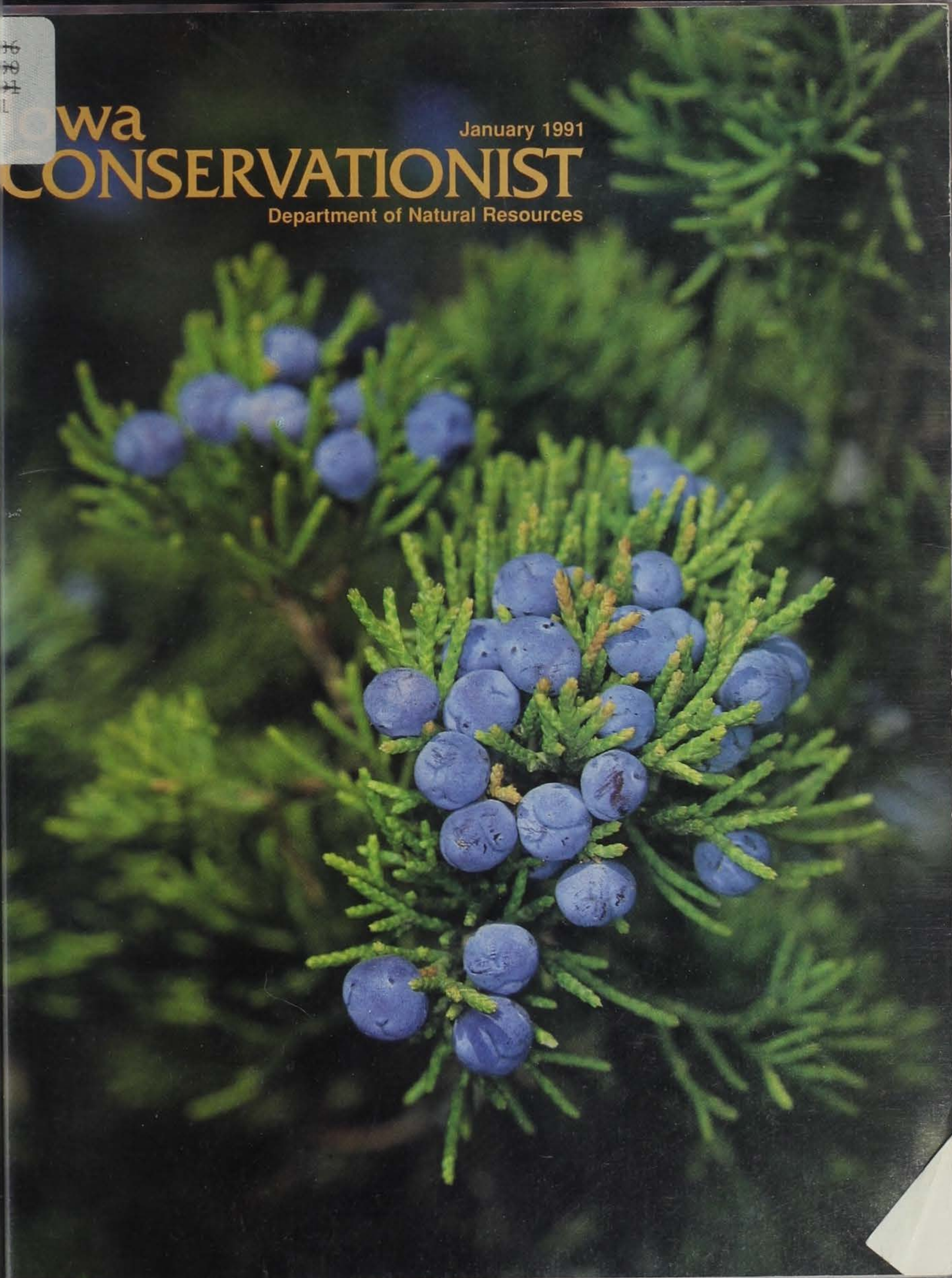


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CONTENTS

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page 6



page 16

FEATURES

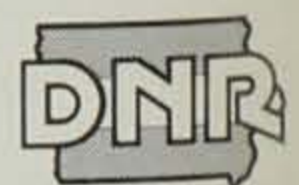
- 3 A NEW QUARRY TO PURSUE** by Bob Middendorf
A recent quarry stocking has expanded Iowa's trout fishing resource.
- 6 OH, CHRISTMAS TREE** by Robert J. Ribbens
Here are some ideas for disposing of your evergreen after the holiday season.
- 9 TAKE A DEEP BREATH** by Christine Spackman
What do the Clean Air Act Amendments of 1990 mean for Iowa?
- 12 REVEALING RACCOON MYSTERIES** by Ron Andrews and Bill Clark
Long-term research on Iowa's raccoons has unveiled some of their secrets.
- 16 BLUEBIRD DAYS RETURN** by Jim Hansen
Bluebirds are once again becoming a familiar site in Iowa.
- 26 VOLGA -- A LAKE TO BE RECKONED WITH** by Gaige Wunder
Northeast Iowa's fishing surprise.
- 30 CONTENDING WITH A CRISIS** by Sharon A. Tahtinen
Iowa's Energy Emergency Plan is ensuring the safety of Iowa's citizens.

