factors. Fawn mortality rates were the primary objective of this study. For modern deer herd management, knowledge of fawn mortality rates and causes of death were necessary to accurately manage herd size.

Twenty-seven percent of all fawns marked in the study died during the first 180 days of life. More than 75 percent of those deaths were caused by coyotes and dogs. Although mortality rates are extremely valuable in determining fawns recruited into the fall population, management practices that could change these rates were limited.

Modern conservation enforcement techniques are important. Law enforcement officers needed a method for determining how long a deer had been dead to assure the animal had been taken during legal hunting hours. In 1983, a research team began developing a predictive model that used a deer's carcass weight and thigh temperature combined with ambient temperature to determine how long it had been dead. As with reflector systems, no immediate changes were made to herd management because of the study results, but the findings are currently aiding law enforcement officers in poaching cases.

Now, as in the past, research biologists are responding to concerns from the public and management biologists. Recently, deer damage, particularly to agricultural crops, has been a major concern. Increasing deer populations and intensive agricultural production have had a head-on collision in much of the state. These problems are magnified on agricultural areas surrounding state parks which provide refuge for deer and correspondingly have high deer numbers. Damage complaints are common from private landowners surrounding state parks (or other refuges) especially in years when crops are left standing in the fields. Without knowing the extent of damage and its economic impact, it is difficult to evaluate the problem's magnitude.

It is especially critical in this case that wildlife research biologists be able to determine the percent of crop yield reduction due to deer and percent due to other factors and how this yield reduction is affected by deer density, feeding behavior, movements, dispersal, weather and cropping practices. Once this information is available, it will be possible to accurately evaluate damage on private land and predict areas that need deer population reductions. As a result, research biologists initiated an ongoing study in 1984 to gather baseline data needed to make these management decisions. Results of the DNR's study at Springbrook State Park in Guthrie County will be used to formulate management recommendations for regulating deer populations and reducing damages in areas of high deer numbers.

Once again, the efforts of research and management biologists will be combined to manipulate Iowa's deer herd to benefit the landowner, recreationist and hunter. The twain do meet—and its outcome is the best wildlife science can produce.

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*DeWaine Jackson is a wildlife research biologist located at Boone.*

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# CONSERVATION UPDATE

## AMERICA'S FAVORITE TREE

Until the middle of the 19th century, any family that wanted a Christmas tree either cut the tree themselves or ordered one from a farmer. The custom was practiced mostly by German-Americans, although Americans of other stock were beginning to hear about the tradition.

*Although cedar trees were popular in the 1860s, by 1880 the fashion had switched to evergreens that dried more slowly, creating less of a fire hazard when decorated with lighted candles.*

All that changed in 1851, when a New Yorker named Mark Carr started that city's first Christmas tree business, according to *National Wildlife* magazine.

Carr lived in the Catskills 80 miles north of New York City, where many German families lived. In mid-December of 1851, Carr filled two ox-sleds with young firs and spruces, loaded them on a steamboat and sold them for a handsome profit at New York's Washington Market.

By 1880 a veritable forest of 200,000 trees was moving to Washington Market from all over the Northeast. They came on boats, by trains and in big horse-drawn farm wagons. Although cedar trees were popular in the 1860s, by 1880 the fashion had switched to evergreens that dried more slowly, creating less of a fire hazard when decorated with lighted candles. Many early photographs show hemlocks, but they too had disadvantages, since their branches are too lacy and frail to support many ornaments.

In Maine, balsam firs had always been considered a nuisance, because they grew like weeds. But in 1892 a steam yacht returning to Boston from Newfoundland stopped at a small town on Maine's Penobscot Bay. The yacht's owner loaded 500 young balsam trees and sold them in Boston's Christmas market at Fanueil Hall. Within a few years, balsam became New England's favorite tree, and the Christmas trade sparked an economic boom for Maine.

