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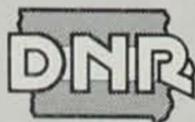
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COVERS: Front -- Gray partridge. Photo by Lowell Washburn. Back -- It's time to start thinking about winter bird feeding. Purple finch. Photo by Ron Johnson.

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Iowa's Most Frustrating Gamebird

Article and photos by Lowell Washburn

The gray, or Hungarian, partridge has been a key component of the European sporting scene since at least the Middle Ages. With the advent of gunpowder it became the mainstay of upland gunning, and up until about World War II, it was the partridge, rather than the larger pheasant, that was favored among most hunters. Unlike the pheasant, the gray partridge was regarded as an "honest bird," excellent for training inexperienced hunters as well as young bird dogs. In England, the partridge was so important the annual sales of shotshell ammunition rose and fell with the success of the species' nesting seasons.

The gray partridge came to Iowa in 1910 when the State Fish and Game Commission released several of the birds in the north-central part of the state. More releases followed, and several thousand had been purchased and stocked by 1915. Pheasants were also being introduced to many parts of the state. But, while pheasant populations exploded, the partridge all but disappeared.

However, the bird later recovered and by the 1960s was thriving throughout north-central and northwest Iowa. The first open season was held in 1963.

In spite of the fact that partridge had become numerous, hunters continued to focus their attentions on the "king" of Iowa gamebirds — the ring-necked

pheasant. Partridge went begging for attention with most birds being harvested incidental to pheasant hunting.

This situation changed abruptly with the arrival of the now-famous March snowstorm of 1965. The weather was devastating, with that single storm reducing pheasant populations by up to 75 percent in



To many, the wary Hun is an impossible challenge.
But here an expert tells how to add more partridge to your gamebag.

the northern parts of the state. However, while pheasant numbers toppled, hunts remained unaffected and actually began to show large increases.

The final blow came to northern Iowa's pheasants around the turn of the decade when farmers were encouraged to farm from road ditch to road ditch in an effort to "feed a hungry world." During the 1970s thousands of acres of prime upland cover disappeared as fencerows were eliminated, sloughs drained and brushy wintering areas were grubbed out. In the north-central and northwest portions of the state, the ringneck became virtually a bird of the past.

By contrast, the partridge population exploded. Following a fresh snow the coveys stuck out like sore thumbs and were literally everywhere. Even during ground blizzard conditions that would quickly kill a pheasant, partridge could often be seen out and about casually scratching for a meal in the barren expanse of windswept plowing. It seemed as if the tougher it got the more they liked it.

Given the above situation, it is not surprising that hunters began to get more and more serious about pursuing partridge after 1965. And it was the dream of biologists and hunters alike that the tenacious Hun would fill the void left by the decline of the pheasant. For most, the dream was very short-lived.

It soon became painfully apparent the Iowa partridge had absolutely no intentions of living up to the "honest bird" image of its European counterpart. Instead, it chose to exhibit every undesirable trait that an upland bird can manage to possess. First and foremost was the Hun's total inability to hold still. Hundred- and even two-hundred-yard flushes were the norm. Once a spooked covey got to rolling, they flew, and flew and flew. Even in pancake-flat terrain the flight may be lost to view, and coveys that did stay in sight often hit the ground running only to reflush again.

Most would-be partridge hunters were soon beside themselves. One frustrated acquaint-

tance, who was also an avid waterfowler, described the partridge as "the pintail of the uplands." An employment services buddy called it "the universal, unequal opportunity gamebird."

In a fit of desperation, hunters tried to adapt. Some used white coveralls to stalk the coveys across snowy landscapes. The tactic sometimes worked, but hardly seemed a proper way to hunt upland birds. By far, the most physically challenging, and certainly the most unproductive tactic, was what could best be called the chase-'em-till-they-tire method. The logic behind this pipe dream was to find a covey and simply dog its heels until the wildly flushing birds wore out and held for a shot. The only thing I ever saw wear out

was the hunter, and the chase usually ended in the middle of a two-mile section with the winter wind cutting like a knife. After a few experiences like this, most hunters gave up on the partridge for good.

But there are a few individuals who have successfully mastered the art of pursuing Iowa's gray partridge. One of them is Gerald Anderson who lives in the heart of Hun country at Winnebago County's Lake Mills. The following paragraphs offer an account of how he hunts this seemingly impossible bird. It is my opinion that anyone who adopts his methods will see a substantial increase in the number of partridge brought to bag.

According to Anderson, the hunting season is divided into two

Gray Partridge: Gold Standard of Iowa Falconry

by Lowell Washburn

From hundreds of feet in the air, the hovering peregrine hung as if suspended by a string, intently surveying the scene below.

The German wire-haired pointer, which only moments before had been rapidly quartering the fields, now slowed to the soft footed creep that meant birds were close — very close. Suddenly, the dog became a three-legged statue as the heavy scent froze it into a solid point. The falcon knew from experience that the pointing dog meant good things to come, and lost no time moving ahead. Soon it hung suspended in a position almost directly above the wirehair.

Quickly assessing that the situation was to his liking, falconer Rick Woods circled to the front of the pointer, and then rushed in yelling and clapping his hands. Wood very nearly stepped on the partridge before they became airborne in an explosive downwind flush.

At the sight of the first wing beat, the peregrine folded her wings to instantly become a teardrop-shaped speck that hurtled toward earth in a blinding stoop. Within three or four seconds the bird had lost half its altitude, and now began pumping its wings to add even more velocity to the vertical decent.



RON ANDREWS

By now the partridge were flying down range at equally unbelievable speeds, their sights on the cover of a thick honeysuckle hedge bordering a nearby hogfeeding operation. The partridge were still a good 50 yards from that cover when the closed fist of the peregrine punched its target, filling the sky with feathers as one bird gave the appearance of going down in flames. The falcon pitched up to avoid smashing the frozen ground and then delicately fluttered back to begin plucking her quarry, as dog and falconer raced to the site.

Since time began, large falcons and gray partridge have coexisted in one of the planet's most spectacular examples of the predator/prey relationships. And in modern-day Iowa, it is the partridge, along with the ring-necked pheasant and mallard duck, that represent the Gold Standard of contemporary falconry. In my view, there is no other form of hunting that can stand in its shadow.

Most hunters would scarcely believe the partridge of falconry is the same bird they pursue with a

gun. Simply put, the gray partridge fears the falcon much more than it fears humans. Once partridge see the raptor's distinctive silhouette, they are pinned as surely as if nailed to the ground, and they become as honest as any covey of bobwhites.

Some Huns become so reluctant to fly they will literally allow themselves to be picked up rather than risk the chase. Woods has picked up several birds in such a manner and notes that this behavior stresses the need for a top-notch bird dog when hunting partridge with a falcon. "Actually, most pointing breeds in use today were originally developed to be used under falcons and not the gun," he said. Of course, picking up tight-sitting birds from the grass is not the essence of successful game hawking, and most coveys do flush. When they do, the exhibition is without parallel.

When partridge fly from humans, they instinctively realize they are fleeing an earthbound predator and behave accordingly.

Along with the ring-necked pheasant and mallard duck, the gray partridge is one of the most sought-after gamebirds of contemporary falconers. Most hunters would scarcely recognize the partridge of falconry as the same bird they pursue with a gun.

But when a partridge blows out beneath a high-flying falcon, it does so with an entirely different attitude. Just as surely as it knows humans will be left behind, the partridge also senses its first move will trigger an immediate response from the falcon. It is literally a race to survive. The resulting flight must be witnessed first-hand to be believed, and anyone who does will gain an entirely new perspective on the speed and maneuverability of this great upland gamebird.

Partridge often escape the falcon. But many times they do not, and when a strike is inevitable, the partridge uses its final trick. At the moment of impact, the bird goes limp. Somehow this tactic seems to neutralize the strike. Although the apparently unconscious bird may roll for several feet across the snow, in reality, it is unharmed. As the falcon returns to flutter down on its meal, the partridge suddenly comes to its feet and, on whirring wings, heads for the horizon. This may be where the phrase "roll with the punches" originated. Needless to say, the trick leaves the falcon totally baffled. But then, the gray partridge seems to have a way of doing that to most hunters — winged or otherwise.

Iowa's partridge have not lived up to the "honest bird" image of their European counterpart. They seem to exhibit every undesirable trait a gamebird can possess -- first and foremost being their inability to hold still.



halves. The year's activity begins well in advance of opening day when acres enrolled in annual government set-asides are clipped and disced in September. As these fields begin to green up again, they attract Huns like magnets. Preseason scouting in these areas serves as an excellent tune-up for the hunting dog and is also an accurate indicator of local populations.

When the season opens in October, these set-aside acres can offer fair to good hunting, and may actually provide the only huntable real estate due to standing row crops. Coveys consist mainly of young birds and they hold well. Flights are often short, but usually terminate in unharvested corn where following is not an option.

However, the arrival of the season's first significant snowfall signals the 'creme de la creme' of Iowa partridge hunting. "The most important thing to bear in mind," says Anderson, "is that unlike other wintering gamebirds, partridge do not relate to cover. Instead, they relate solely and directly to available food supplies. Three-fourths of that winter food will consist of corn."

The second thing to remember is coveys occupy amazingly small territories and often range across an area only a quarter-mile or so in radius. Wintering coveys are prone to focus on cornfield end rows and windswept hillsides. "No gamebird is more predictable in its daily routine," says Anderson. For unknown reasons, partridge will favor exact locations in specific fields for generation after generation. "There are fields around here where I could drive a stake, and if that field is planted to corn there will be a covey headquartered within 20 feet of that stake come winter," says Anderson. He also adds that the birds' activity schedules are equally predictable. Whenever a covey is spotted, the exact time should be noted. The group will usually be in the same spot the next day at that time.

The most rewarding hunts begin immediately following a fresh snowfall as Anderson drives the back roads in search of fresh signs. With Huns, the word sign translates into the telltale scratchings that betray where coveys are foraging — usually in corn stubble. Since coveys have an affinity for

end rows, their "digs" are easily seen and consist of large "dark areas" where topsoil, stalks and leaves are exposed as birds search for waste grain and weed seeds.

As you scan a fresh dig, it is likely you won't see a single bird. "Rest assured, they are there," says Anderson. "They may be under the snow or hiding behind a stalk but they are there, and chances are they will hold."

The next step is to obtain permission and give the covey a



try. Typically, a dug in covey hiding in fresh snow will allow hunters to approach to within 20 yards, allowing time for two or even three rapid shots when the flock flushes. Once they fly, the covey may stay airborne for a quarter-mile or more. But if the snow is fresh and powdery, the group may burrow in again as soon as they land. If so, they will likely hold for a second flush, though this time the birds may take off at a slightly greater range. After the second flush the birds generally wise up and keep moving well out of range.

"Anytime you happen to spot a covey that is on its feet or running, don't waste your time," says Anderson. "These birds are a guaranteed wild flush. Only birds that are truly dug in offer good gunning potential." Persistence is the key and hunters should test every covey that looks good. "Of course, not all coveys will hold," says Anderson. "But with diligence, you'll find enough to keep you coming back for more."

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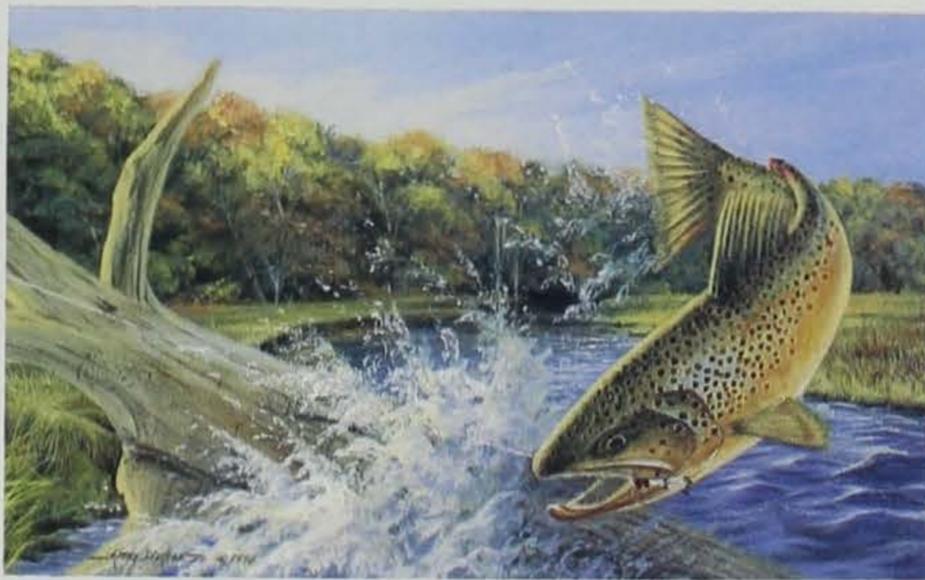
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Duck, Trout and Habitat Stamps



Jerry Raedeke, Minnesota artist, was commissioned by Iowa Ducks Unlimited to design the 1991 Iowa Duck Stamp. Iowa Duck Stamp prints are available from Raedeke Studio Gallery, 1435 South Shore Drive, Worthington, Minnesota 56187; phone 507/372-2095. The regular edition size is 900 signed and numbered prints. Cost of the print is \$120, a signed stamp is an additional \$5, pencil remarque is \$60 and a color remarque is an additional \$120.*

Missouri wildlife artist Kathy Dickson was commissioned to design the 1991 Iowa Trout and Habitat Stamps for the Iowa Department of Natural Resources. Iowa Trout and Habitat Stamp prints are available from Treasured Scenes Artistry, P.O. Box 4085, Poplar Bluff, Missouri 63901; phone 314/686-3360. The regular edition size of the trout stamp is 300 signed and numbered prints. The habitat stamp edition size is 1,000 signed and numbered prints. Image size of both prints is 6-1/2 x 11 inches. Cost of the habitat print with stamp is \$105, trout prints with stamps are available for \$108. Pencil remarques are an additional \$50 and color remarques \$100.