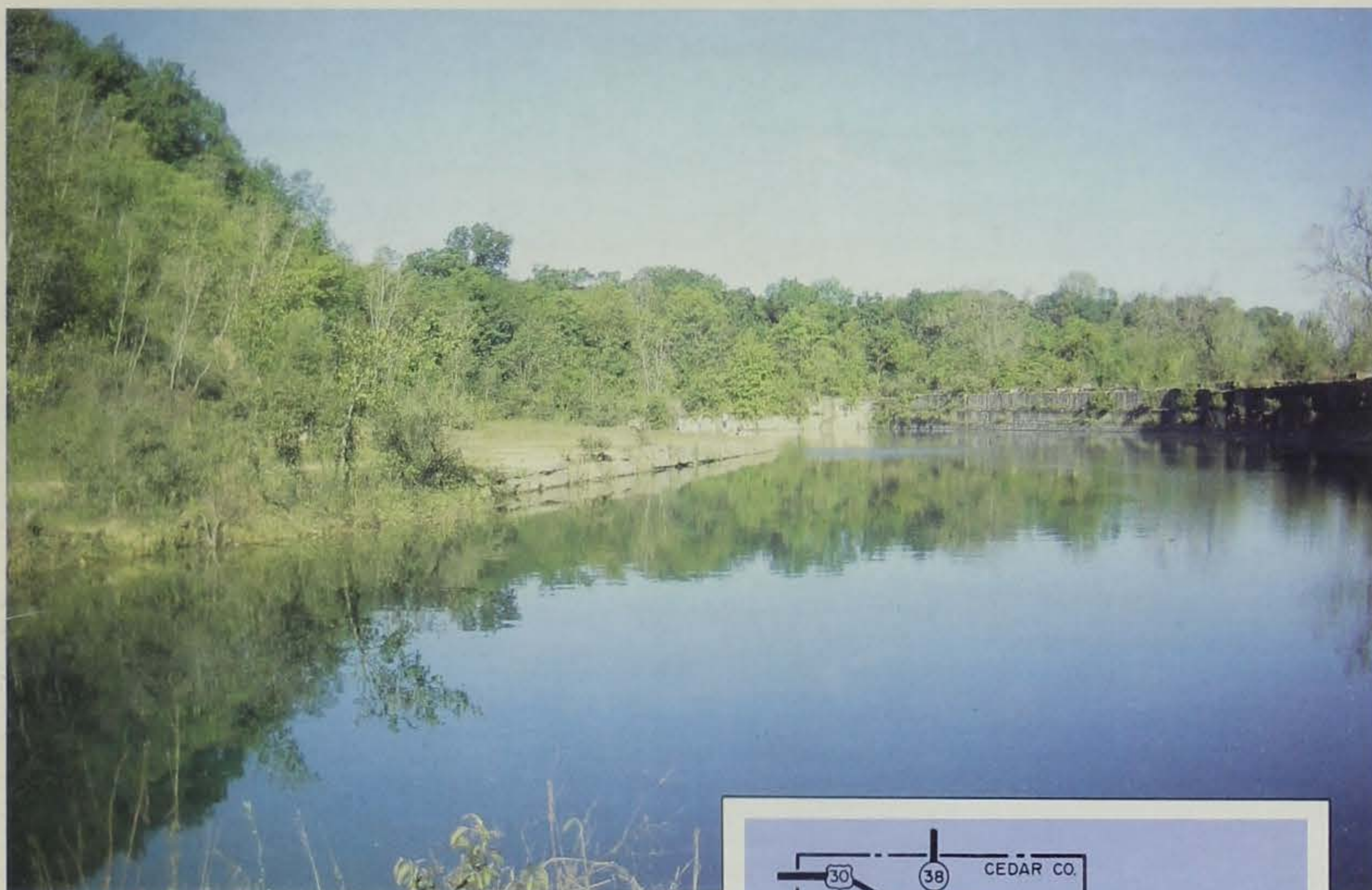
DEPARTMENTS

- 19 Warden's Diary
20 Conservation Update
23 Classroom Corner
24 County Conservation/Calendar

COVERS

Front -- Eastern red cedar by Bruce Morrison.
Back -- Dolliver State Park by Bruce Morrison.