In the Midwest, Christmas trees for cities like Chicago came largely by boat from the forests of Michigan. As early as 1887, two brothers named Schuenemann sailed from Michigan in their fishing schooner with a load of trees lashed to the deck. They tied up beside Chicago's Clark Street bridge and began selling their trees. Although both brothers were later lost in Lake Michigan storms, the younger brother's widow took over the business in 1913, and the Schuenemann Christmas tree ships became part of Chicago history.

By 1920 Christmas tree cultivation had become a profitable business in many parts of the country. Farmers were pleased to find a crop suitable for growing on rocky upland pastures and other unproductive pieces of land. In the 1930s Franklin D. Roosevelt helped popularize the concept by growing Christmas trees on his estate at Hyde Park, New York.

This year, 32 million Christmas trees will be sold in the United States—big business by any standard. The most popular tree is the scotch pine, a European import popularized in the 1930s by a Pennsylvania car salesman and entrepreneur named Fred Musser. But no matter now many trees are cut and sold, the fundamentals of the business have not changed much since Mark Carr's time. The challenge, still, is how to ship fir trees to eager families in time for the Christmas holidays.

—National Wildlife

## WILDLIFE "POISONING" SCARES UNFOUNDED

Rumors have recently spread through northern Iowa that deer and other wild game might be "poisoned" by pesticides and unfit to eat. Based on an investigation and consultation with agricultural and veterinary experts,

Department of Natural Resources' officials report these rumors are unfounded and that hunters should not be afraid to eat wild game. Further investigations into the source of these rumors in testing of animals suspected of being poisoned should lay these fears to rest. No samples showed any pesticide residues.

The first concern over potential poisoning surfaced when a hunter from northeast Iowa shot a deer during Minnesota's bow season and fed the liver to farm cats, two of which died. Analysis of the liver supposedly revealed the presence of Parathion, a potent insecticide.

"Subsequent investigation by an Iowa Department of Agriculture chemist indicated the tests were not valid, but rumors began to spread anyway," said Richard Bishop, chief of the DNR's wildlife bureau. "The most common scenario was that spraying of soybeans last summer to protect against spider mites lead to contamination of the deer. No cases with contamination have been substantiated and all apparently originated from the single instance of the cats dying. These pesticides simply are not deposited to any degree in the muscle tissue and break down rapidly after use," said Bishop.

Samples of the meat from the original deer were tested for the presence of pesticides by the Minnesota DNR. Samples of liver and meat from road-killed deer collected in northeast Iowa were tested at the Iowa State University Veterinary Diagnostic Laboratory, along with the remains of the original two cats that died. None of these tissues revealed any detectable amount of pesticide. Experts at Iowa State University further stated that even if deer ate contaminated plant material, pesticides commonly used in Iowa would be quickly broken down in the liver and eliminated without accumulating in meat at dangerous levels.

"Just what killed the cats remains a mystery, but pesticides were not implicated. Our staff has spent time tracing down the facts in this case," said Bishop. "We are satisfied that the original concern was unwarranted and not based on facts," he said. "Hopefully, the real story will spread as rapidly as the rumors, and hunters will realize that our wild game is still safe to eat."

## 11-YEAR-OLD MALLARD SHOT BY IOWA HUNTER

An 11-year-old banded mallard was shot last October by Steve Heddinger of Fort Dodge. Because the majority of banded ducks are recovered by hunters before two or three years of age, Heddinger's duck, taken at Lizard Lake, was an exceptional bird.

The duck was banded by the U.S. Fish and Wildlife Service (USFWS) on Jan. 29, 1977, near Ware, Illinois. Heddinger sent the number on the band to the USFWS and in turn was sent information on the duck. According to records, the duck was hatched in the spring of 1976 and had made 22 migrations to and from its summer nesting grounds in Illinois and wintering grounds in Texas. The current record age for a banded mallard is more than 23 years.