**Next year, Iowa Ducks Unlimited will be selling a special edition of this print with a special stamp to DU donors only. More information when details are set.*

Up From the Ground Came A . . . ?

The thick black substance found buried beneath the ground in some parts of Iowa is known as coal tar, a residue from a manufacturing process used years ago and a potentially toxic chemical.

by Pete Hamlin

Workers tunneling under a street near downtown Des Moines recently had to abandon an expensive piece of machinery when they smelled a pungent odor that irritated their noses. Highway department workers were taking soil samples along a new right of way in Dubuque when their drill punched through the roof of an underground storage vault. The drill bit came up with a very strong odor and a thick black substance clinging to it.

In building a bridge in Burlington a coffer dam is being constructed 200 feet from shore. Just a few weeks ago the inside of the dam was coated with a thick black substance that had a pungent smell.

The thick substance with the pungent aroma in each case was coal tar.

Coal tar is a residue from the manufacturing process which produced a form of gas from coal. The gas was commonly manufactured from the mid-1800s until the late 1940s and was used for illumination, cooking and heating. The old gas street lights from that era frequently used coal gas. As natural gas became more available, coal gas plants went out of business because natural gas was cheaper to use.

The manufacturing process involved treating coal with heat and chemicals to produce a gas which had the same energy value (BTUs) as modern natural gas. A by-product of the manufacturing process was a thick, black, strong smelling tar. Coal tar consists of a group of chemicals called PAHs (poly-aromatic hydrocarbons) which include some toxic chemicals such as cancer-causing substances. Luckily coal tar does not readily dissolve in water. This means that if tar and water come into contact, such as underground, the tar does not mix with the water. It simply remains in place. The only chemicals which dissolve coal tar are gasolines so that if a leaking underground storage tank is located near a coal tar site it is possible that the PAHs have

migrated away from the site.

Because most of these plants were built between 1850 and 1900 and went out of business at least 40 years ago, finding the actual location of the coal tar disposal area can be very difficult. The DNR has tentatively identified 100 of these sites with a possible 70 additional sites that need further investigation. By checking historical records, the DNR has learned that most of these plants are located near rivers and close to the existing business district of that time. A recent construction project along the river in Davenport uncovered coal tars from a plant that went out of business in 1905. Finding the specific location of the coal tar disposal area after all these years can be a difficult process.

Once a site is located, the DNR will try to identify a responsible party and work with that party to clean up the coal tar. Of the 100 tentative sites in Iowa 30 are under consent orders with responsible parties who are working to remediate the site.

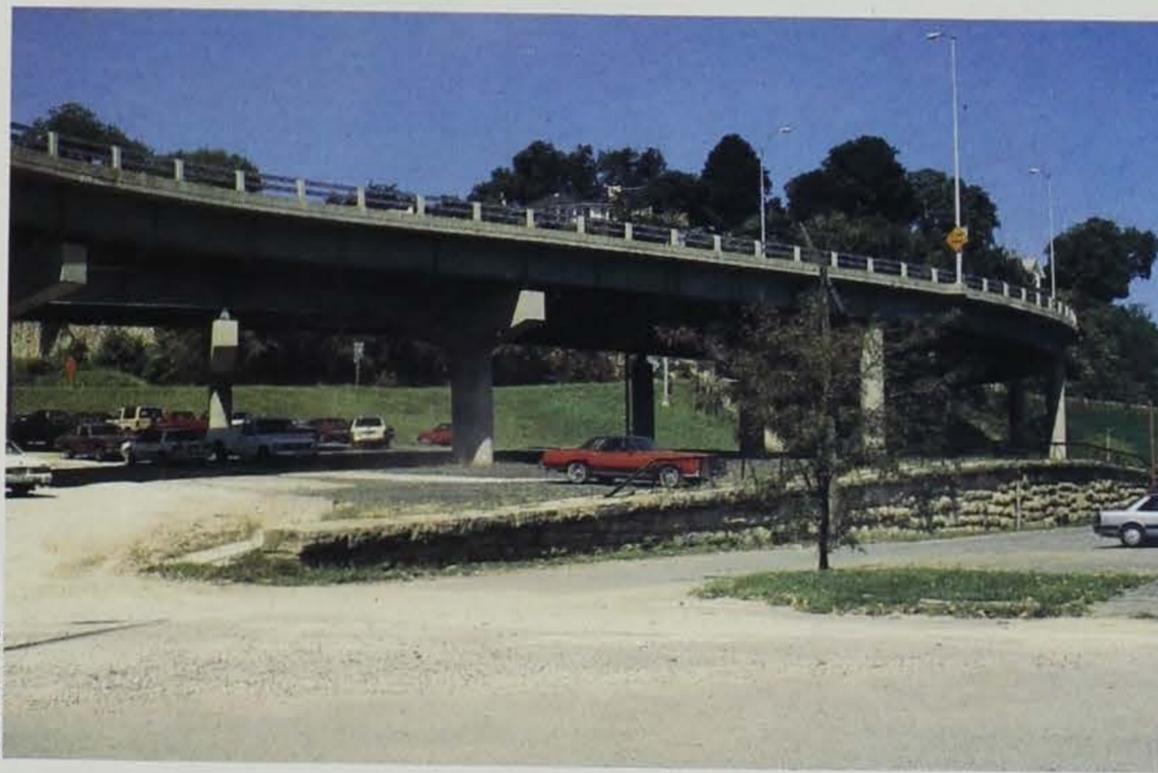
Remediation consists of pin pointing the disposal area and studying the subsurface geology. Then a plan is submitted to the DNR for our approval. The responsible party selects one of several techniques to remediate the site. The most common technique is to excavate the soil and haul it to an approved hazardous waste disposal site or to incinerate the soil. A newer technique, which needs a lot of research, is to induce a strain of bacteria which actually eat coal tar. Whatever technique is selected it can be expensive costing several million dollars.

Iowa has a large number of coal tar sites which the DNR is working to clean up. This will be a process lasting into the next century. By remediating these sites one more threat to our precious groundwater will be eliminated.

Pete Hamlin is the chief of the department's air quality bureau in Des Moines.



DNR PHOTO



DNR PHOTO

Coal tar is residue produced from the manufacturing of coal into gas. This gas was commonly manufactured in the mid-1800s through the late 1940s. Plants such as the one found in Burlington (top), produced the gas for heating, cooking and lighting, but as less-expensive natural gas became available the plants went out of business. Because coal tar contains potentially toxic chemicals, the DNR is working to identify and clean up these deposits, but identifying these sites are proving to be a challenge. The Burlington coal gas site, today (above).

Iowa's 1990 Energy Leaders

Article by Patricia Cale
Photos by Ron Johnson

*Reprint from the Iowa Energy
Bulletin, Volume 15, No. 6, October 1990.*

*Patricia Cale is an energy information
specialist for the department in Des Moines.*

With questions on our minds about rising fuel prices and concerns about the environment, where do we turn for answers? Iowa's energy leaders can point us in the right direction,

For the second year, the Department of Natural Resources presented awards to Iowa organizations and companies showing leadership in energy efficiency and use of renewable resources. The 1990 Iowa Energy Leadership Awards honored the following:

**** Deere and Company.** *Since 1972, even before the first energy crisis, Deere and Company has shown that an investment in energy efficiency is an investment in productivity. Throughout the company's plants in Ankeny, Davenport, Dubuque, Ottumwa and Waterloo, energy management and finding new uses for renewable resources are top priority.*

**** Cedar Rapids Bus Department.** *This agency has gone beyond its nominal mission of saving energy through public transportation. It is protecting the environment by using less-polluting ethanol, by controlling energy use in its bus barn and garage and by burning its monthly 200 gallons of waste oil for heat rather than sending it to the landfill.*

**** Fisher Controls International.** *This Marshalltown company is getting the jump on environmental protection with its "zero discharge" policy. In 1988 the company decided to reduce to zero the amount of waste materials leaving its facilities. This goal will be met by eliminating the use of disposable products and by recycling and reuse.*

**** Indian Creek Nature Center.** *In July 1989, Indian Creek in Linn County went dry for the first time. This spurred the Indian Creek Nature Center to not only conserve water in its building but to make water and energy conservation part of its public education effort. Now visitors to the center can see for themselves low-flush toilets, compact fluorescent light bulbs, energy-efficient appliances, water heater insulation and other efficiency measures.*

**** Iowa State Men's Reformatory.** *The difficult assignment of making a 120-year-old building that houses 1,300 inmates energy efficient has been tackled with enthusiasm by the staff at this Anamosa institution. In addition to installing energy-saving measures, the staff has taken on recycling, water conservation, composting and a project to burn waste products such as wood chips.*

All of the 1990 winners can serve as examples for other companies, organizations or institutions. To learn how to reduce your energy costs as well as your impact on the environment, look to these energy leaders.

Deere & Company Leaps Ahead on Energy Efficiency

Several months before the first oil embargo in 1973 shocked most Americans into energy conservation, Deere & Company was already starting to manage its energy use. The company's energy efficiency and renewable energy accomplishments since then have won it a 1990 Iowa Energy Leadership Award.

According to George Van Damme, manager of the company's energy program, John Deere is actually using only 32 percent as much energy now as in 1973, in spite of an 18 percent growth in production and 59 percent more factory floor space.

Deere has Iowa factories in Ankeny, Davenport, Dubuque, Ottumwa and Waterloo. "Because of the energy management program, some factories have been able to add production without having to add boilers," said David Williams, powerhouse and energy management supervisor at the Waterloo factory.

It now takes 43 percent less energy to produce a ton of product, whether it be agricultural equipment, construction equipment or machine components, as it did in 1973 at the Deere facilities.

"The push on energy management has been primarily economic," said Williams. "We're making a contribution to the bottom line."

Deere has found that energy savings and environmental protection go hand in hand, both driven by economics. For example, waste oil, once treated and disposed of as hazardous waste, now provides an energy source at the Waterloo plant. Co-firing it in boilers with coal reduces waste, fuel costs and air emissions. Each year burning the waste oil displaces between 3,000 and 6,000 tons of coal. "We were paying 15 cents per gallon to get rid of the oil. Now we're saving those costs plus the energy savings," said Williams.

The Waterloo facility also is exploring ways to help Black Hawk County reduce waste going to its landfill. In 1988 the Waterloo power plant test-burned refuse-derived fuel (RDF) with coal. "We experimented and found that 30 percent RDF was optimum," according to Williams.

If the Deere facility could burn Black Hawk County's waste, every 10 tons of RDF could displace seven tons of coal. The company is pursuing the project not only for energy management but as a service to the community as well, Williams said.

Deere & Company have also been leaders in a process called co-generation, in which steam is made



Through a computerized energy management system and other innovations, Deere & Company has cut energy use by one-third. Many of these energy savings go hand-in-hand with environmental protection. For example, waste oil is now co-fired with coal in the boilers, rather than being disposed of as a hazardous waste.

for heating, and electricity is generated as a by-product. By co-generating and producing some of its own electricity at its Waterloo plant, Deere has helped reduce the peak load for the utility company from which it buys power.

Deere's agreement with Iowa Public Service, its electric utility, allows each to generate electricity in its most efficient mode. "And since we're buying IPS's extra electricity, we're helping keep rates down for all of its customers," Williams said.

Deere's energy use is also kept down through a computerized energy management system and through innovative high-efficiency lighting. The computer system allows fine tuning of boilers for more efficient operation, a great advantage over the old system that used pneumatic tubes, according to Mike Klein, a maintenance technician in the Waterloo power plant.

Lighting in the plant is provided by a mixture of efficient high- and low-pressure sodium lights, fluorescents and compact fluorescents. "Some things, such as the compact fluorescent lights, that are new to other people are old around here," said Williams.

Drive for Energy Efficiency in Bus Department

People who manage glass bus terminals know what breaks a business before stones do—high energy bills.

And when managers and employees in glass buildings cut their energy costs by more than \$20,000 a year, they're rewarded for their efforts with statewide recognition. Such is the case for the Cedar Rapids Bus Department.

"We've taken two buildings that were basically energy inefficient — one was designed purely for an architectural statement, the other was built in 1949 — and made them state of the art," said William Hoekstra, director of the bus department.

The buildings include the all-glass ground transportation center located in the center of Cedar Rapids and the 1949 parking garage.

"No one took into consideration that it would be energy inefficient," said Hoekstra of the glass transportation center that helped to rack up nearly \$124,000 in heating bills by the end of its first year of existence. That was the same year the department was allocated only \$78,000 for a total maintenance budget.

With a \$46,000 deficit intact in 1985, the Cedar Rapids Bus Department started on a crusade for energy efficiency.

The city had been looking into computerized energy management systems for the ground transportation center, a concept Hoekstra had learned about while touring an elementary school with a similar program. Computerized energy systems automatically control the heating, cooling, water heating and lighting systems of an entire building. With the recommendation of an energy audit, Hoekstra was confident it was the way to go.

"I could see where we could really save money by going this way. That's when we really started going after those (state and federal) grants," said Hoekstra.

Although the user-friendly program was implemented and proved to be highly successful, only one of the two buildings was benefitting. This was Hoekstra's cue to get out a pen and start applying for more funds. This time the secured grant went toward a telephone loop to connect the computer terminal with the bus parking garage.

The long distance computerized system did its job but there were still those electric bills to contend with. Once again Hoekstra got out his pen. The next \$25,000 went for a waste oil furnace which turns used oil and lubricants from the the buses into valuable heating fuel. The 99.99 percent clean-burning furnace emits little into the atmosphere.

"Now we're in control (of our energy expenditures)," said Hoekstra. "It used to be we couldn't control them at all."