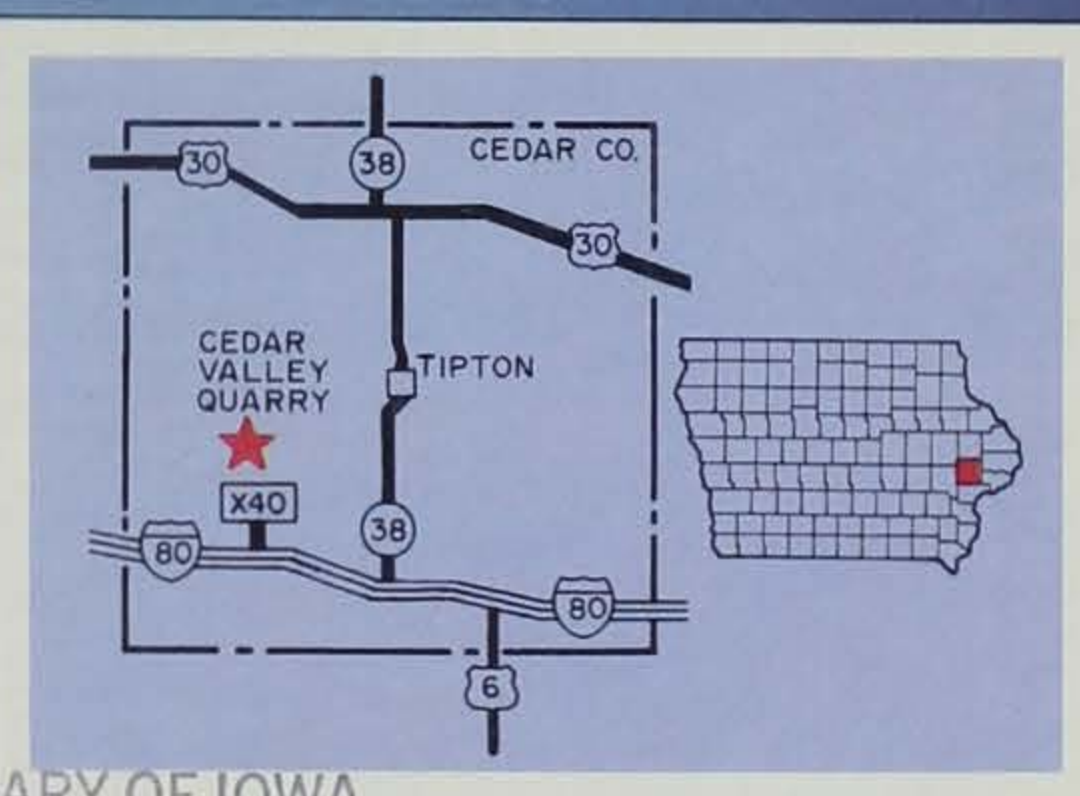




▲ Cedar Valley quarry in Cedar County.

A New Quarry to Pursue

by Bob Middendorf
STATE LIBRARY OF IOWA
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Iowa anglers in 1990 gained a new coldwater fishing area where they can pursue the sport of catching trout. The fisheries bureau program for stocking was expanded from the traditional northeast section of the state, south to Cedar County. This new location is a flooded quarry in the county conservation board's Cedar Valley Park. The park is situated just off County Road X-40, approximately seven miles southeast of Tipton, or four miles north of Interstate 80 on X-40.

Historical information from the county states quarry operation commenced in the mid-1890s and was in existence for more than 25 years. Large blocks of stone were taken out and used for construction of bridges throughout the mid-west. An average size block was six foot by three foot by three foot, weighing more than four tons -- several of them can be found sitting on the site today. With the arrival of the portland cement production, stone use was dramatically reduced and

operations had essentially ceased by 1910. Pumps used to remove seepage from the springs and nearby Cedar River were shut off, and the quarry began to flood.

In 1969, the quarry and other plots of land were deeded to the conservation board by the Iowa Land and Building Company. The county board received a deep, clear, three-acre body of water with a limited resident warmwater fish population. A majority of its shoreline is characterized by sheer verti-

... the quarry was suitable for trout stocking and survival on a year-round basis.

► **Favorable zones for both warmwater and coldwater fish species during the summer months.**

cal walls with water depths reaching 70 feet.