With Iowa's duck season in progress, hunters are reminded to report all banded birds taken. The information derived from the recovery of bands is vital to proper wildlife management. Band numbers should be sent to Patuxent Wildlife Research Center, Bird Banding Lab, Laurel, Maryland 20708. Anyone reporting a band number will be sent information on that bird.


## 1988 INDEX AVAILABLE

*The 1988* **Iowa CONSERVATIONIST** *index is available from the Iowa Department of Natural Resources.*

*The index lists all stories published in the* **Iowa CONSERVATIONIST** *magazine during 1988. The stories are alphabetically listed by author's last name as well as by subject matter for easy reference.*

*To receive your index(es), send $1 per copy in check or money order to the 1988* **Iowa CONSERVATIONIST** *Index, Iowa Department of Natural Resources, Wallace State Office Building, Des Moines, Iowa 50319-0034. Please allow eight weeks for delivery of the index.*

*Keep in mind that the trees that are dropping those leaves in your yard are also saving you money.* National Wildlife *magazine reports that trees may cut cooling costs 50 percent or more by shading a house from sunlight. And come winter, trees may lower heating bills by as much as 15 percent by deflecting winter gusts.*

# All-Time Top 10 Racks

*New *Top 10* Entry. See page 18 for the *1988 Record Deer Racks.*

## Shotgun Typical

| Name | Address | Year | County Taken | Total Score |
|---|---|---|---|---|
| *Harold Dickman, Sr. | Woodbine | 1964 | Harrison | 200 2/8 |
| Wayne A. Bills | Des Moines | 1974 | Hamilton | 199 5/8 |
| Kenneth Tilford | Lamoni | 1985 | Decatur | 198 1/8 |
| George L. Ross | Ottumwa | 1969 | Wapello | 195 1/8 |
| Bob Jackson | Des Moines | 1983 | Madison | 191 |
| Gregg Redlin | Iowa City | 1983 | Johnson | 187 6/8 |
| Dennis Vaudt | Storm Lake | 1974 | Cherokee | 187 3/8 |
| Roy Metzger | Bloomfield | 1985 | Davis | 186 7/8 |
| Randall Forney | Glenwood | 1971 | Fremont | 186 2/8 |
| Jack W. Chidester, Jr. | Albia | 1976 | Monroe | 186 1/8 |

## Bow and Arrow Typical

| Name | Address | Year | County Taken | Total Score |
|---|---|---|---|---|
| Lloyd Goad | Knoxville | 1962 | Monroe | 197 6/8 |
| Robert Miller | Wyoming | 1977 | Jones | 194 2/8 |
| Richard Swim | Des Moines | 1981 | Warren | 190 5/8 |
| Robert McDowell | Ottumwa | 1985 | Wapello | 183 4/8 |
| Vern Backstrom | Des Moines | 1986 | Polk | 180 1/8 |
| *Glen Thompson | West Burlington | 1987 | Des Moines | 177 5/8 |
| Ernie Aronson | Davenport | 1985 | | 176 |
| Gary Wilson | Cherokee | 1974 | Cherokee | 175 4/8 |
| Gordon Hayes | Knoxville | 1973 | Marion | 175 1/8 |
| Don McCullough | Conesville | 1980 | Muscatine | 174 7/8 |

## Shotgun Nontypical

| Name | Address | Year | County Taken | Total Score |
|---|---|---|---|---|
| Larry Raveling | Emmetsburg | 1973 | Clay | 282 |
| Carroll Johnson | Moorhead | 1968 | Monona | 256 2/8 |
| David Mandersheid | Welton | 1977 | Jackson | 253 3/8 |
| Edgar Shields | Grand River | 1986 | Decatur | 229 6/8 |
| Duane Fick | Des Moines | 1972 | Madison | 228 2/8 |
| LeRoy Everhart | Sumner | 1969 | Van Buren | 224 4/8 |
| Todd Hawley | Panora | 1982 | Guthrie | 224 2/8 |
| *James Fine | Moulton | 1987 | Davis | 222 4/8 |
| Max Marlin | Blakesburg | 1981 | Wapello | 222 2/8 |
| Donald Crossley | Hardy | 1971 | Humboldt | 221 4/8 |