The Cedar Rapids Bus Department is currently experimenting with alternative fuels such as ethanol, LP gas and natural gas in its service trucks and support vehicles.

"Now while everyone else is paying \$1.35 at the gas station for unleaded gas with 87 octane, we're



Along with the ethanol-injection systems on Cedar Rapids' buses, the use of compressed natural gas in the Cedar Rapids Bus Department's support vehicles is helping improve air quality and energy efficiency.

paying 42 cents a gallon for natural gas with 130 octane," said Hoekstra. "By staying on the cutting edge of technology we haven't felt a real pinch."

Thousands of dollars in savings later, the crusade continues. Here are a few other energy and environmental improvements that have been implemented at the Cedar Rapids Bus Department:

Ethanol-injection systems have been added to the buses to increase the efficiency of diesel fuel and to clean up engines and emissions.

Experimentation on a bus with a four-cylinder turbo-charged motor is underway.

Petroleum-based products have been discontinued as cleaning solvents.

The air conditioner and furnace are serviced every spring to insure efficiency. Freon from air conditioners is captured and recycled.

Most of the lights have photosensors or motion sensors which turn them off when they're not needed.

Ceiling fans push warm air down from the high ceiling area in the winter.

Exhaust pipes have been extended upward on the bus bodies, sending exhausts upward instead of at ground level.

Projects planned for the future include the addition of steam heat, which could save \$25,000 a year, plus another \$2,000 in savings by not having to use the humidifier. And a grant application is currently in for an updated skylighting system that would implement a netting much like greenhouse netting that repels heat in the summer and still allows the natural light to penetrate.

"Zero Discharge" Program Protects the Environment — and the Bottom Line

Fisher Controls International is getting the jump on environmental protection with its "zero discharge" program. The company is well on the way to meeting its goal of reducing to zero the amount of waste materials it generates. Because waste reduction and recycling also mean energy savings, the company has been chosen as one of five 1990 Iowa Energy Leadership Awards winners.

Fisher Controls, located in Marshalltown, has taken a pledge to reduce all toxic and hazardous emissions, "to have zero effect on the environment," according to Dennis Swanson, pollution prevention specialist for the company. "To accomplish that, we are reviewing everything we do," he said.

In 1988, the company's office, research, design and manufacturing facilities in Marshalltown generated one million pounds of hazardous waste, shipped more than 1,400 tons of garbage to the local landfill and used seven million gallons of water. Since then, by rethinking all of its processes, it has cut hazardous waste by 90 percent and water consumption and non-hazardous waste by 50 percent.

Not only does this protect the environment, it also contributes to the company's bottom line. Savings of \$150,000 in disposal costs and a reduction of \$120,000 in chemical costs have already been achieved.

Paper is being recycled instead of being sent to the landfill. In just a two-month period last spring, Fisher employees kept 55 tons out of the waste stream. Swanson estimates that this amount of paper saved the equivalent of 935 trees, 385,000 gallons of water and 225,000 kilowatt hours of electricity. To help the community, the company donates the paper to the Marshalltown recycling center rather than selling it.

Some disposable or hazardous products have simply been eliminated, according to Swanson. In the machine shop, which covers 10 acres, oil that leaked out of machines was cleaned up with "floor dry." In 1987 Fisher used 235,000 pounds of the absorbent material, making it one of the company's major waste sources. "To eliminate the floor dry, we've fixed the leaks to reduce the oil on the floor. We clean

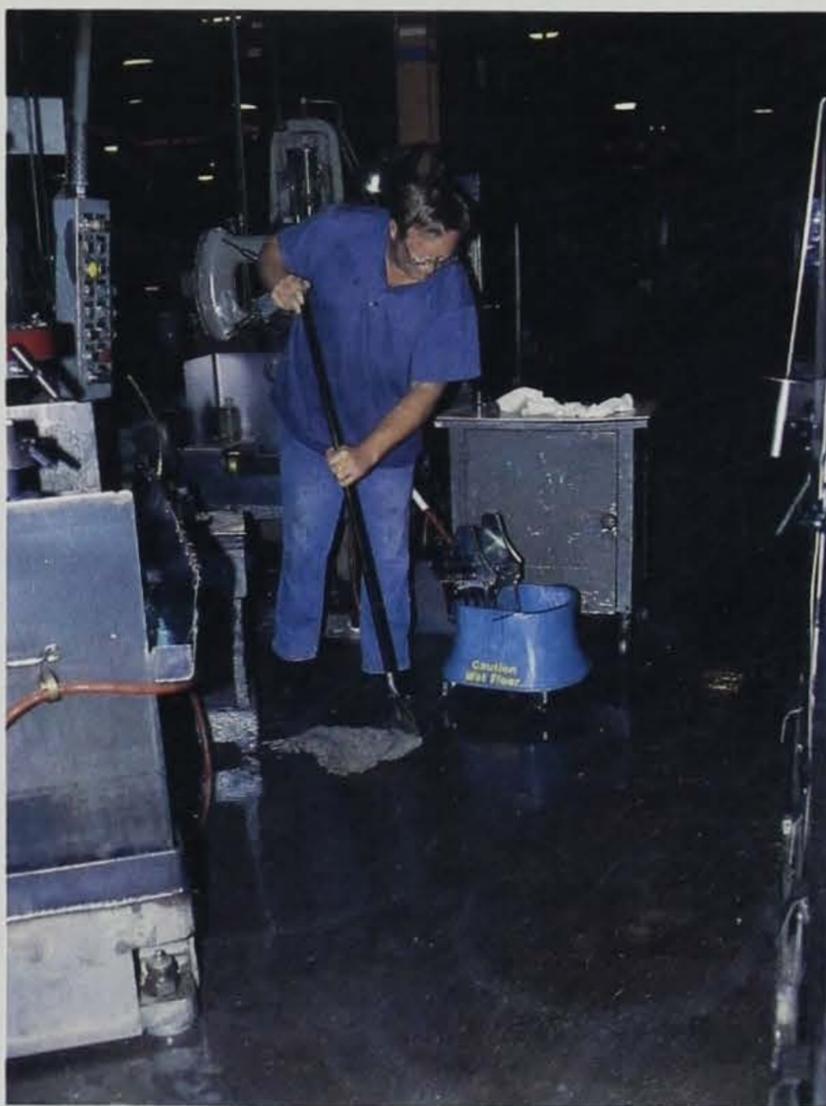
it up with a mop and bucket. The mop water is treated; the oil is separated and recycled and the water is clean enough to go to the city sewer," said Swanson.

Parts cleaning, formerly done with solvents that evaporate, producing toxic air emissions, now involves the use of detergents in parts washers. The detergents are recovered and reused from the waste water.

All processes using water have been analyzed, enabling the plant to reduce its water consumption. Wastewater treatment has been reduced from a 24-hour a day operation to only six hours per day.

Waste oil used in machining, as well as the oil collected out of the wastewater, is now recycled instead of being processed and disposed of as a hazardous waste. The oil is treated, then blended with other fuels to make a fuel oil that can be burned for energy. "Currently, we are sending it to a processor, but we plan to buy equipment that will allow us to reuse our own oil in-house," said Swanson.

Swanson attributes the company's success to its employees. "People have really embraced what is happening. They make it work. The company has bitten off the big chunks, but the employees are constantly finding other ways for the program to grow," he said.



To eliminate the yearly 235,000 tons of absorbent "floor dry,"

Fisher Controls employees now mop up leaked oil. The oil is separated from the water and recycled, blended with fuel oil to be burned for energy.

Individual employees have suggested ideas to recycle plastic bags and to remelt and reuse molded plastic tool protectors. "Another staff member is personally taking on newspaper refuse. He found a way to use it on the loading dock as packing material," said Swanson.

Nature Center Practices What it Preaches

In July 1989 Indian Creek in Cedar Rapids went dry for the first time in history. Spurred by the landmark event, the nature center there decided to turn the renovated dairy barn it calls home into a practical exhibit of responsible resource use.

This dedication to good resource habits has won the Indian Creek Nature Center recognition as a recipient of an Iowa Energy Leadership Award.

"We thought that since we were teaching these practices, we needed to clean our own backyard," said

Indian Creek Nature Center director Rich Patterson decided the center would practice what it preached when it came to energy conservation. One of the in-house demonstrations of energy savings includes three new low-flow toilets.



Rich Patterson, director of Indian Creek, the oldest nature center in Iowa. "We're practicing what we preach as far as energy efficiency goes," he said.

In keeping with the goal to make the education center a "living" example of effective resource use, its newest project is the addition of efficient lighting to its already long list of energy-saving appliances. Working hand in hand with the locally owned Crescent Electric Co., the center has been entirely converted from traditional incandescent lighting to more efficient compact fluorescent and halogen lighting.

Visitors can read tags hanging from the fixtures to gain information about the bulbs and how much energy and money they save in comparison to a normal bulb.

The center keeps close track of its electric bills and faithfully records in kilowatt hours its rate of consumption — a rate that continues to drop as energy-smart appliances are added.

Not long after the creek dried up, the nature center

staff installed three low-flow toilets to replace the previous six-gallon-per-flush toilets. The new toilets use only one and one-half gallons of water per flush. The cooperative project was instituted between the maker of the toilets, the Kohler Co. and, the Cedar Rapids Water Department and Valenta Plumbing of Cedar Rapids.

"Kohler liked the idea of putting the toilets in a public building and actually allowing people to try the toilets," said Patterson.

Rest room users are provided with "in stall" information including the fact that Cedar Rapids residents flush toilets an average of 770 thousand times a day, an activity that requires 4.6 million gallons of water. Patterson contends that only a third as much water would be needed if all inefficient units were replaced with low-flow units, therefore eliminating a need for the city to drill new wells.

Indian Creek's next plan of attack is to publish a booklet funded by a grant from Iowa Electric on the potential of efficient lighting . . . in between picking up awards for energy excellence, that is.

The Indian Creek Nature Center is a private, non-profit venture. Located at 6665 Otis Road S.E., it is open from 9 a.m. to 4 p.m. Saturdays, and from 1 to 4 p.m. Sundays.

State Institution Reforms Energy Use

How do you keep energy, water and waste management costs down in a 120-year old institution that houses more than 1,300 residents? That's the assignment that the staff of the Iowa State Men's Reformatory, located in Anamosa,



IOWA COMPANY IS NATIONAL ENERGY INNOVATOR

A Sioux City company has won a National Award for Energy Innovation in a program sponsored by the U.S. Department of Energy. Lite-Form, Inc., was honored at a ceremony in Washington, D.C., on October 10.

Lite-Form has developed and patented a lightweight concrete wall forming system that builds in energy efficiency. According to Pat Boeshart, the inventor of the system, "Concrete blocks and conventional concrete form work have been around for many years with little significant change in application or method. Lite-Form radically changed conventional construction by incorporating insulation and energy efficiency along with increased worker productivity."

The system works by using insulation materials — an extruded polystyrene with high insulation value — as the forms into which concrete is poured to construct the foundation wall. Once the form is filled with concrete, any interior or exterior finish can be applied, including dry wall, paneling, plaster or stucco, making the system applicable to residential or commercial buildings.

According to Boeshart, the system is easy to learn and work with. "A large addition to a church in Paynesville, Minnesota, was constructed in March 1990 over a weekend by a group of volunteers. Other than one inspection by our technical support person, the volunteers successfully assembled and poured the structure by themselves," he said.

Lite-Form was one of 51 projects chosen from those submitted by states and U.S. territories for a national award. Three other projects were chosen as State of Iowa winners in the program. They are the Amana Society for a study of growing silver maple trees for energy; the Center for Amorphous Semiconductors at Iowa State University for a study on flexible solar film; and the Department of Natural Resources for its Integrated Program for Energy Conservation and Environmental Protection.

has tackled with enthusiasm and ingenuity. And the effort has paid off with energy and cost savings, and now, an Iowa Energy Leadership Award.

In addition to installing energy-saving measures, the reformatory staff has taken on recycling, water conservation, composting and a project to convert waste products, such as sawdust, to energy.

The largest prison in Iowa, with a continually growing inmate population, the reformatory started in 1987 to manage the rising cost of energy. Through a state financing program, the institution replaced lighting and added insulation and a computerized energy management system to control energy use in its 25 buildings.

The staff didn't stop there, however. According to Warden John Thalacker, "It would be easy for reformatory employees to stay with the status quo. But they have continued to seek new ways to be good stewards of our natural resources."

With landfill space at a premium, the staff is now reducing waste through recycling. Since January 1989, the amount of waste going to the landfill has been cut by 50 percent. "We're recycling everything that has a market," said Glen Hansel, the reformatory's power plant supervisor.

All the waste is sorted by inmates into products that can be sold, including several types of paper, four grades of plastic, tin cans and steel. With milk jugs running at \$180 per ton and computer paper selling for \$110 per ton, the sorting is worthwhile financially.

Trips to the landfill have been cut from five per week to two. Adding up the savings from fewer trips

and lower landfill fees and the gains from selling recyclable products, Hansel estimates that the institution is netting more than \$1,000 per month.

Some of the institution's waste that can't be recycled is going to pay a dividend come harvest next year. Organic waste, primarily leaves, grass clippings and garden waste, is being composted in a large pile. The compost will be used as fertilizer, replacing commercial fertilizers, on some of the 1,700 acres the institution farms.

Water conservation is another priority with the reformatory staff. Until recently the power plant, when generating electricity, was using up to 60,000 gallons of water per day for cooling the power equipment. The water was drained directly to the storm sewer. Now, with some equipment donated by the University of Iowa and a little tinkering, the cooling water is being reused several times before being released.

Savings of more than two million gallons of water per month is the result. This not only saves the costs associated with pumping and treating water, but it conserves the water supply. "You can't put a price on water," Hansel points out. "You either have it or you don't."