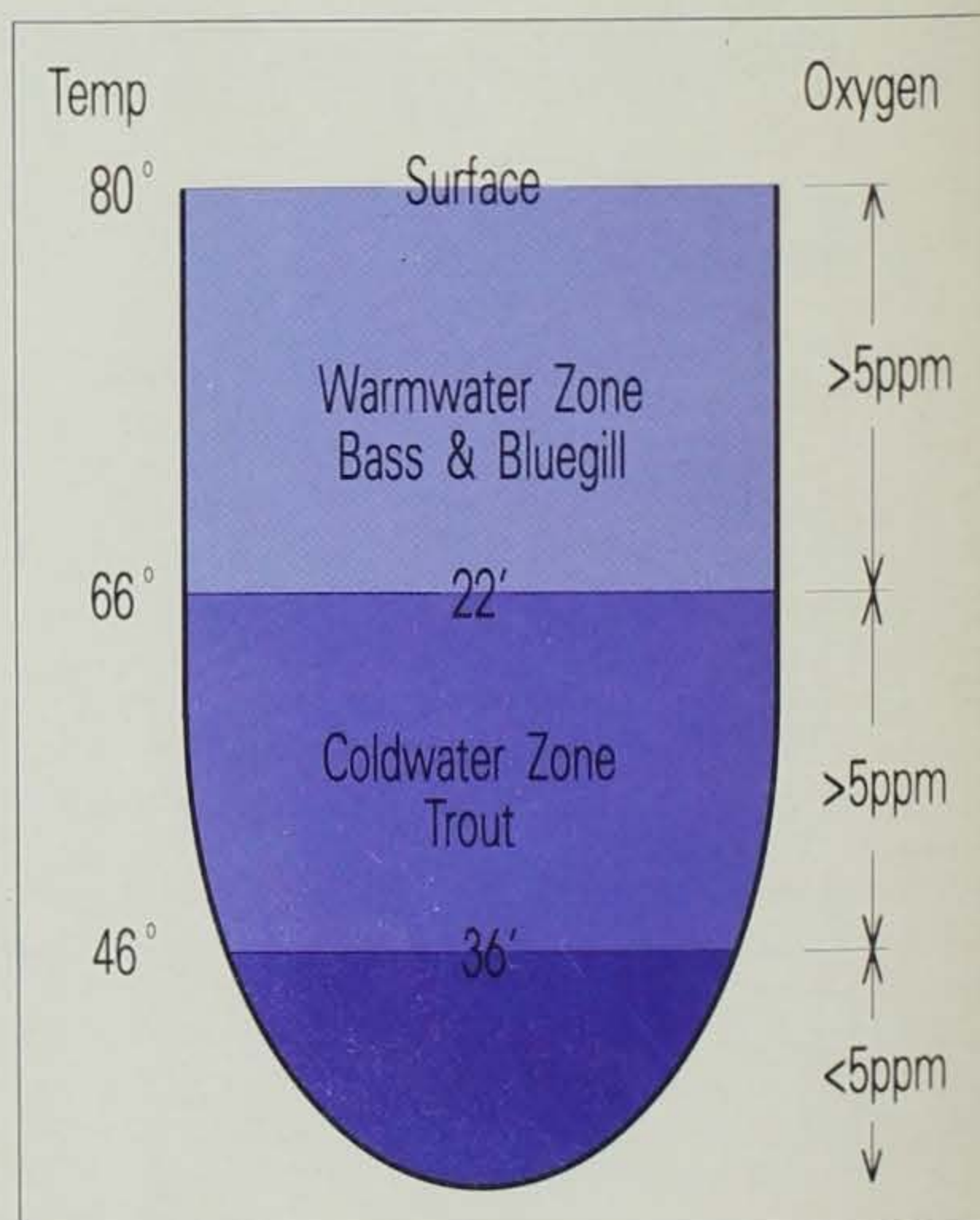
Having this area of deep, cold water, conditions were favorable for supporting an additional fishery at the site. A study was undertaken in 1985 to determine the feasibility of establishing a put-and-take trout program. The first requirement was to determine if sufficient oxygen — at least five parts per million (ppm) during hot weather months — was available at depths having temperatures of 66°F and below. To collect this information, bi-monthly oxygen and temperature profiles were compiled from June through mid-September.

Data assembled and evaluated disclosed the quarry was suitable for trout stocking and survival on a year-round basis. But, during critical periods of June to mid-September, available water volume is restricted to between 22- and 36-foot depths. For other times of the year, a major portion of the water column from the top downward is suitable. Using this information, a request was made for trout stocking to take place on a monthly basis from April through October. This coincides with the time frame used for stocking streams in northeast Iowa.

Trout for the quarry

became a reality on April 9, 1990, when the first monthly quota of 300 rainbows and 100 browns were introduced. Anglers from several counties waited for the hatchery truck to discharge its cargo; shortly after release, fish were caught by anxious anglers. At this time of the year, cold water temperatures allowed fish harvest to be made at or near the surface. A wide variety of baits ranging from cheese and corn to flies and jigs were found successful in catching trout.

Methods of catch changed, however, with the onset of hot weather. Upper level water temperatures increased to 70 and 80 degrees, and at this time trout relocated in more favorable depths of 22 to 36 feet. Tactics now involved still fishing with a slip bobber attached to the line. This allowed bait to be lowered to the preferred



depths. Corn and nightcrawlers now became the most productive baits. Also at this time of year, the quarry became a two-story fishery, with populations of warmwater species located in upper levels and trout at the cooler lower depths.

Fall weather and falling water temperatures found a return of the spring fishing techniques. A first-year stocking came to a close in October, but fishing activity continued through late fall. Extension of the trout program into southeast Iowa has proven to be very popular. County board employees performed angler interviews, and results showed almost all anglers came from less than a 50-mile radius. Trout fishing interest in the surrounding counties has evidently been increased — of 102 individuals interviewed, 36 had purchased a stamp for the first time to fish the quarry. Nearly all first-time trout stamp purchasers said they now planned to fish streams in northeast Iowa, the traditional trout country.

Biologists are frequently approached by landowners who feel they have a pond, sand pit or quarry that will support trout. Normally at these waters, year-round environmental parameters necessary for successful trout survival are not available. A critical combination of sustained water temperatures below 66 degrees and oxygen concentration limits above five parts per million are not met. Cedar Valley quarry is a unique exception to what occurs at most of Iowa's lakes and ponds.

Bob Middendorf is a fisheries biologist for the department at Solon.



Ron Johnson

Extension of the trout fishing program into southeast Iowa has proven very popular.

Anxious anglers await the first trout stocking of Cedar Valley quarry.