## Bow and Arrow Nontypical

| Name | Address | Year | County Taken | Total Score |
|---|---|---|---|---|
| Bob Harding | Pleasantville | 1985 | Wapello | 229 3/8 |
| Jerry Monson | Clear Lake | 1977 | Cerro Gordo | 220 7/8 |
| Blaine Salzkorn | Sutherland | 1970 | Clay | 218 1/8 |
| Chris Hackney | Alberton | 1983 | Wayne | 211 5/8 |
| *Joe Rettenmeier | Dubuque | 1987 | Dubuque | 204 1/8 |
| Phillip M. Collier | Burlington | 1978 | Des Moines | 203 5/8 |
| Ted Miller | New Virginia | 1986 | Warren | 203 5/8 |
| Bill Erwin | Sioux City | 1966 | Woodbury | 202 5/8 |
| Dorrance Arnold | Oelwein | 1977 | Clayton | 200 5/8 |
| Dennis Ballard | Iowa City | 1971 | Johnson | 197 4/8 |

## OUR ERROR

*The above photo, which appeared in the October 1988* Iowa CONSERVATIONIST, *was inaccurately captioned. The caption should have read:*

***In 1980, boxelder was the dominant tree on 10 acres adjacent to Timber Creek in Marshall County. Between 1980 and 1982, Gilman Boy Scouts planted 3,000 walnut seedlings beneath the boxelder. In 1981 the boxelder was killed resulting in a successful "conversion" planting of a high-value woodland.***

## BALD EAGLE DAY, JAN. 7, IN DUBUQUE

A Bald Eagle Day will be held Saturday, Jan. 7, 1989, at Lock and Dam 11 in Dubuque. This is the first bald eagle day to be held at Dubuque and will feature observation areas, indoor programs and a guest speaker.

Biologists with spotting scopes will be at the observation areas along Lock and Dam 11 from 7 a.m. until 4 p.m. An indoor educational program will be conducted at Marshall School, 1450 Rhomberg Ave., Dubuque, every half hour from 9 a.m. to 10 a.m., noon until 1 p.m. and from 2 p.m. until 3 p.m.

Brett Mandernack, director of the Eagle Valley Nature Preserve, Wisconsin Department of Natural Resources, will be the guest speaker with talks from 11 a.m. until noon and from 1 p.m. until 2 p.m.

For more information on Bald Eagle Day, contact the Dubuque Convention and Visitors Bureau, 770 Town Clock Plaza, Dubuque, Iowa 52001, (319)557-9200 or (800)79-VISIT. After business hours, call (319)583-0537 or (319)582-6161.

## DONATIONS

| | | |
|---|---|---|
| Ralph E. Rolland<br>Eagle Grove | 1972 Mercury station wagon valued at $200 | |

## CLASSROOM CORNER

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a. Cricket
b. White-tailed Deer
c. Hognose Snake
d. Mosquito
e. Chorus Frog
f. Ruffed Grouse
g. Brown Thrasher
h. Humans
i. Whip-poor-will
j. Grasshopper

1. c 2. f 3. j 4. h 5. i 6. a

Before sealing envelope, be sure to enclose holiday gift order form along with your remittance.