The reformatory staff hasn't stopped thinking up new ways to save energy and the environment. Projects to burn unrecyclable paper to heat water and to convert a boiler to biomass fuels may be next on the agenda. According to Hansel, "We could replace the natural gas and oil we now use with wood waste, sawdust, corn cobs, oat hulls — up to 17 different fuels."



The Twelve *Months* of Christmas



Use the form and envelope at the left to order holiday gift subscriptions to the *Iowa Conservationist* for your family and friends. Each gift subscription recipient will receive a gift card acknowledging your thoughtfulness, 12 beautiful issues of the magazine each year, as well as the 1991 *Iowa Conservationist* calendar, while supplies last.

Help Rebuild Our Forest Resource

Twenty Percent Down - Remainder To Be Paid By March 1, 1991
For Orders More Than \$500

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
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DNR 1991
ORDER FORM

2. Address
(Please Print)

(Landowner Name - Please Print)

(Mail Address)

(City) (State) (Zip)

(Area Code) (Phone Number)

3. Check One Box

- I will pick up my order at the nursery when notified.
- Delivery to a drop-off point by refrigerated state truck. List county where seedlings are to be delivered.

County

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
4. Where did you obtain this order form?
1. _____ District Forester
 2. _____ Picked up or mailed from the Nursery
 3. _____ County Conservation Board
 4. _____ Other DNR Personnel
 5. _____ Conservationist Magazine
 6. _____ SCS, or ASCS office
 7. _____ County Extension Office
 8. _____ Pheasants Forever
 9. _____ Izaak Walton League
 10. _____ Other _____

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.



HAPPY HOLIDAYS

This holiday season give a gift of Iowa's outdoors. Order a gift* subscription to the

Iowa CONSERVATIONIST

\$6 for one year
(12 issues)

\$12 for three years
(36 issues)

*Each magazine recipient will be sent a beautiful, full-color 1991 *Iowa Conservationist Calendar* (December 1990 issue) and a gift card notifying them of your thoughtfulness.

Additional calendars may be ordered for \$3 each.

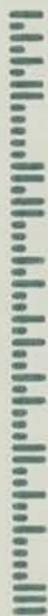


THE Twelve *Months* Christmas

Use the form and enter the name of the recipient of the *Iowa Conservationist*. The recipient will receive 12 beautiful Christmas cards as well as a

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Twenty Percent Down - Remainder To Be Paid By March 1, 1991
For Orders More Than \$500

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	\$30.00	96		
Songbird Packet	\$15.00	95		

Species	Height	Cost/Hundred	Code	Number of Plants	Office Use Only
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(Do not order less than 500 plants and order in units of 100)

White Pine	8-14"	12.50	30		
Scotch Pine	8-14"	12.50	20		
Red Pine	8-14"	12.50	17		
Ponderosa Pine	6-12"	12.50	15		
Jack Pine	8-14"	12.50	10		
Red Cedar	6-14"	12.50	16		
Norway Spruce	8-14"	12.50	13		
White Spruce	8-14"	12.50	43		
Black Walnut	10-18"	18.00	24		
Black Walnut (top pruned)	10-18"	18.00	44		
Green Ash	8-18"	18.00	08		
White Ash	8-18"	18.00	28		
Silver Maple	8-18"	18.00	21		
Red Oak	8-14"	18.00	41		
Mixed Oak	6-14"	18.00	51		
Cottonwood	8"	18.00	83		
Hybrid Poplar (rooted cutting)	8"	18.00	53		
Russian Olive	8-16"	18.00	19		
Autumn Olive (Cardinal strain)	6-14"	18.00	03		
Tatarian Honeysuckle	8-16"	18.00	23		
Amur Honeysuckle	8-16"	18.00	01		
Redosier Dogwood	8-18"	18.00	18		
Gray Dogwood	6-12"	18.00	07		
Common Lilac	6-12"	18.00	47		
Chokecherry	8-16"	18.00	39		
Wild Plum	10-18"	18.00	31		
Osage Orange	8-18"	18.00	14		
Ninebark	6-14"	18.00	12		
Siberian Crab	6-12"	18.00	46		
Nanking Cherry	8-16"	18.00	79		
Highbush Cranberry	6-12"	18.00	80		

DNR 1991
ORDER FORM

2. Address
(Please Print)

(Landowner Name - Please Print)

(Mail Address)

(City) (State) (Zip)

(Area Code) (Phone Number)

3. Check One Box

- I will pick up my order at the nursery when notified.
- Delivery to a drop-off point by refrigerated state truck. List county where seedlings are to be delivered.

County

4. Please Answer Each Question

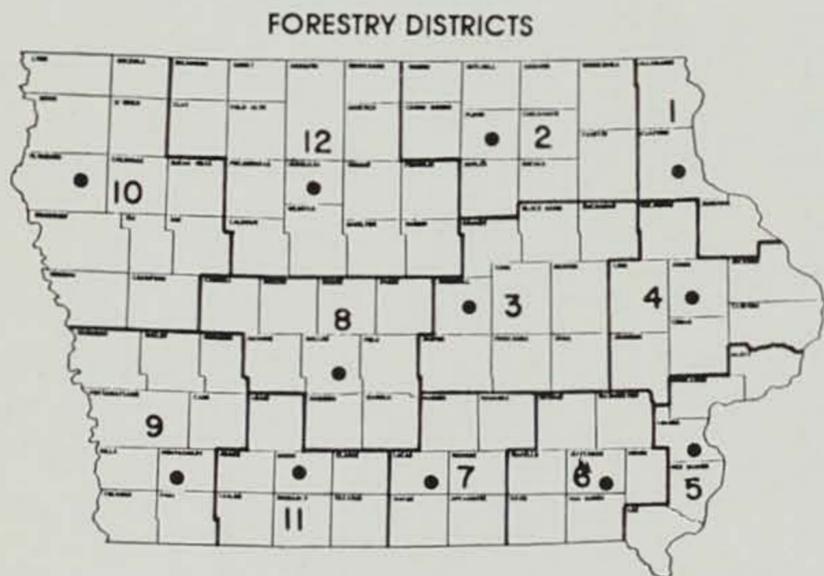
- These trees are to be planted in _____ County.
- Are you a tax-exempt government? Yes No
- Did you purchase plants from the Nursery last year? Yes No
- Where did you obtain this order form?
 - ____ District Forester
 - ____ Picked up or mailed from the Nursery
 - ____ County Conservation Board
 - ____ Other DNR Personnel
 - ____ Conservationist Magazine
 - ____ SCS, or ASCS office
 - ____ County Extension Office
 - ____ Pheasants Forever
 - ____ Izaak Walton League
 - ____ Other _____

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TO HELP YOU ORDER

- Phone Orders** For your convenience use our phone order system to order your plants. Just call the State Forest Nursery at 515/233-1161 to place your order.
- Payment** For orders more than \$500, the nursery will bill you for 20 percent of the cost with the remainder to be paid by March 1, 1991. **DO NOT** send money with your order.
- Spring Delivery** Spring orders are usually sent out during the month of April. Plants will be shipped via a state refrigerated truck to a drop-off point in each county.
- Claims** Claims for any cause must be made within 10 days after receipt of plants. We give no warranty expressed or implied as to the productiveness or life of the material, and will not be in any way responsible for results or economic losses incurred or claimed by the customer.
- Restrictions** The nursery stock must be planted and used for establishing or improving existing forest, erosion control, game or water conservation. These restrictions apply: These plants cannot be resold or given away with roots attached, to any person, firm, corporation or agency or planted for new windbreak, shade or ornamental purposes. All plantings must be protected from fire and domestic livestock grazing. All trees planted or used in violation of the above restrictions are subject to forfeit for destruction.
- Refunds** No refunds after March 1.

DISTRICT FORESTER ADDRESSES



- | | | |
|----------------------------|-----------------------------|----------------|
| 1. Elkader | Box 662, 52043 | (319) 245-1891 |
| 2. Charles City | Box 4, 50616 | (515) 228-6611 |
| 3. Marshalltown | Box 681, 50158 | (515) 752-3352 |
| 4. Anamosa | Box 46, 52205 | (319) 462-2768 |
| 5. Wapello | 515 Townsend Ave., 52653 | (319) 523-8319 |
| 6. Fairfield | Box 568, 52556 | (515) 472-2370 |
| 7. Chariton | Box 310, Route 2, 50049 | (515) 774-4918 |
| 8. Adel | 110 So. 8th, 50003 | (515) 993-4133 |
| 9. Red Oak | Box 152, 51566 | (712) 623-4252 |
| 10. Le Mars | 1100A 12th St., S.W., 51031 | (712) 546-5161 |
| 11. Creston | 500 E. Taylor, 50801 | (515) 782-6761 |
| 12. Humboldt | 102 8th St., S., 50548 | (515) 332-2761 |
| State Forest Nursery | | (515) 233-1161 |

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WARDEN'S DIARY

A Day On The Ice by Chuck Humeston

Now just because it's getting a little bit cooler outside doesn't mean it's time to hibernate. Have you ever considered ice fishing?

You mean walk out on a frozen lake? Yes.

Drill a hole through two feet of ice? Yes.

Sit out there with the wind in my face? No, put your back to the wind.

Even a harmless activity like this provides a wealth of adventure for the conservation officer. For one, consider just going out to check on the anglers. The ice on the lakes in the Iowa Great Lakes Region does funny things. Where ice once existed one day, can be open water the next. You have to be careful. Just ask one of my former colleagues who walked on Spirit Lake to find one of the new thin spots. Luckily, he bounced back to the top after he fell through.

Now out on these lakes, little cities spring up complete with traffic lanes and parking spaces. We usually go out to check for violations such as locking the ice shack while it's being used, licenses, limits and use of too many fishing lines.

I pulled open a door one afternoon to find the angler sitting there with eight lines (you can only have two). I began talking to his nearby friends who were supposed to be owners of the other six lines. Suddenly these friends have never heard of this guy in the shack. Funny how you find out who your friends are in such a situation.

Gary Owen, fellow conservation officer, and I were on West Okoboji. It was New Year's Day. People were fishing everywhere. I walked up to a shack, pulled open the door, and the poor guy who had been propped against the door



fell out on the ice in front of my feet, complete with beer cans. He looked up and smiled this, "Happy-New-Years" smile at me. His friends dragged him away.

The wind cranked up (as it always does up there), and we were close to calling it a day. We each decided to check one more shack. I walked up to one and pulled on the door. It was locked. I pulled again. I knocked on the door. I could hear the running of feet inside. I pulled again. I yelled at Gary to come help me. I put both feet on the shack, gave a heave ho, the door came open sending me sailing backwards down the ice. Skipping and sliding back to the doorway I noticed smoke billowing out of the shack. A fire? I sniffed the smoke. Hmmmm, peculiar smelling fire. Inside was a group of persons discovering that leafy substances do not flush down an ice fishing hole as easily as a commode. The stuff simply floats. Gary and I looked at each other . . . the day was going to be a bit longer.

Yes, it is never dull. Checking a shack another day, one of my fellow officers pulled open the door. He just stood there and stared, wide-eyed. "What's wrong?" I asked.

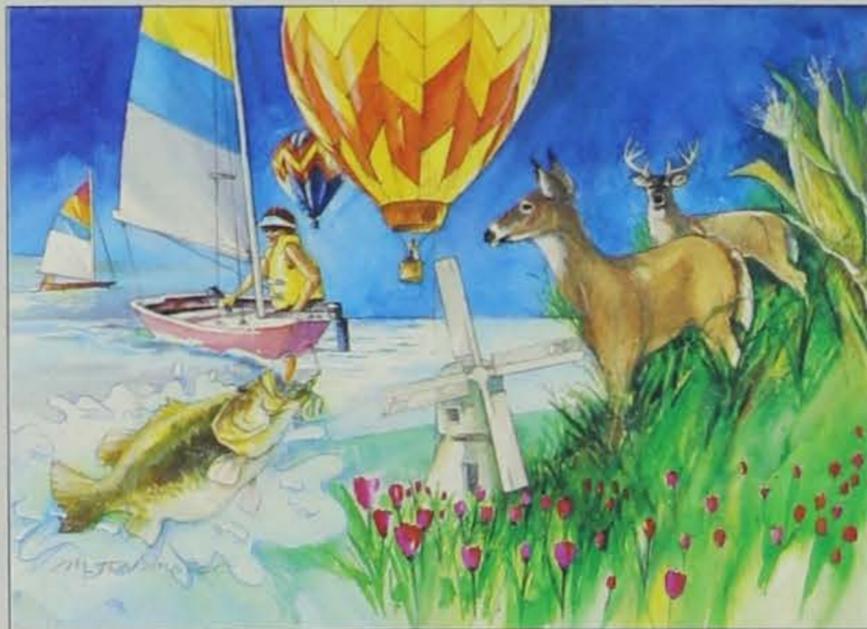
He learned the hard way that a shack is not always what it seems . . .

Checking a shack another day, one of my fellow officers pulled open the door. He just stood there and stared, wide-eyed.

CONSERVATION UPDATE

State Credit Card Means Money In the Bank for REAP

Iowans concerned about preserving the state's natural resources can now play an active role in ensuring they will be here tomorrow by using the *Iowa Tomorrow Visa Card*.



Pictured above is the art to be used for the Iowa Tomorrow Card. One-half of one percent of credit charges will go into the Resource Enhancement and Protection account.

"The *Iowa Tomorrow Card* is yet another option for credit card users, especially for those who would like to see part of the usual charges on their credit card go towards maintaining Iowa's natural and scenic attractions," said Michael Fitzgerald, state treasurer.

Applications for the state-sponsored credit card are now available to anyone who qualifies for a credit card. Every time a purchase is made with the *Iowa Tomorrow Card*, a percentage goes to the Resource Enhancement and Protection (REAP) account.