Rick Rouse

Oh, Christmas Tree

As of January 1990, yard waste, including Christmas trees, can no longer be disposed of in landfills. Here are some ideas for disposing of your evergreen after the holiday season.

Article by Robert J. Ribbens
Photos by Ron Johnson

It has long been the symbol of the Christmas holiday season. An object to stash the presents under and have the kids decorate. But when the season is over and there are no longer any gifts under the old conifer that displaced the space that is usually reserved for your easy chair, where does the Christmas tree go?

Most people carefully yank the prickly, needle-dropping tree from its temporary stand and drag it across the living room floor and out to the curbside where after a period of time, as if by magic, it disappears. Yes, it goes "away." Once again, the Christmas season has officially concluded.

"Away" is a place that is usually not far from your home. "Away" is the landfill just down the road.

In the 1990 Christmas season alone, Iowans will decorate and dispose of an estimated 400,000 Christmas trees. Talk to most

public works employees or trash haulers and they will tell the tale of the after-Christmas disposal nightmares that are prompted by the huge influx of Christmas trees going to the local landfill. If Iowans tossed all of those 400,000 Christmas trees out the door and each of them weighed 20 pounds, 4,000 tons (eight million pounds) worth of wood waste will be thrown into landfills this month.

There are alternatives to this disposal dilemma, however. Christmas tree recycling programs have been successfully implemented in many communities throughout Iowa and the United States.

The City of San Diego, California, for example, collected 260 tons of wood waste in a single Christmas season. Wood chips were used by the local parks department in street medians.

Saint Petersburg, Florida, used mulch from a Christmas tree recycling program, which



collected 8,000 trees, in a research project on the use of mulch as ground cover for soil erosion control and as an alternative fuel.

Galveston, Texas, used Christmas trees for a dune restoration project. Trees were bound together and tied to cement anchors and placed on the shore of the Gulf of Mexico. These mounds of trees acted as a natural wind break which slowed the wind just enough to enable wind-blown sand to drop to the ground.

Thus, artificial sand dunes were being created in an attempt to restore dunes that have suffered from Gulf shore development.

The City of Longmont, Colorado, used Christmas trees in an innovative way. Christmas trees were roped together and weighted with concrete blocks and set atop frozen lakes. When the lakes thawed in the Spring, the trees dropped to the bottom creating a rich habitat for trout.

Closer to home, Hamilton County in north-central Iowa conducted a Christmas tree recycling program in January 1990. Local Christmas tree vendors attached information about the program to every tree sold. The nine Hamilton County communities advertised in local papers and on local radio about when and where people could voluntarily drop off Christmas trees after the holiday season. Three donated tree chippers operated by local service organizations processed an estimated 500 trees. Anyone bringing a tree could take wood chips for free. Parks departments from the nine communities used wood chips in landscaping applications.

In a metropolitan setting, the City of Des Moines used curbside pickup of Christmas trees as the preferred method of collection. Residents were asked to make sure that trees were in four-foot lengths and had all tinsel removed. City collection workers picked up the trees, free of charge, which was financially feasible because the cost of labor and fuel was equal or less than the costs of disposing of the trees at the landfill. The trees were then turned into wood chips, which were used by the city and area residents for landscaping.



Tree courtesy of Captain Jack's Tree Farm, Ankeny.

▲ **This holiday season, Iowans will decorate and dispose of an estimated 400,000 Christmas trees. The new regulations mean communities and residents will have to come up with alternative disposal methods.**

Christmas tree recycling, until now, has relied on communities taking the initiative to lessen the disposal burden on local landfills. However, due to new laws dealing with yard and landscape waste, recycling of the traditional yuletide symbol may become an even more attractive option. Beginning January 1, 1991, yard waste, including Christmas trees, can no longer be disposed of in landfills. Landfills are rapidly reaching capacity and land disposal bans will unquestionably prompt many communities to investigate and implement Christmas tree recycling programs.

Planning for such a program can be accomplished with relative ease. Renting a tree chipper or sharing a chipper between a number of communities is inexpensive and efficient. Estimating the number of trees that may be available for recycling may be perceived as a planning complication. However, estimating may not be as difficult as it seems. On a national average, there is one tree for every 7.2

The holiday season is over and you are faced with disposing of your Christmas tree. What do you do? Who can you call to find out about proper disposal methods?

If your community will be recycling the trees:

- Other suggestions for disposal:**

- And:**

- people. If there are 20,000 people in a county, there may be up to 2,800 trees available for recycling. If curbside collection is to be used, estimations for the recovery rate should be high (60 percent and up). If voluntary drop-off of the trees is expected, recovery rates should be estimated somewhat lower. These are good planning tools, but not fail-safe estimations. Curbside programs that are not properly advertised or that make it difficult for citizens to comply with will have less participation. Conversely, drop-off settings, if well advertised and in a convenient location can have a large recovery rate.

C

but usually use the availability of such a program heavily to dispose of unsold trees immediately after Christmas.

Whatever the type of program set up to deal with Christmas trees, communities will benefit from implementing a tree recycling system to divert the trees from the landfill. Communities can save on the cost of collection (if voluntary drop-off methods are used), save space in landfills, save on cost of tipping fees to dispose of the trees at landfills, and can get free mulch for community parks and recreation departments.