## Shotgun Ty

| Name | Address |
|---|---|
| *Harold Dickman, Sr. | Woodbine |
| Wayne A. Bills | Des Moines |
| Kenneth Tilford | Lamoni |
| George L. Ross | Ottumwa |
| Bob Jackson | Des Moines |
| Gregg Redlin | Iowa City |
| Dennis Vaudt | Storm Lake |
| Roy Metzger | Bloomfield |
| Randall Forney | Glenwood |
| Jack W. Chidester, Jr. | Albia |

## Shotgun Non

| Name | Address |
|---|---|
| Larry Raveling | Emmetsburg |
| Carroll Johnson | Moorhead |
| David Mandersheid | Welton |
| Edgar Shields | Grand River |
| Duane Fick | Des Moines |
| LeRoy Everhart | Sumner |
| Todd Hawley | Panora |
| *James Fine | Moulton |
| Max Marlin | Blakesburg |
| Donald Crossley | Hardy |

### OUR ERROR

*The above photo, which appeared in the October 1988* Iowa CONSERVATIONIST, *was inaccurately captioned. The caption should have read:*

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## DONATIONS

| | |
|---|---|
| John Deere Employees<br>Ankeny | $200 for water and ice rescue vehicle (airboat) at Big Creek State Park |
| Council Bluffs Fish and Game Club<br>Council Bluffs | $50 for state park newsletter at Lake Manawa State Park |
| Bill Riley<br>Phoenix, Arizona | $2,000 for maintenance contract at Saylorville Corridor multi-purpose trail (Big Creek State Park) |
| Judy White<br>Midwest Printing<br>Council Bluffs | Printing services valued at $405 for Lake Manawa State Park newsletter at Lake Manawa State Park |
| Cambron Tire Service<br>Indianola | Seven tractor rims valued at $75 for fireplace construction at Lake Ahquabi State Park |
| K&L Tournament Committee<br>Des Moines | $254 for water and ice rescue vehicle (airboat) at Big Creek State Park |
| Lowell Walter Trust<br>Independence | Pick-up truck valued at $2,770 for staff usage at Cedar Rock |
| IDSO Machine Shop<br>Milford | Well casing valued at $320 for gate construction at Gull Point State Park |
| Iowa Electric Light and Power<br>Milford | 40 power poles valued at $1,000 and 10 loads of wood chips, value unknown for playground construction at Gull Point State Park |
| Spirit Lake Protective Association<br>Spirit Lake | Five grills valued at $435 for Mini-Wakan State Park and Templar Park State Recreation Area |
| June and Paul Strueber<br>Dubuque | IBM personal computer system valued at $5,034 for interpretive and outdoor education programs at E. B. Lyons Nature Center |
| Reed Thacker<br>Indianola | Concrete cutting machine and labor valued at $60 for sewage dump station improvement at Lake Ahquabi State Park |
| Ralph E. Rolland<br>Eagle Grove | 1972 Mercury station wagon valued at $200 for staff usage at George Wyth State Park |
| Van Buskirk Construction Co.<br>Waterloo | 4,500 tons of clean sand valued at $27,000 for beach improvement at George Wyth State Park |
| Joe Boesen<br>Boone | Flowers valued at $100 and labor valued at $100 for park landscaping at Ledges State Park |
| Asplundh Tree Service<br>Perry | Five loads of wood chips valued at $200 for trail surfacing at Ledges State Park |
| Steve Blair<br>Indianola | $750 for water and ice rescue vehicle (airboat) at Big Creek State Park |
| Garvis Honda<br>Des Moines | $100 for water and ice rescue vehicle (airboat) at Big Creek State Park |
| Container Haulaway Corporation<br>Des Moines | $50 for water and ice rescue vehicle (airboat) at Big Creek State Park |
| Pete Schol<br>Ankeny | $50 for water and ice rescue vehicle (airboat) at Big Creek State Park |
| Order of the Foresters<br>Polk City | $580 for water and ice rescue vehicle (airboat) at Big Creek State Park |
| Saylorville Dam Snowmobile Club<br>Johnston | $500 for water and ice rescue vehicle (airboat) at Big Creek State Park |
| Polk City Kiwanis<br>Polk City | $500 for water and ice rescue vehicle (airboat) at Big Creek State Park |
| Ron's Electric<br>Ankeny | $100 for water and ice rescue vehicle (airboat) at Big Creek State Park |
| Anonymous | 20 power poles valued at $400 and two windows valued at $197 for state park facility maintenance at Nine Eagles State Park |

## CLASSROOM CORNER

by Robert P. Rye

Some animals are silent, while others use sound for protection, mate finding or feeding. Have you thought about how, or why, these sounds are made? Listen and look at the animals — many of the sounds are not made with vocal cords.