One-half of one

percent of credit charges will go into the REAP account. Revenues will support work in such areas as conservation education, water protection programs, reforestation efforts, wildlife habitat protection, roadside vegetation development and preservation of historical resources.

Besides helping protect Iowa's natural resources, the *Iowa Tomorrow Card* offers a 16.9 percent interest rate, a \$15 annual fee (\$3 of which goes directly into the REAP account), a 25-day grace period and no fees for late payments. (Interest will continue to accrue on late payments at the 16.9 percentage rate.)

The *Iowa Tomorrow Card* functions like other Visa cards, including worldwide acceptance at more than seven million locations and quick cash access at member offices and automatic teller machines (ATMs).

The *Iowa Tomorrow Card* was a result of legislation passed in 1989 which authorized the State to sponsor a credit card. The Credit Card Center of Davenport Bank and Trust was chosen to administer the program.

For more information or for an application, write the Credit Card Center, P.O. Box 4535, Davenport, Iowa 52808-4535.

Governors Call For Action To Global Climate Changes

The National Governor's Association has proposed seven national goals to address the global climate change issue.

The task force recommended seven specific goals for the nation to adopt now and pursue through the 1990s:

- develop an international agreement to protect the atmosphere;
- use cost-effective energy conservation and efficiency measures to stabilize U.S. emissions of carbon dioxide;
- stop production of and recycle chlorofluorocarbons and use cost-effective strategies to stabilize or reduce other greenhouse gases;
- develop and commercialize alternative energy systems, including clean fossil, renewable energy sources and safe nuclear power;
- implement forestry programs to reduce the effects of global climate change;
- plan and act now to adapt to a changing climate;
- pursue an aggressive research program to reduce key uncertainties about global climate change.

"The central issue

facing policymakers is whether enough is known about global climate change to warrant taking action now to reduce it," said Illinois Governor James R. Thompson. "Considering all the evidence and the risks of both overreaction and underreaction, we have concluded that we should take some prudent steps now, even in the face of scientific uncertainty." He pointed out that many of the recommendations, such as improving energy efficiency, benefit consumers and the economy by reducing energy bills.

Copies of the task force report are available for \$15 each from NGA Publications, 444 N. Capitol St., Suite 250, Washington, DC 20001.

Gallup Poll: Animal Rights Activists Lack Public Support

A recent Gallup poll commissioned by the National Shooting Sports Foundation reveals a notable lack of public support for the goals and actions of animal rights activists. A majority of the people surveyed -- 89 percent -- disagrees with animal rights groups and their activities, the Wildlife Management Institute reports.

When asked "Which of the following

best describes your attitude about animal rights activists," 46 percent of the respondents indicated they thought animal rightists were well-meaning but disagreed with their positions when they placed concern about animals over people's rights. Another 43 percent thought the groups were well-meaning but their positions too extreme. Only seven percent agreed with what the groups are trying to accomplish and approved of how they were going about it.

The poll was based on 1,000 random telephone surveys with individuals 18 and older across the U.S. The maximum expected error range on a sample of this size is plus or minus one percent.

Perhaps the best-known goal of animal rights groups -- a total ban on medical research involving animals -- was opposed by 63 percent of the surveyed respondents, while only 35 percent supported the goal.

Efforts by animal rightists to stop all forms of hunting have even less public support, the poll showed. Only 21 percent of those surveyed supported the antihunting program while nearly 77 percent opposed it.

When asked their opinion of the rightists' strategy of entering the woods during the hunting season to harass hunters and

scare wildlife to disrupt the hunt, 90 percent of those surveyed said they opposed this activity and only nine percent said they supported it.

"We commissioned this study because of our serious concern over the hunter harassment activities of these groups," said Robert T. Delfay, executive director of NSSF.

"Some of these people would follow hunters into the woods with blaring radios and carry on in such a way that a hunter had little choice but to leave the woods and go home. We were bothered by this ironic abuse of human rights in the name of animal rights and wanted to see if the American public shared our concern."

Only the animal rightists' goal of regulating treatment of farm animals, which are sometimes raised in confining areas, received support from the majority of those surveyed, with 60 percent supporting this objective.

"While a majority of those surveyed did indicate some level of respect for the motives of the animal rights activists, the vast majority clearly do not agree with what these groups are trying to accomplish or how they are going about it," Delfay added.

--Wildlife Management Institute

DNR Publications

New and recently revised publications of the Iowa Department of Natural Resources are listed below. These publications are free unless otherwise noted (\$). We reserve the right to limit quantities. To request copies, write the Iowa Department of Natural Resources, Wallace State Office Building, Des Moines, Iowa 50319-0034.

County Conservation Park Area Directory (Revised; 40-page booklet containing information on 1,284 county conservation board areas. Free from the DNR while supplies last. After supplies are depleted, the directory will be available for \$1.25 each (or 50 cents each with minimum 25 copies ordered) from the Iowa Association of County Conservation Boards, Box 77, Elkhart Iowa 50073.)

Iowa Public Hunting Areas (Revised; 24-page booklet on public hunting areas in Iowa.)

1990 Hunting Season Card (New; wallet-size card on Iowa's hunting and waterfowl seasons and bag limits.)

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:

-- Dec. 6, Des Moines
-- Jan. 3, 1991, Des Moines

Environmental Protection Commission:

-- Nov. 19-20, Des Moines
-- Dec. 17-18, Des Moines
-- Jan. 22-23, Des Moines

State Preserves Advisory Board:

-- Dec. 11, Des Moines

You Too Can Avoid the Draft

It's cold outside. You had all kinds of projects planned for last summer to conserve energy in your home but you just didn't get them done. Is it too late to do something about your high heating bills? Although some projects may be difficult to complete now, there are still plenty of energy-saving opportunities waiting for your attention.

A place to start is your source of heat -- the furnace. When was the last time you changed your filter? It should be changed every one to two months during the winter. Do you turn your thermostat down at night or when you're out of the house? Turning it down from 70 to 60 degrees at night can save 10 percent on your heating bill. An automatic setback thermostat can be installed to control the heat for you.

Water heaters use a lot of energy, usually more than what's needed. There are two ways to cut water heating costs: cut consumption and cut standby losses. You can cut your consumption by repairing leaky faucets, washing only full loads of laundry and dishes, washing clothes in warm or cold water instead of hot and always rinsing in cold water, and installing low-flow showerheads. You can cut standby losses by installing an insulation blanket on your water heater and



One way to help keep energy costs down this winter is to insulate around windows.

reducing the temperature to 110-120 degrees.

Windows are notorious for drafts. Apply clear caulk around the woodwork on the inside where the woodwork meets the wall and below the sill. You can also install clear plastic on the inside of the window. The type you stretch tight with a hair dryer works best.

Most people think the majority of drafts come through windows and doors, but in actuality these drafts account for only 10 to 20 percent of the average home's air leakage. The other 80 to 90 percent enter through cracks in the shell of the house and holes from the heated space into the attic. Most cracks are not very big, but when added together they could create a hole big enough to throw a case of caulk through.

The biggest sources of air leakage in a home are the rim joists area (where the floor sits on

the foundation) and holes between the living space and the attic. It may be too cold to caulk the holes in the attic, but plan to do it in the spring. You should be able to seal the joint around the top of the foundation in the basement.

Other areas of overlooked air leakage include electric outlets and switches -- both exterior and interior. Outlets and switches in interior walls leak heated air up into the unheated attic. Installing foam gaskets behind the cover plates is one inexpensive solution to this problem. To further reduce air infiltration, place plastic safety plugs backed with gasket punch-outs in outlets not being used.

And you thought you had the winter to relax! Don't worry -- these simple measures won't take much time, and you'll have a warmer, more comfortable and energy-efficient home.

All-Time Top 10 Racks

See page 28 for the 1990 Record Deer Racks.

SHOTGUN TYPICAL

Name	City	Year	County Taken	Total Score
H. 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
*Michael R. Edle	Danville	1989	Des Moines	195-4/8
George L. Ross	Ottumwa	1969	Wapello	195-1/8
*Forest N. Richardson	New Virginia	1989	Warren	194-3/8
Bob Jackson	Des Moines	1983	Madison	191
Monty Stark	Mt. Pleasant	1984	Henry	189-3/8
Gregg Redlin	Iowa City	1983	Johnson	187-6/8
Dennis Vaudt	Storm Lake	1974	Cherokee	187-5/8

SHOTGUN NONTYPICAL

Name	City	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
*Carl Wenke	Cedar Rapids	1972	Lee	245
Wendell Prott				
Edgar Shields	Grand River	1986	Decatur	229-6/8
Bob Harding	Pleasantville	1985	Wapello	229-3/8
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

BOW AND ARROW TYPICAL

Name	City	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
*Kevin Peterson	Mediapolis	1989	Des Moines	188
*Bill Mitchell	New Albin	1989	Allamakee	184
Robert McDowell	Ottumwa	1985	Wapello	183-4/8
Vern Backstrom	Des Moines	1986	Polk	180-1/8
Glen Thompson	W. Burlington	1987	Des Moines	177-5/8
Ernie Aronson	Davenport	1985		177-1/8
Gary Wilson	Cherokee	1974	Cherokee	175-4/8

BOW AND ARROW NONTYPICAL

Name	City	Year	County Taken	Total Score
Jerry Monson	Clear Lake	1977	Cerro Gordo	220-7/8
David Propst	Duncombe	1987	Webster	219-3/8
Blaine Salzkorn	Sutherland	1970	Clay	218-1/8
Chris Hackney	Alberton	1983	Wayne	211-6/8
Joe Rettenmeier	Dubuque	1987	Dubuque	204-1/8
Phillip M. Collier	Burlington	1978	Des Moines	203-6/8
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

*New Top 10 Entry

Classroom Corner

by Robert P. Rye

The animals you find in the water now are looking for food to survive the winter. Many of the issues of the day (hazardous chemicals, habitat loss, solid waste) affect these animals. You can gain a better understanding of what is going on by looking for who is living in the stream. The animals can be grouped by how they feed.

Shredders -- eat the softer plant materials leaving the skeleton.

Collectors -- feed on fine materials in the streams (filtering or crawling along bottom or burrowing -- gathering collectors).

Scrapers -- remove simple plants from rocks and logs.

Predators -- feed on insects and other invertebrates

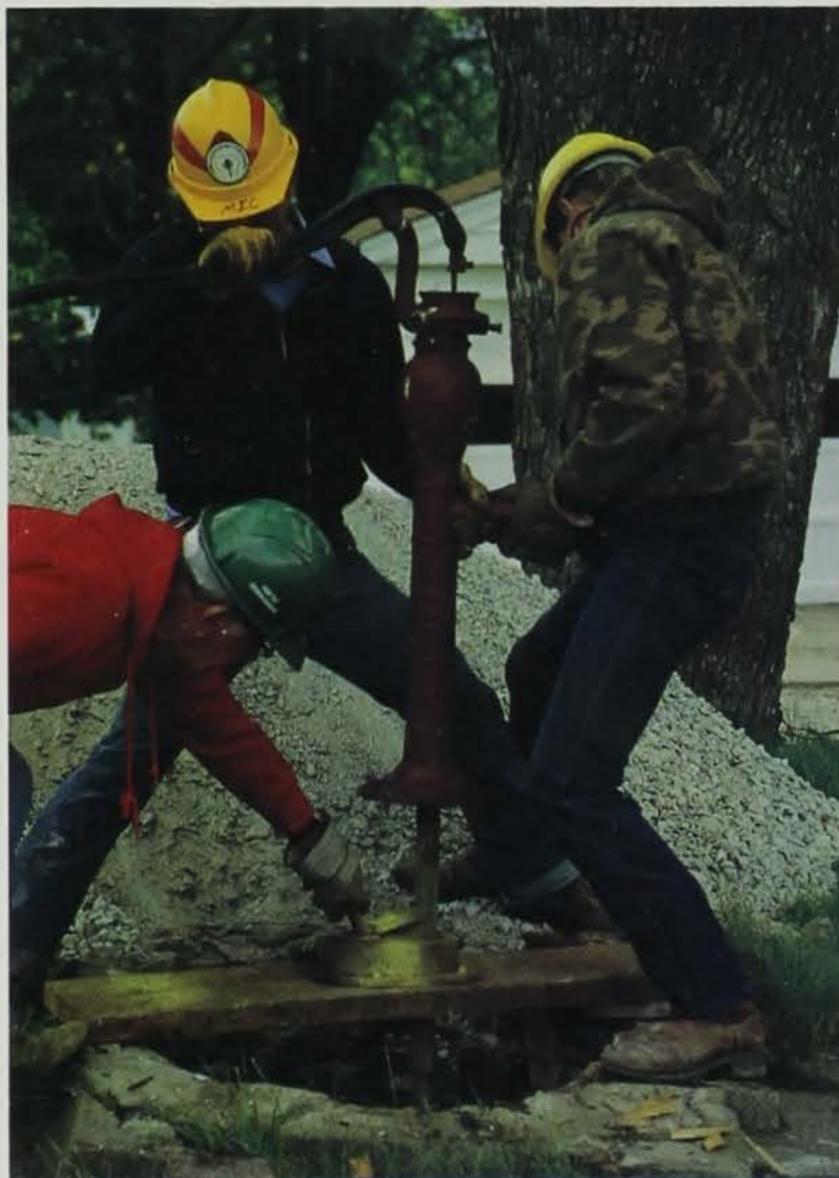
I will give you the answers, and you are to go to the stream and collect the animals and find which group they belong to.