Robert J. Ribbens is an environmental specialist with the DNR in Des Moines.

Take a Deep Breath



DNR Photo

With the passage of the Clean Air Act Amendments of 1990, the United States enters a new era of air pollution control. The authors of these amendments have attempted to address the many unsolved air pollution problems of the nation -- acid rain, urban smog, air toxics and stratospheric ozone loss. The challenge in the next few years will be for the federal, state and local air pollution control agencies to carry out the mandates of the amendments.

by Christine Spackman

Iowa will see benefits from the Clean Air Act Amendments in the form of increased demand for corn-based ethanol as a "clean fuel" for problem areas of the United States.

Iowa has avoided the tremendous ozone and carbon monoxide problems that haunt cities like Los Angeles and New York. The Clean Air Act Amendments of 1990 set forth comprehensive program requirements to reduce the levels of these air pollutants in problem areas. Iowa will not need to address these requirements because it is already

meeting the national ambient air standards for these pollutants. However, it will reap the benefits of increased demand for corn-based ethanol as a fuel additive and as a "clean fuel" in the ozone and carbon monoxide problem areas.

Regarding mobile sources of these pollutants, like automobiles, trucks and buses, the Clean Air Act Amendments mandate new vehicles emit significantly less hydrocarbons, nitrogen oxides and carbon monoxide. These new vehicles will burn fuel more efficiently resulting in some savings at the gasoline pump. These tail pipe emission standards will be phased in beginning in 1993. There are also provisions for a potential second tier of tail pipe reductions in 2004 depending on the extent of ozone problem areas in the

nation at that time.

The air toxics provisions of the Clean Air Act Amendments are Congress' second attempt at addressing the problem of emissions of toxic air pollutants. Its first attempt, in 1977, mandated that the United States Environmental Protection Agency (EPA) establish national emission standards for hazardous air pollutants. In the 13 years since the last revision to the Clean Air Act, the EPA has adopted such standards for only seven hazardous air pollutants.

The Clean Air Act Amendments require that the EPA establish a list of source categories to be regulated for air toxics. Only sources emitting 10 tons per year of a regulated air toxic or a combination totaling 25 tons of regulated air toxics will be subject to the air toxics provisions. There is a

schedule by which the EPA is to adopt maximum achievable control technology standards for each source category by the year 2000. Facilities subject to these standards must comply with the standards within three years of their adoption. Besides the technology-based standards, the amendments call for a study of residual risks -- the health risks from toxic pollutants emitted after the enforcement of maximum control -- and later Congressional action on this issue.

A goal of reducing sulfur dioxide emissions, from electric utility boilers, by 10 million tons and nitrogen oxides by two million tons by the year 2000 is intended to address acid rain. The reductions are to take place in two phases. Facilities in Iowa affected by phase one reductions are listed in Table 1.



Ron Johnson

These facilities must reduce sulfur dioxide emissions to an interim level by 1995. The second phase will require further reductions from potentially 26 Iowa facilities by the turn of the century.

Protection of the stratospheric ozone layer is the purpose of several provisions restricting and eventually banning production of chlorofluorocarbons (CFCs) and other compounds. The EPA is required to issue regulations concerning air conditioning and refrigeration -- the primary producers of CFCs -- by January 1, 1992. Nonessential consumer products that release these substances, such as aerosol and non-insulating foam products, are to be banned by 1994.