Try matching the following to improve your knowledge of animal sounds.

1. What animal is harmless but makes threatening hissing sounds?
2. What animal attracts its mate with a booming sound made by its rapidly beating wings that strike nothing but air?
3. What animal makes mating "music" by rubbing its hind legs against its forewings?
4. What animal produces music for many unrelated reasons?
5. What animal has been named for the sound it makes?
6. What animal produces its monotonous sound by rubbing the "file" on the right wing against the "scraper" on the left wing?
7. What animal makes an unpleasant, doomful sound with its rapidly beating wings?
8. What animal repeats each well-sung musical phrase twice?
9. What animal's call is like the sound made when you run your thumb over a comb?
10. What animal, when alerted to something strange in its area, will snort by blowing air out its nose?

a. Cricket
b. White-tailed Deer
c. Hognose Snake
d. Mosquito
e. Chorus Frog
f. Ruffed Grouse
g. Brown Thrasher
h. Humans
i. Whip-poor-will
j. Grasshopper

**ANSWERS:**

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

# A Case Study in Adaptation

by Rick Hawkins

RINGGOLD COUNTY CONSERVATION BOARD

**Like most of southwest Iowa, the landscape . . . is gently rolling, with an abundance of timber and numerous artificial ponds.**

Adaptation is a key word in the study of basic environmental principles. It is also the key which makes the county conservation board program work so well within the diversity of Iowa counties.

Each county conservation board must assess its own unique combination of economics, population, geography and natural resources. The board is then better able to adapt and direct its efforts to meet the needs of the population in that particular county.

Ringgold County is no exception, lying in the scenic southern tier of Iowa counties. Like most of southwest Iowa, the landscape around the county seat of Mount Ayr is gently rolling, with an abundance of timber and numerous artificial ponds. This is an area of agricultural land, economy and people with a total population that hovers around 6,000.

Wildlife is plentiful in Ringgold County, including deer, quail, pheasant, wild turkey, waterfowl and many non-game species. The Iowa Department of Natural Resources (DNR) maintains two large wildlife areas and part of a third within the county. These are open to the public for hunting, winter recreation and primitive camping. The DNR also operates one of its state fish hatchery stations near Mount Ayr.

The Ringgold County Conservation Board took these demographical factors into consideration in creating its unique program. Its goal is to offer the best possible, quality conservation program within the confines of the small budget provided by the low economic base of the county. Therefore, since its creation in the early 1960s, the Ringgold County Conservation Board has channeled most of its efforts toward outdoor recreation and education.

What has evolved through the years in Ringgold County is a system that includes three medium-sized, multi-use recreational parks which are geared primarily toward day use with limited modern camping, as well as a two-mile recreational trail that borders one of the parks. Seven county towns have received assistance from the board in developing the parks, helping to spark community pride. The conservation board also works comfortably with the DNR in monitoring unique areas around the county for preservation of natural habitats.

A strong thrust has been aimed at environmental education and involvement with youth in hopes of nurturing and maintaining an understanding of our natural resources for generations to come.

Analyzing and adapting to the needs of Ringgold County requires a lot of work by the conservation board. As the program is continually reassessed, input from the public is vital.

What makes your county conservation board special? If you have not done so, study your own county conservation board design. It may surprise you to know how much had to be considered and determined before the projects ever started. Look at your county parks. Consider the educational and recreational opportunities provided. Visit with your county conservation board members and employees to help them accommodate the public and preserve the beautiful versatility Iowa has to offer. Enjoy — and appreciate — your county conservation board system.