Characteristic	Feeding Type	Name
Builds a case to live in ● case made of material that was once living (wood or leaves) ● case made of rocks or sand grains	Shredder Scrapper	Caddisfly
Has two tails and no feather gills on abdomen ● dark and uniformly colored ● large and brightly colored	Shredder Predator	Stonefly
Has three tails and no feather gills on abdomen ● flat and egg-shaped ● cigar-shaped and round	Scrapper Collector	Mayfly
Worm-like ● cigar-shaped and round ● large and in leaf litter ● other worm-like insects	Collector Shredder Filter feeder	Cranefly, Blackfly or Midge

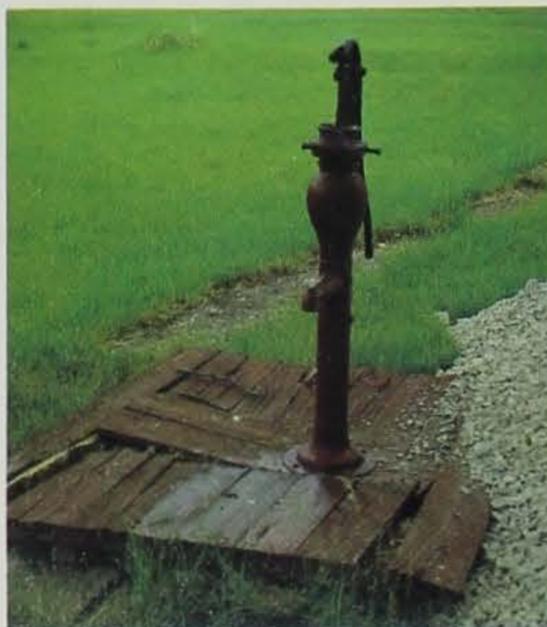
Local Groundwater Crew Plugging Away

Article and photos by John Klein

▼▼▼
Individuals with the Iowa Conservation Corps were hired to fill abandoned wells for Clarke County residents. Here, the crew pulls the pump into a pump jack to remove the pipe. All of the pipe must be removed before filling.



▼▼▼
Many wells are unused and dilapidated, such as this well in residential Osceola. The pile of gravel at the side will be used to fill the lower portion of the well.



The Clarke County Conservation Board first became concerned about the quality and quantity of the county's groundwater when wells in the south-central Iowa county dried up during the droughts of 1988 and 1989. The rains of 1990 replenished the water table, but the drought demonstrated that people have taken their groundwater for granted for too long.

The quantity of groundwater depends on the cycles of nature, but in order to help ensure the quality of local groundwater supplies, the Clarke County Conservation Board developed a unique program. As part of an employment-training program known as the Iowa Conservation Corps, the Clarke County Conservation Board hired three individuals to fill abandoned wells for Clarke County residents. In May 1990, the well-plugging crew began to seal abandoned wells to prevent surface contamination of groundwater.

Landowners were notified about the program through the local radio and newspaper and through the county extension office. Once contacted by an interested landowner, the crew measured each well and estimated the cost to close the well.

Landowners decided whether or not to plug the well, taking into consideration a number of factors. Landowners decided if their wells would be used in the future and what their risks were for groundwater pollution. Other issues of concern included safety hazards, liability and effect of the wells on the future sale of the property.

Many landowners agreed to participate in the well-filling program because new laws require abandoned wells be filled by 1993.



Water is pumped out with a submersible pump prior to filling (left). A portable generator provides electricity.

After the water is removed, the gravel is used to fill the well with two plugs of bentonite clay to prevent future contamination from the surface (below).

A recently enacted law also requires wells to be reported on real estate transfer forms.

Landowners paid for the materials to fill the well, and the Clarke County Conservation Board charged a standard fee of \$25 per well for the labor to plug the wells. Wells were filled with clean one-inch limestone gravel, plus bentonite clay to serve as watertight seals to prevent surface water contamination in the future. Costs varied greatly depending on the diameter and depth of the well, but most landowners paid less than \$100, including the labor fee.

To plug the wells, the crew first removed old pipes from the well, pumped out the water, filled the well to the water table level with gravel and placed the first bentonite clay seal. The crew filled the well again with gravel to a level four feet below the surface, placed the second clay seal, removed all surface well casings and spread dirt over the top. The crew also provided landowners with reporting forms from the Iowa Department of Natural Resources.

Some rural residents were reluctant to fill wells they might someday use as a water source. The Clarke County Conservation Board encouraged these landown-



ers to cap their wells with a concrete top which could be removed if the well is needed in the future.

As the program progressed, the crew was surprised to discover many wells in urban areas. Prior to 1939, the City of Osceola in Clarke County did not have a reliable public water supply, so many households within the city limits had backyard wells. These wells not only posed safety hazards, but they also threatened the groundwater. In some places, abandoned wells were used as hidden places to dispose of trash, household chemicals, used motor oil and other contaminants that could easily seep

down into the groundwater.

In Clarke County, such practices are fading. The Clarke County Conservation Board well plugging crew of 1990 offered a solution for landowners concerned about abandoned wells and groundwater supplies. It also motivated Clarke County residents to take their water resources seriously. Many people in Clarke County no longer take the quality and quantity of their groundwater for granted.

John Klein is the director of the Clarke County Conservation Board.

Playing the Numbers Game

No one knows the exact number of deer in Iowa. So, biologists must consistently play the numbers game in order to properly manage Iowa's deer herd. How do they do it?

by Willie J. Suchy

Although it would be extremely useful to know how many deer there are in Iowa, I doubt that we ever will. Whitetail deer, because of their secretive nature, are almost impossible to count with any accuracy. And even if they could be counted it would be a logistic nightmare to organize such a task, much less pay for it. Does this mean we really cannot do a good job of managing the deer herd? Well, I don't think so. What it does mean is that we must be much more creative in using what information we do have if we hope to do a good job.

What information do we have? Well, first we have three population surveys that provide us with an index to changes in deer numbers. These surveys consist of an aerial count conducted each winter, a spotlight survey conducted in April, and a record of the number of deer reported killed on our highways each year. Second, we have harvest estimates. These are based on returns from hunter report cards sent to a random sample of hunters every year. Hunters are asked to report if they were successful or not, and if they were, the county in which the deer was killed and whether it was a buck or doe. Lastly, we have information collected from past and ongoing deer biology research. This includes information on productivity, movements and mortality.

Since we've already stated that we can't accurately count deer, how can these surveys provide us with useful information? They can be useful if we think of them as providing us with an index to deer numbers. For example, although we don't know what proportion of the deer population is killed on the highways each year, we would expect more deer to be killed if deer populations are up, and less when populations are down. Thus, changes in the number of deer killed should reflect changes in the deer population. This is what we mean when we refer to these surveys as indexes.

The number of deer killed on the highways

appears to be a fairly good index to deer populations, especially when we take into account the change in the volume of traffic. The results are the number of deer killed per billion vehicle miles driven (figure 1). As you can see, these numbers have increased steadily over the last 15 years. This number declined by about six percent between 1988 and 1989. One problem with the traffic kill as an index is that it assumes the proportion of deer killed and reported remains the same each year. We have no way to tell if this is true or not.

The average number of deer seen per route on the spotlight survey has also increased over the last several years. About 80 routes are spread throughout the state. Each one is 25 miles long. The mean number of deer sighted increased by 34 percent between 1988 and 1989 and then declined by 19 percent between 1989 and 1990. This variability is probably largely due to the differences in spring weather from year to year. These weather differences, along with the differences in when spring occurs, determines leaf-out. Excessive leaf-out can make deer harder to detect.

The aerial deer surveys are probably the most timely because they are flown immediately after the hunting seasons, weather permitting. Ideal conditions for this survey are a period of cold weather during which a fresh snowfall occurs. The cold weather tends to group the deer and a snowfall of at least two inches is needed to make the deer more visible. Unfortunately, these conditions didn't often occur during the last two winters. Last January and February were especially warm and dry. A majority of the biologists felt they had difficulty seeing deer and the deer were scattered when they flew their surveys.





"Double Trouble" by Larry Zach. Edition size 850. Image size 24"x16". Send \$85 (Iowa residents add \$3.40 sales tax) to Larry Zach, 901 SE Trilene, Ankeny, Iowa 50021. For more information or to place a Visa or MasterCard order, call (515) 964-1570.

Because of the problems that can be encountered during any one survey, we use all three surveys and hope that between them they reflect actual changes in deer numbers.

Harvest

Iowa is divided into 10 management zones. Estimates are made of the number of bucks and does killed in each zone during the shotgun season. These estimates have a five percent margin of error. The success rate for hunters that reported going afield and the percent of the harvest consisting of does are also calculated. Harvest and success rates have increased,

especially over the last five years (figure 2). This has occurred because of increased numbers of hunters, increased numbers of deer and liberal quotas allowing more hunters to shoot more does.

In 1989, harvest during the shotgun season was up slightly from 1988 (table 1). Success rates were nearly 70 percent during the first season and 60 percent during the second season. About 44 percent of the harvest during the first season consisted of does while 56 percent of the second season harvest were does.

Deer Biology

Past studies indicate the productivity of deer in

Figure 1. Statewide Road Kills

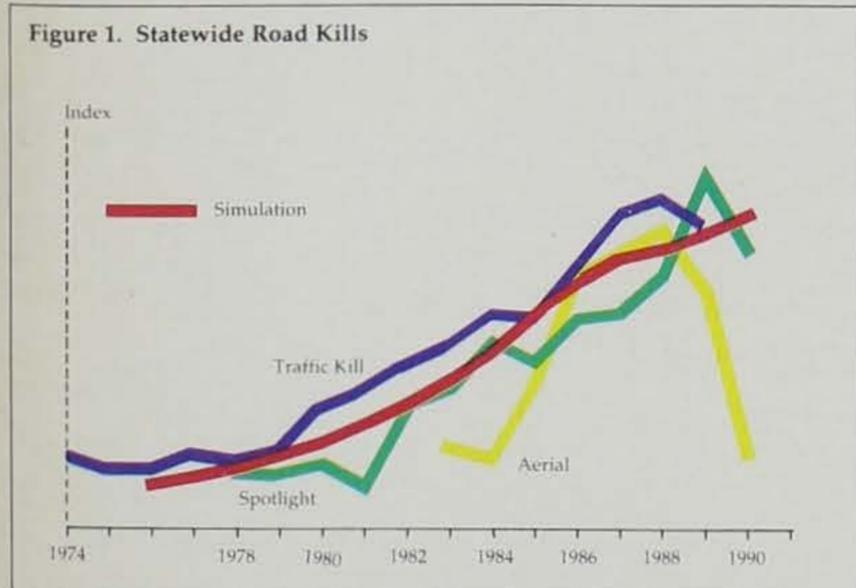


Figure 2. Statewide Harvest

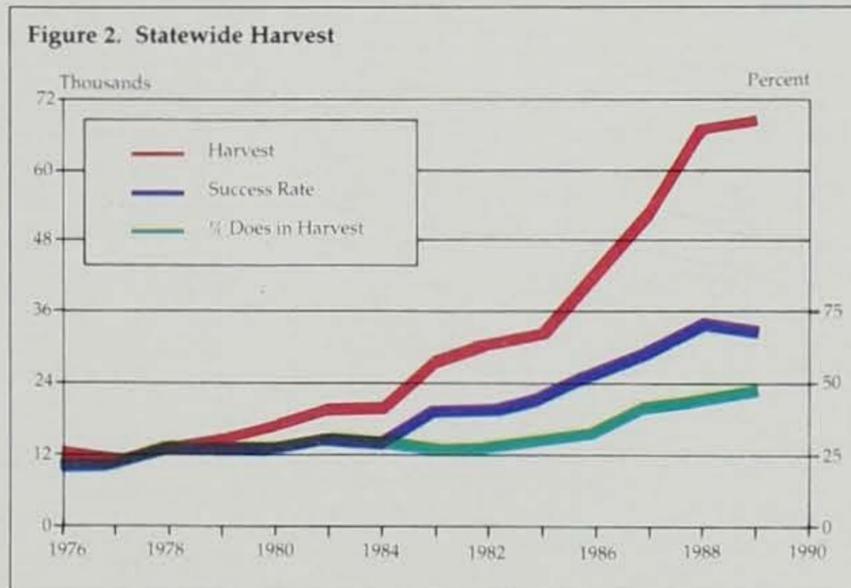


Table 1. Harvest estimates for paid gun hunters during the 1989 shotgun season.

Zone	Harvest			Percent Success Rate			Percent Doe Kill		
	First Season	Second Season	Overall	First Season	Second Season	Overall	First Season	Second Season	Overall
1	3,982	1,230	5,240	72	57	68	48	65	52
2	2,569	906	3,493	73	57	68	47	58	50
3	2,837	738	3,598	68	50	63	42	50	43
4	6,380	3,257	9,727	73	64	70	38	50	42
5	6,058	3,380	9,509	71	64	68	42	53	46
6	4,261	1,959	6,278	72	56	66	40	55	45
7	8,543	3,295	11,849	64	57	62	47	58	50
8	3,238	1,067	4,324	59	52	58	47	54	48
9	7,817	1,667	9,531	74	67	72	45	60	48
10	3,368	1,055	4,454	70	64	69	44	58	47
Statewide	49,053	18,554	68,004	69	60	66	44	56	47

1990 Record Deer Racks

Editor's Note: This is a list of deer racks scored between October 1989 and September 1990. New entries into the *All-Time Top 10 Racks* are designated by an asterisk (*). See page 23 for the listing of the *All-Time Top 10 Racks*.