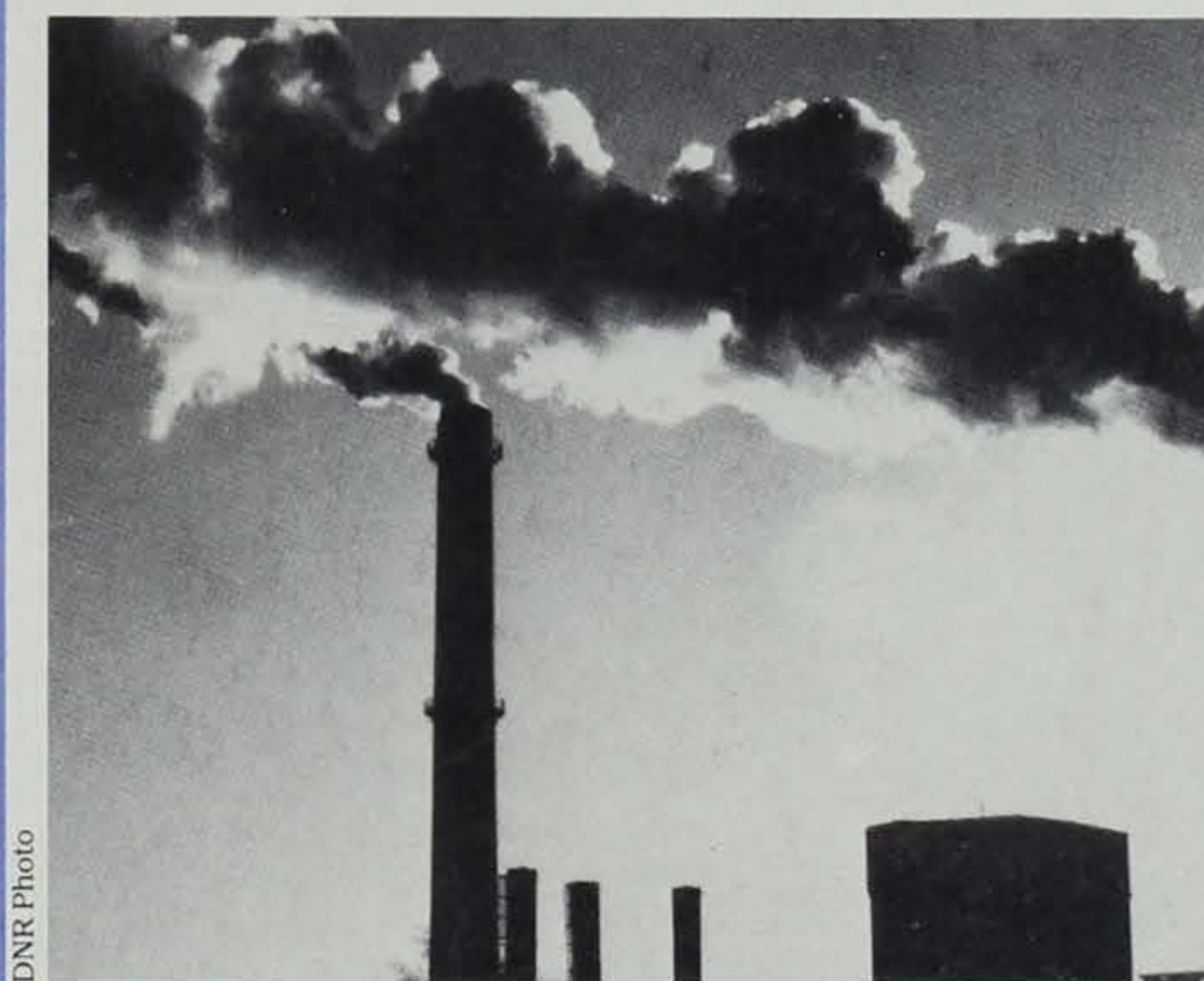
The Clean Air Act Amendments also mandate that states require major air pollution sources to obtain operating permits. Currently, Iowa requires only construction permits for air pollution sources. Iowa will be required to charge a permit fee to offset the costs of developing and administering an operating permit program.

All the changes required by the Clean Air Act Amendments will result in improvements to Iowa's and the nation's air quality.

Christine Spackman is an environmental specialist for the department's air quality section in Des Moines.

Table 1 - Iowa Facilities Affected by Phase I Acid Rain Reductions

Facility	City
Iowa Public Service Co.	Sioux City
Interstate Power Co.	Clinton
Iowa Southern Utilities	Burlington
Iowa Electric Light & Power	Cedar Rapids
Iowa-Illinois Light & Power	Bettendorf
Iowa Power	Des Moines



DNR Photo

The amendments call for a study of health risks from toxic pollutants emitted after the enforcement of new standards and later Congressional action regarding the study results.

Revealing Raccoon MYSTERIES



Article by Ron Andrews
and Bill Clark
Photos by
Lowell Washburn

Although the raccoon has occupied Iowa since before settlement, it has not been until the past two decades that it gained the spotlight in the furbearer world. In a relatively short period of time, their rise to prominence and now their fall, has generated considerable discussion and debate among wildlife enthusiasts.

For 14 consecutive years, more than one-quarter million of these masked mammals have been harvested annually. A record high 390,000 pelts were harvested during the 1986-87 season, but the 1989-90 harvest

was more than one-quarter million pelts below the record of four seasons earlier. Raccoon hides accounted for 65 percent of Iowa's total fur value during these banner years. During the last two seasons, however, a different scenario has unfolded, and it now appears that raccoon harvests will flounder at pre-1970 levels. The rise and fall of the raccoon "surge" and its parallel to average raccoon pelt values are shown in Table 1 on page 15. The average price placed on this furbearer's pelt closely parallels how much

effort hunters and trappers will make to add a few dollars to their pockets. Effort is related to many factors, including interest in the sport, perceived furbearer population levels and international fashion demands. The outlook for an upward turn in effort does not appear to be soon.

Because of record high harvests of the 1970s and '80s, hunters and trappers were concerned that we may be taking too many furbearers. Despite the low harvests of the past two seasons, record numbers of raccoons are being seen on surveys indicating high population densities (see Table 2 on page 15). Earlier, a few furharvesters believed if the high harvest continued, the raccoon might soon be driven to the verge of extinction. The pendulum has swung, however, and many of these same people are clamoring that without additional harvest, disease and starvation could suppress an increasing raccoon population.