*Rick Hawkins is the director of the Ringgold County Conservation Board.*

# WARDEN'S DIARY

At the suggestion of a good friend of mine, I wanted to relate to you something that happened a few years back in northeast Iowa.

The winter snows had fallen long and deep, and the forest had been locked in sleep for a long time. Then one day the grey skies gave way to bright blue and the sun's rays warmed the world once again. The huge blue spruce, just outside our window, had been like a giant Christmas tree for us that winter. It was a never-ending source of entertainment with such a variety of bird life, feeding in the feeder which hung in the small walnut tree next to it.

The birds used the tree for winter cover, peaking out from its warm branches during the cold weather and hiding deep within during the storms. They were like a continuous movie just outside our window. My wife, Joyce, had moved the kitchen table next to it, and we watched all the activity as we ate or as we sipped our coffee. We had no TV there because of the hills, but it didn't really matter as they kept us entertained with all their antics. The chickadees were the clowns, always bounding around, never still. They would light in the branches close to your head and noisily encourage you to hurry and fill the feeder. The nuthatch always performed its acrobatics and upside-down act on the suet bag.

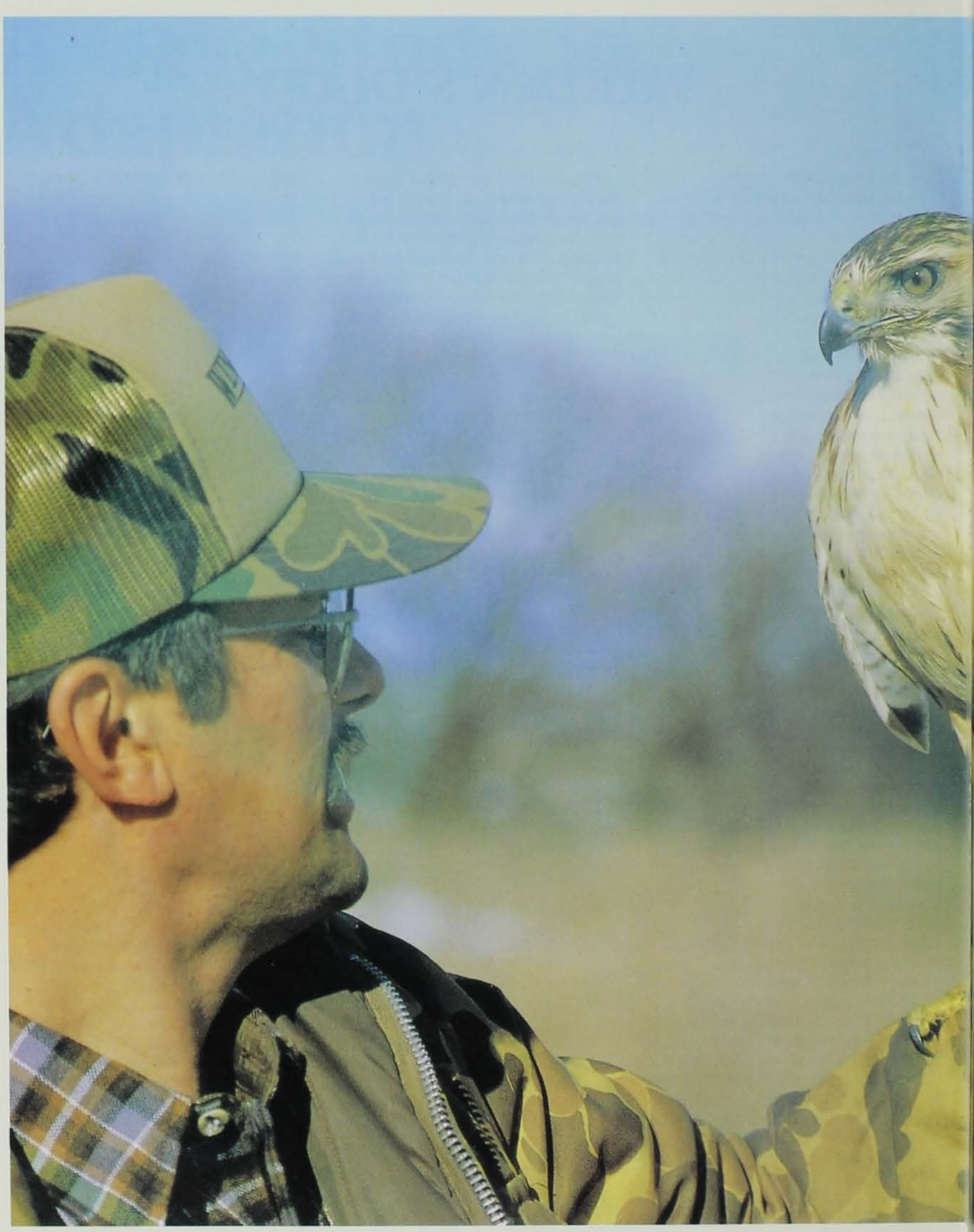
The real thrill came on a bright sunny day when we watched a female cardinal settle herself on the pine bough straight out from the window. She just sat there for the longest time, making no attempt to hop over to the feeder. Suddenly a bright red male appeared next to her. They sat together, just a few inches apart for the longest time. Then he carefully moved over next to her. Soon they were shoulder to shoulder, even touching at times. Then he flew to the feeder and with great care and patience he selected a sunflower seed and flew back to her. After a few minutes he cautiously extended his bill to her and she gently took the offering. As she extracted the nut from the shell, he returned to the feeder and with great care selected yet another. He sat patiently beside her as she finished the first and extended her another. Very coyly she accepted this and soon they flew off together.