SHOTGUN TYPICAL

(Minimum qualifying score -- 150 points)

NAME	CITY	YEAR	COUNTY TAKEN	TOTAL SCORE	NAME	CITY	YEAR	COUNTY TAKEN	TOTAL SCORE
*Michael R. Edle	Danville	1989	Des Moines	195-4/8	Kevin L. McDonald	Amana	1990	Iowa	164
*Forest N. Richardson	New Virginia	1989	Warren	194-3/8	Clell Howard	Sumner	1988	Fayette	163-5/8
Bill Mitchell	New Albin	1989	Allamakee	184	Mike Kuethe	Sumner	1988	Fayette	163-5/8
Richard Harmon	Le Grand	1989	Appanoose	183-7/8	Ray Boland	Harpers Ferry	1989	Allamakee	163-2/8
Richard Bassett	Osceola	1989	Clarke	182-1/8	Trent Dow	College Springs	1989	Page	163-1/8
Cecil Erickson	Cumberland	1975	Cass	174-2/8	Gloria Connick	Sioux City	1989	Woodbury	163-1/8
Greg Sinn	Wayland	1989	Henry	173-2/8	Howard Sinclair	Woodburn	1987	Warren	162-7/8
Marion Shappell	Mt. Pleasant	1970	Henry	172-7/8	Scott Woods	New Virginia	1989	Warren	162-5/8
Kevin A. Anderson	Boone	1989	Boone	172-3/8	Marty Mills	Cumberland	1984	Cass	161-7/8
Paul Hagist, Jr.	Brighton	1986	Jefferson	172-2/8	Tom Bollman	Washington	1989	Van Buren	161-5/8
John Bloomer	Columbus Jct.	1987	Louisa	172-1/8	Dave Vande Noord	Pella	1989	Marion	161-2/8
Darrell Richards	Altoona	1989	Polk	172	Lee Foster	Riceville	1986	Mitchell	161
Gerald Vogt	Dow City	1989		171-7/8	Vernon Boland	Harpers Ferry	1984	Allamakee	161
Don Hines	Bloomfield	1987	Washington	171-3/8	Dave Hinegardner	Montour	1982	Tama	160-7/8
Kermit Greenstreet	Dow City	1989	Crawford	171-2/8	Clinton Rila	Mt. Pleasant	1989	Henry	160-5/8
Jerry L. De Bolt	Glenwood	1987	Mills	170-6/8	Hugh P. Sheridan	Grinnell	1988	Appanoose	159-6/8
Mike Matthews	Mt. Pleasant	1988	Henry	170-5/8	Randy Huesmann	Stockton	1980	Muscatine	159-6/8
Oran Schreckengost	Dougherty	1960	Mitchell	170-4/8	Joyce Reed	Silver City	1989		159-6/8
Gerald Bailey	Salem	1970	Henry	170-4/8	Richard Sampson	Ottumwa	1989	Davis	159-4/8
Patrick G. Burkle	Earlville	1990	Clayton	170-2/8	David Esaias	Clarinda	1989	Page	159-2/8
Doug Ericson	Humeston	1989	Clarke	170	Brian Dustin	Albia	1989	Monroe	159
Terry Lee Snyder	Minburn	1989	Madison	170	Roger Craft	Creston	1989	Union	158-5/8
Clarence Gartman	Maquoketa		Jackson	170	Ron Long	Sac City	1986	Sac	158-3/8
Byron Mesenbrink	Moorhead	1989	Monona	168-7/8	Jeff Eggert	Wyoming	1989	Jackson	158-2/8
Tom McDowell	Mt. Pleasant	1987	Henry	168-4/8	Mike Hagen	Newhall	1989	Allamakee	158-2/8
Mark Mincks	Bloomfield	1989	Davis	168-3/8	Bob Kastler	Woolstock	1965	Wright	158-2/8
Phillip W. Johnson	Lucas	1989	Lucas	168-1/8	Gary Ehlinger	Maquoketa	1989	Maquoketa	158
Rod Crowner	West Burlington	1978	Jefferson	168	Ron Heisterkamp	Little Sioux	1989	Monona	158
Marlin Roth	Mount Pleasant	1983	Washington	167-7/8	Lee Samey	Moulton	1989	Appanoose	157-7/8
Mike Wells	Sigourney	1987	Keokuk	167-4/8	Casey Stieger	Cedar Rapids	1989	Winneshiek	157-6/8
Tom Yochum	Eldon	1985	Wapello	167-4/8	Rod Crowner	West Burlington	1982	Lee	157-5/8
Larry Hieber	Castana	1989	Monona	167-2/8	Kerry Burrells	Blakesburg	1989	Davis	157-5/8
Steve Becker	Danville	1986	Des Moines	167-1/8	Denis Leiting	Arcadia	1968	Crawford	157-3/8
Larry Hieber	Castana	1983	Monona	166-6/8	Terry Joe Gann	McClelland	1989	Washington	157-1/8
Dan Oliphant	Toddville	1989	Jones	166-5/8	Fred Daly	Blakesburg	1989		156-7/8
Steve Card	Des Moines	1989	Warren	166-4/8	Wayne Bohlken	Anamosa	1973	Linn	156-7/8
Mike Thomas	Pella	1989	Lucas	166-3/8	Rick Anderson	Exira	1989	Audubon	156-6/8
Russell Brissey	Burlington	1984	Des Moines	166-2/8	Vernelle P. Riedemann	Paullina	1953	Cherokee	156-4/8
Joe Schinstock	Salem	1988	Lee	166	Pete Kelly	Marshalltown	1989	Marshall	156-2/8
Jeff Kauzlarich	Rathbun	1989	Appanoose	165-5/8	Lynn R. Roberts	Carlisle	1989	Polk	156-1/8
Larry Cutkomp	Donnellson	1989	Van Buren	164-6/8	Richard Drake	Mount Ayr	1988	Ringgold	156
Ron Hansen	Hampton	1989	Franklin	164-4/8	Davis Heywood, Jr.	Randolph	1989	Mills	156
Dick Vinchattle	Stratford	1980	Webster	164-1/8	Jeff Bodier	Ellston	1989	Ringgold	156
					Donald M. Young	Winterset	1959	Madison	156
					Lee Huntrods	Rhodes	1989	Marshall	155-7/8
					Harley Mohn	Dunlap	1981	Monona	155-7/8
					Andy Schrodt	Tingley	1989	Decatur	155-7/8
					Tom Kessler	Stanhope		Hamilton	155-6/8

Iowa is near the upper level possible for the species. This makes sense since productivity in deer is related to their nutritional level. Iowa's deer are very healthy because there is an abundance of food. Deer utilize a variety of plants for food. Which ones they use at any one time depends upon the nutritional value of each plant and the alternatives available at the time. Agricultural crops, weeds, browse from brush and twigs and mast crops such as acorns are all important foods

during one or more periods of the year. The abundant sources of food, along with the relatively mild winters, allow about 60 to 70 percent of doe fawns to produce a single fawn their first year. Most will have twins in subsequent years, and a few will have triplets.

Deer in Iowa also appear to have high survival rates. There are few remaining sources of mortality because most large, natural predators have been eliminated from the state. Relatively few deer die of causes other than hunting. Vehicle collisions, dogs, coyotes and accidents, such as getting caught in fences, have all been recorded as causing fatalities. Poachers also take an unknown number of deer each year. Past



ROGER HILL

Marion Shappell	Mt. Pleasant	1976	Henry	152-4/8
Pete Thome	Stacyville	1987		152-3/8
Jeff Schroeder	Clear Lake	1988		152-2/8
Bob Reymie	Albia	1082	Davis	152-2/8
Doug Schroeder	Urbandale	1989	Lucas	152-1/8
Jim Yates	Humeston	1989		152
Rick Kyles	Dumont	1989	Butler	151-6/8
Alan Bockenstedt	Strawberry Point	1988	Clayton	151-6/8
Larry Maack	Charter Oak	1989	Crawford	151-5/8
Jack Williams, Jr.	Des Moines	1989	Warren	151-5/8
Danny J. Watkins	Des Moines	1988	Madison	151-4/8
Al Pyner	Corydon	1989	Wayne	151-2/8
Jerry Bishop	Ankeny	1989	Wayne	151-1/8
Phil Reeves	Bronson	1989	Woodbury	150-5/8
Dale Elmquist	Atlantic	1989	Page	150-5/8
Dale Weeks	Winterset	1989	Madison	150-5/8
Rusty Samuelson	Decorah	1989	Winneshiek	150-4/8
Lloyd Bodier	Ellston	1989	Ringgold	150-4/8
Steve Cox	Albia	1989	Monroe	150-3/8
Michael Culbertson	Dubuque	1989	Clayton	150-3/8
Danny Brown	Oskaloosa	1987	Marion	150-2/8
Jeff Bush	Lenox	1988	Taylor	150-1/8
Pat Murphy	Muscatine	1988	Muscatine	150

SHOTGUN NONTYPICAL
(Minimum qualifying score -- 170 points)

Gene A. Olsen	Hancock	1985	Pottawattamie	155-6/8
Ryan Wolfe	Randolph	1989	Fremont	155-4/8
Brian Stevenson	Bloomfield	1989	Davis	155-3/8
Rick Barton	Mt. Pleasant	1989	Henry	155-3/8
Wayne Hamman	Mapleton	1982	Monona	155-1/8
Mark Mincks	Bloomfield	1989	Davis	154-4/8
Larry Kindig	Mt. Pleasant	1988	Henry	154-3/8
Matt Mundeel	Ottumwa	1990	Appanoose	154-3/8
Doug Richardson	Albia	1986	Monroe	154-1/8
Terry Lester	Sergeant Bluff	1989	Monona	154-1/8
Steve Miller	Forest City	1989	Hancock	154-1/8
Brian Parkins	Creston	1989	Union	154
Travis Andersen	Woodbine	1988	Woodbine	153-7/8
Linc Alter	Mt. Pleasant	1988	Henry	153-7/8
Mark Simpson	West Liberty	1987	Lee	153-6/8
Dan Heiber	Battle Creek	1987	Monona	153-6/8
Mark G. Miller	Audubon	1987		153-5/8
Marvin Sammons	Riverside	1989	Washington	153-5/8
J. J. Steege	Fredericksburg	1987	Chickasaw	153-5/8
Dean Mirs	Tripoli	1989		153-4/8
Bob Schlessler	LeMars	1989	Fremont	153-4/8
Rick Williams	Allerton	1989	Wayne	153-3/8
Jerry Keenan	Creston	1988	Union	153-2/8
John Hill	Packwood	1989	Keokuk	153-2/8
Duane Rarick	Ainsworth	1988	Washington	153
Denny Lehman	Eddyville	1989	Wapello	152-7/8
Nick Long	Fairfield	1989	Jefferson	152-7/8
Terry Adams	Menlo	1989	Guthrie	152-6/8
Michael J. Hodapp	Sibley	1989	Osceola	152-5/8
Christopher Manz	Council Bluffs	1988	Shelby	152-5/8

NAME	CITY	YEAR	COUNTY TAKEN	TOTAL SCORE
*Carl Wenke	Cedar Rapids	1972	Lee	245
John Novy	Greenfield	1989	Page	210-2/8
Gary Garner	Lucas	1989	Warren	207-4/8
Larry McBride	Ft. Dodge	1989	Webster	203-5/8
Ronald R. Hoyt	Bagley	1974	Guthrie	203
Gary Anfinson	Denver	1988	Monona	202
Anthony Costello	Dallas Center	1980	Dallas	195-1/8
Tom C. Klever	Audubon	1982	Guthrie	195
Jeff Rasche	Princeton	1989	Scott	192-7/8
Marlin Easler	Harmony	1987	Winneshiek	192-2/8
Harold Cobb	Derby	1989	Lucas	192-1/8
George Murphy	Washington	1989	Van Buren	191
Marlene Scott	Leon	1989	Decatur	189-3/8
Floyd McKenzie	Montpelier	1970	Lee	188-5/8
Gerald Bailey	Salem	1971	Henry	188-3/8
Jason W. Fox	Oskaloosa	1989	Mahaska	187-4/8
Francis C. O'Donnell	Strawberry Pt.	1988	Clayton	186-4/8
John Watters	Maquoketa	1989		184-1/8
Mark Evans	Glenwood	1989		181-6/8
Paul L. Millang	Boone	1982	Harrison	181-2/8
Glen Bockenstedt	Strawberry Pt.	1985	Clayton	180-3/8
Darrell Rhoads	Ottumwa	1989	Van Buren	179-3/8
Leo R. Dose	Mapleton	1989		179-3/8
George Waters	West Branch	1989	Cedar	178-7/8
Jan Mesenbrink	Moorhead	1964	Monona	178-2/8
Bruce Larson	Spring Valley	1981	Howard	177-2/8
Jon Schroeder	Urbandale	1989	Lucas	176-6/8
Dan Orth	Burlington	1979	Des Moines	176-1/8
Randy Roozeboom	Oskaloosa	1989	Mahaska	176

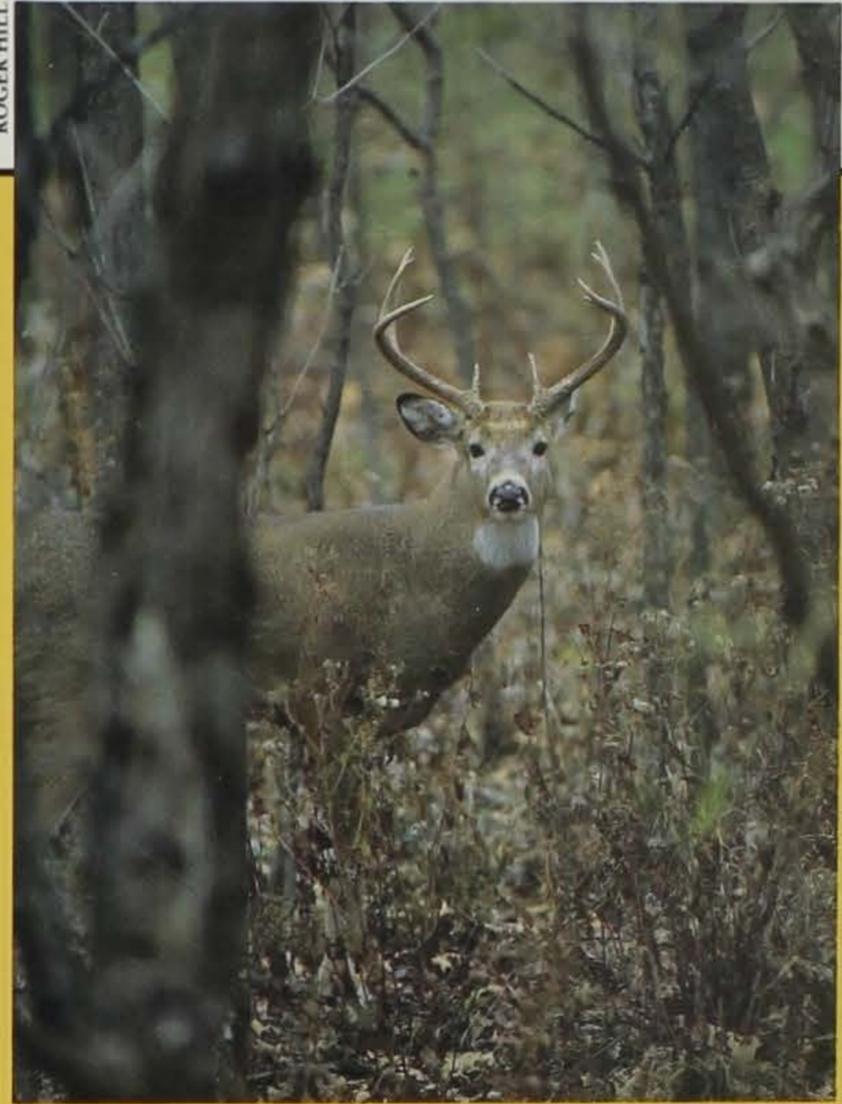
studies indicate that more than 70 percent of the fawns born each year survive, while nearly 90 percent of adult deer would survive if they were not hunted.