Story and photo
by Jerry Hoilien

Every day this was repeated and would sometimes go on for a half hour or more. Joyce smiled and said they were courting, and when I teasingly brought an apple from the bowl and placed it in front of her, Joyce laughed and said, "That's just like a man!"

As the sun's warmth grew stronger, there was a rash of activity in the pine boughs. A nest was being constructed right there, directly in front of the window. When finished, we waited, and soon could see several eggs. As the female began to incubate, we watched with amusement as the male would fly to the very top of the pine and sing his heart out.

And Joyce would smile and say, "Isn't that just like a man . . ." and then . . . take my hand in hers.



# FALCONRY

Story by Karen Peterson Craft
Photos by Ron Johnson

Falconry is the art of hunting wild game with nature's proven predators—the raptors or birds of prey. The sport has changed little since the days of the ancient Egyptians. Falconry was often mentioned in the writings of Shakespeare and gained much popularity in England where it was strictly governed as a sport for the nobility. In the United States, falconry has gained popularity within the past 25 years. Previously, only a few purists enjoyed the sport.

With the refinement of efficient hunting equipment, including semi-automatic shotguns and high-powered rifles, there has been revived interest in hunting with more primitive weapons. Archery and muzzleloading equipment provide the hunter with more challenge. Beyond that, hunting with falcons or hawks is a way to return to basics, develop association with a natural predator and, after much dedication, *possibly* bag game.

## Falconer's Training

In the mid-1970s a set of federal guidelines for falconry was developed. These have since been adopted with slight modifications by those states where falconry is permitted, including Iowa.

A would-be falconer must first find a willing sponsor (often the biggest obstacle to someone wanting to enter the sport). A sponsor is a licensed falconer of general or master class, willing to serve as a tutor to the applicant during a two-year apprenticeship. A written test on raptors must also be taken before a permit is granted. A score of 80 percent is required on this state-administered, federally approved test covering raptor identification, migration routes, diseases, handling, nutrition and state and federal regulations. Additionally, the equipment and facilities of the aspiring falconer must be inspected and approved.

Once a sponsor is found, the test is passed and facilities are approved, the apprentice is permitted to pos-