Deer also exhibit a high degree of mobility. Many deer do not stay in the same area in which they were born. Dispersals of several miles are common and movements exceeding 10 miles are not uncommon. This offers one plausible explanation of why deer have done so well over the last 50 years. This mobility would allow them to easily take advantage of constantly changing habitat and pioneer suitable unoccupied areas.

Management Problems and Solutions?

So, how do we put all of this information together to manage deer? Well, in the past, the goal of management was to increase the number of deer in all parts of the state. To do this, we carefully restricted the number of licenses that were valid for does. As long as the surveys indicated the population was increasing, we were satisfied we had

ROGER HILL



Ed Koza	Cedar Rapids	1989	Des Moines	175-3/8
Christopher Manz	Council Bluffs	1987	Shelby	175
Don Herr, Jr.	North English	1988	Keokuk	174-6/8
Jim Potter	Maquoketa	1990	Jackson	174
Jim Smith	Afton	1989	Union	172
H. Van Zandbergen	Hospers	1989	Lyon	171-6/8
Robert Carney, Jr.	Maxwell	1989	Story	171-5/8
Larry McDuffey	New Virginia	1989	Clarke	171-1/8
Dave Schaller	Waukon	1988	Winneshiek	170-4/8

BOW AND ARROW TYPICAL (Minimum qualifying score -- 135 points)

NAME	CITY	YEAR	COUNTY TAKEN	TOTAL SCORE
*Kevin Peterson	Mediapolis	1989	Des Moines	188
*Bill Mitchell	New Albin	1989	Allamakee	184
Ernie Aronson	Davenport	1985	Washington	177-1/8
Ricky G. Seydel	Coon Rapids	1989	Harrison	174
Herbert Amundson	Mason City	1985	Winneshiek	173-6/8
Jackie L. Dodson	Van Meter	1989	Dallas	173-2/8
Greg Covington	Monticello	1986	Delaware	171
Don Houg	Winterset	1989	Madison	170-5/8
Tim Whitlatch	Russell	1989	Lucas	170
Scott C. Kemble	Panora	1989	Iowa	165-3/8
Jerry Brown	West Union	1989	Fayette	164-5/8
Sandra J. Collins	Exline	1989	Appanoose	162-6/8
Ken Miller	Rock Rapids	1977	Sioux	162-1/8
R. C. Field	Mason City	1988	Cerro Gordo	161-7/8
Jim Garton, Jr.	Des Moines	1989	Polk	161-1/8
Mike Cardamon	Des Moines	1988	Lucas	160-2/8
Jim Arp	Walford	1989	Linn	159-4/8
David Bayless	Clarinda	1985	Page	159-2/8
Gregg Dale	Chariton	1989	Lucas	159
Jeff Horsey	Farmington	1989	Lee	158-6/8
Terry Boltjes	Paullina	1989	O'Brien	158-3/8
Mike Jones	Fort Dodge	1989	Webster	158
Theodore J. Steege, IV	Fredericksburg	1987	Chickasaw	157-2/8
Roy Rath	Thayer	1989	Union	156-4/8
Ron Miller	Rock Rapids	1976	Sioux	156-2/8
Todd Langel	Luxemburg	1989	Clayton	155-5/8
Phil Anderson	Villisca	1989	Adams	155-4/8
John Jessen	Denison	1989	Crawford	154-4/8
Raymond Boland	Harpers Ferry	1989	Allamakee	153-5/8
William Franz	Independence	1959	Allamakee	153-4/8
Todd Ferrill	Nauvoo	1982	Des Moines	153-2/8
Bill Henderson	New Market	1989	Taylor	153-2/8
Tom Williams	Center Point	1989	Linn	153
Leonard H. Mussell	Des Moines	1989	Guthrie	152-7/8
Gary Faley	Davenport	1989	Scott	152-1/8
Todd Lust	Ankeny	1989	Decatur	151-6/8
Mike Laughlin	Shenandoah	1989	Fremont	151-5/8
Jim Smith	Fayette	1989	Fayette	151-4/8
Dave Kennedy	Mt. Pleasant	1985	Henry	151-3/8
Dale Dykes	Leon	1989	Decatur	151-2/8
Scott Neiderhuth	Keosauqua	1989	Van Buren	150-6/8

Curtis Martens	Callender	1988	Webster	150-2/8
Bruce K. Leeck	Algona	1989	Kossuth	149-7/8
Ed A. Jacobson	Ida Grove	1989	Ida	149-7/8
Rick Archer	Onawa	1989	Monona	149-6/8
Chris Widmar	Centerville	1989	Appanoose	149-6/8
David Frettim	Adel	1989	Davis	149-2/8
Scott C. Kemble	Panora	1986	Guthrie	148-6/8
Jim Hotchkiss	West Chester	1989	Washington	148-4/8
Chuck Hurley	Osage	1987		148-1/8
Chris Inghram	Burlington	1989	Benton	147
Dale Clark	Afton	1989	Ringgold	147
Randy Klobnak	Hamilton	1989	Marion	146-4/8
Mark Webb	Donnellson	1989	Lee	145-5/8
Dean Dempster	Delhi	1989	Delaware	145-2/8
James E. Wells	Melcher	1989	Lucas	145
Gerald Owen	Maquoketa	1989	Jackson	144-7/8
Robert Barslou	Swea City	1989	Kossuth	144-7/8
Brian VanderVelden	Monroe	1989	Jasper	144-5/8
Noel E. Harlan	Keosauqua	1989	Van Buren	143-2/8
Mike Hagen	Newhall	1986	Benton	144-4/8
Dave Kramer	Monticello	1989	Jones	143-1/8
Rick O'Toole	Cedar Rapids	1989	Linn	142-7/8
Craig J. Cutts	Cedar Rapids	1989	Linn	142-6/8
John Bantz	Glenwood	1989	Mills	142-3/8
Chuck Pallwitz	West Des Moines	1989	Warren	142-3/8
Kenneth H. Treanor	Dubuque	1989	Dubuque	142-1/8
Trina Baugh	Panora	1989	Guthrie	142-1/8

achieved our goal. However, in the mid-1980s, the goal of our management plan changed. In most parts of the state we felt we had as many deer as would be tolerated and we should stabilize the deer herd. The question that needed to be answered was How many does do we need to harvest to stabilize the population in each zone? To answer this question requires an estimate of the population. How could we make such an estimate given the sources of information we have?

The solution was to integrate all of the information into a computer-simulated model for each zone. The model would combine our knowledge of deer biology,

the harvest estimates and the trend information so we could recreate the population that existed in the past. To do this, we would start with an initial number of deer, run the simulation using the harvest data collected over the past several years and then see how the projections compared to the survey data (figure 2). This process was repeated until we found what could be considered a minimum population needed to sustain the harvest reported.

Once this estimate was made, we could determine how many does should be harvested over the next few years to stabilize the population. We began this process before the 1987 hunting season. By comparing the results of the last three hunting seasons with the results predicted by the models we can evaluate how well the models have performed. Each year we update each model and where necessary, modify them so they perform better. As the model's performance improves, we gain confidence in it as a management tool. In states such as Wyoming, where modeling has been used for many years, biologists feel it takes at least three to five years before the models perform properly. Iowa's simulations for several zones appear to be following the survey data fairly well, while some still seem to need some improvement.

Although it may sound like the models are the ultimate solution to managing Iowa's deer population, they are far from perfect. For one, we can only use the models for managing units at the smallest level for which we collect data -- the 10 management zones. One thing that appears to be happening is areas within existing zones vary in harvest pressure. Some areas are being over-hunted while other areas are not receiving enough pressure. We may need to further subdivide zones and redesign our sampling for smaller units if we hope to manage at a finer level. Additionally, the information on deer biology used in the models comes from past studies on small study areas. More current information on larger areas would prove beneficial.

So exactly how many deer do we have in Iowa? Well, we still don't really know. But, if I had given you an estimate at the beginning of this article, many of you probably wouldn't have read this far and would have missed the opportunity to learn more about our deer management program. So for those of you who made it this far . . . the simulations indicate that a post-season population of about 200,000 deer in 1989 would have been needed to sustain the harvest recorded over the last several years.

The work reported on in this article is paid for by Iowa's sporting enthusiasts in the form of license fees and in federal aid from the Pittman-Robertson Act that provides for an excise tax on sporting arms and ammunition.

Willie J. Suchy is a forest wildlife research biologist for the department in Chariton.

Chris Keyes	Albia	1988	Monroe	141-6/8
Thomas Allen	Council Bluffs	1989	Harrison	141-5/8
Stephen A. Cullinan	Ottumwa	1989	Wapello	141-3/8
Tracy Brenden	Whiting	1989	Monona	141-1/8
Larry Chesmore	Rowley	1989	Buchanan	140-5/8
Ann Borcharding	Strawberry Pt.	1989	Delaware	140-2/8
Ed Smith	Coin	1987	Page	140-2/8
Chris Larson	Lewis	1989	Cass	140
Terry D. Parker	Fort Dodge	1989	Webster	139-6/8
Mike Shannon	Treynor		Pottawattamie	139-4/8
Roger Frey	Afton	1989	Union	139-2/8
Ryan Ohl	Hinton	1989	Plymouth	139-1/8
Jeff Vanourney	Central City	1989	Linn	139-1/8
Russell Allspach	Newton	1989	Jasper	138-5/8
Dick Paul	Red Oak	1989	Montgomery	138-5/8
Jim Buffum	Council Bluffs	1989	Pottawattamie	138-3/8
Robert Miller	Rock Valley	1987	Sioux	138-3/8
Steve Dudley	Ottumwa	1988	Wapello	138-2/8
Gene Hewlett	Grand River	1989	Decatur	137-6/8
Shannon Woodward	Albia	1989	Monroe	137-6/8
John W. Beeson	Correctionville	1989	Woodbury	137-5/8
Doyle Curnes	Osceola	1988	Clark	137-5/8
Doyle Curnes	Osceola	1988	Clark	137-5/8
Terry Kahler	Elgin	1987	Fayette	137-5/8
Jim Hedley	Dubuque	1989	Dubuque	137-4/8
Matt Mundell	Ottumwa	1988	Davis	137-3/8
Arlin Dickinson	Webster City	1989	Hamilton	137-2/8
Rodney Jepsen	Denison	1989	Harrison	137-1/8
Darrel Podhajsky	Traer	1988	Tama	137-1/8
Don Gee	Chariton	1989	Monroe	137
R. C. Edmondson	Pacific Jct.	1989	Mills	136-7/8
Michael M. Brenden	Whiting	1989	Monona	136-5/8
Ben Vasseau	Kilduff	1989	Jasper	136-3/8
Lane Eddy	Des Moines	1989	Clarke	136-2/8
Ed Smith	Coin	1988	Page	136-1/8
Ken Miller	Rock Rapids	1985	Sioux	136-1/8
David Flenker	Council Bluffs	1989	Pottawattamie	135-7/8
Lynn Markert	Pomeroy	1988	Calhoun	135-7/8
Kevin Cave	Keota	1989	Keokuk	135-5/8
Larry Mork	Osage	1987	Mitchell	135-5/8
Jeff Musich	Harlan	1989	Harlan	135-3/8
Jo Anna Blaylock	Monticello	1989	Keokuk	135
Thomas J. Starns	Albia	1988	Monroe	130-2

BOW AND ARROW NONTYPICAL
(Minimum qualifying score -- 155 points)

NAME	CITY	YEAR	COUNTY TAKEN	TOTAL SCORE
Rick Metcalf	Selma	1988	Van Buren	193-6/8
Herb Ruble	Indianola	1989	Warren	186-1/8
Patrick Salmen	Sioux City	1989	Monona	184-7/8
David Daniels	Moulton	1984	Appanoose	184-6/8
Craig Shepard	Cedar Rapids	1980	Linn	180-5/8
Jon Lewis	Madrid	1988	Clark	172-2/8
Gary Frost	Fort Madison	1967	Lee	171
Dale Irwin	Muscatine	1988	Muscatine	162-7/8