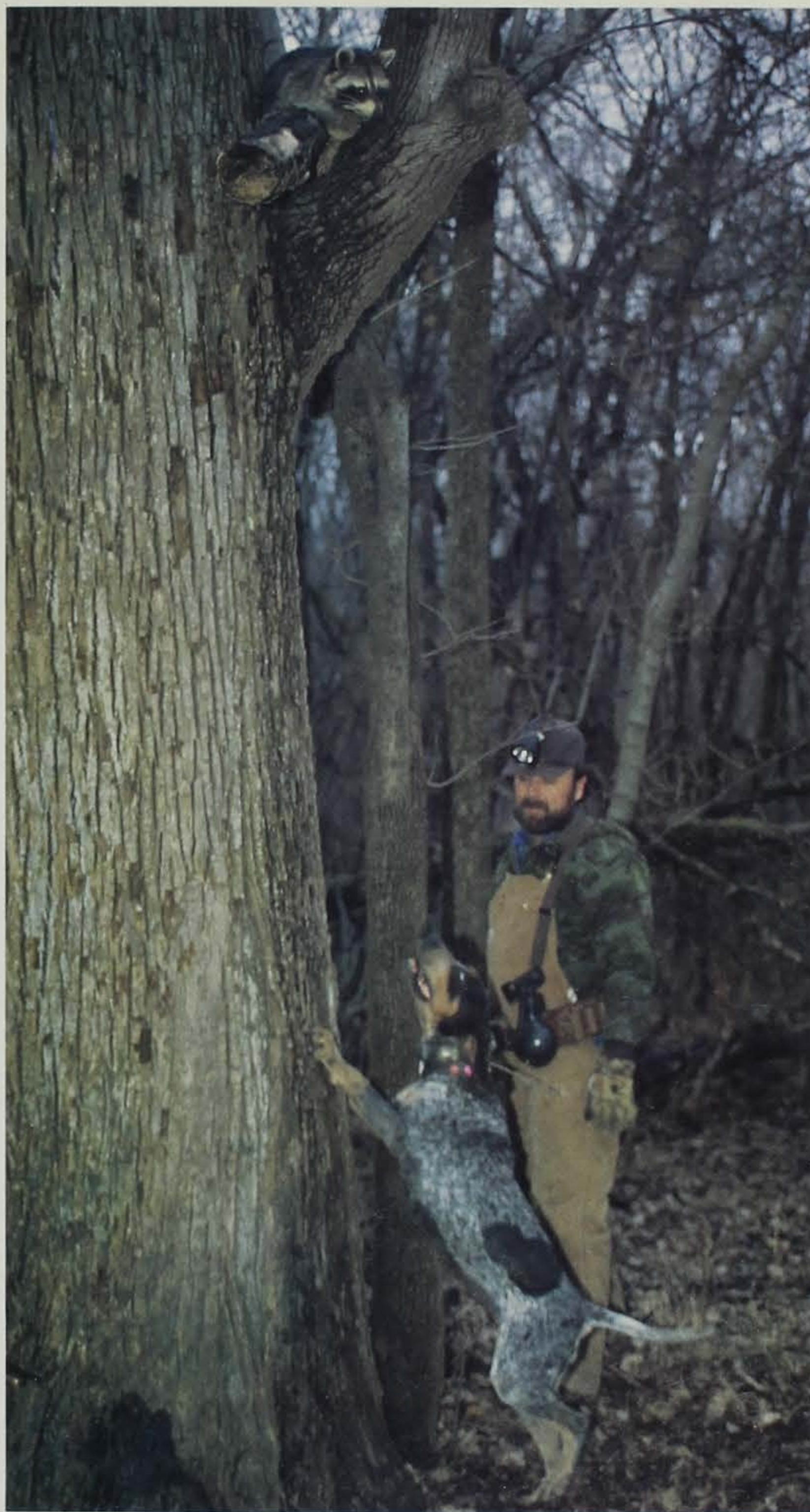
Responding to these concerns, the Iowa Department of Natural Resources has provided funding to Iowa State University's (ISU) Department of Animal Ecology for long-term research studies to unveil the mysteries of reproduction and mortality among raccoon populations. Appropriately enough, a study area along the South Raccoon River in central Guthrie County was selected. The 16-square-mile study area consists of a wide array of interspersed habitats including row crops, pastures, active and aban-

doned farmsteads, and riverbottom and upland timber. Guthrie County raccoon spotlight surveys conducted since 1978 have been consistently at or near the top of the 85 survey routes run throughout the state.

In order to determine the reproductive capability of Iowa's raccoon population, reproductive tracts were collected from raccoon carcasses at fur buyer locations. When raccoons, as well as many other wildlife species, have their young, a dark spot (placental scar) remains in the reproductive tract indicating where the embryos were attached. The data suggests that nearly 60 percent of the yearlings and slightly more than 90 percent of the adults breed each year. By counting the placental scars, the average Iowa raccoon family was determined to consist of three to four young with a range of one to eight. Yearling litter size is, however, about 18 percent smaller than that of adults.

Although yearling raccoons have smaller litters and lower pregnancy rates, their abundance makes their contribution to reproduction of Iowa's raccoon population important. Yearling raccoons account for about one-third of the breeding-age raccoons and they produce nearly 20 percent of the annual raccoon population. Female raccoons between two and three years old make up most of the population, however, and account for 75 percent of the annual reproductive output. This relatively young age structure is indicative of a high population turnover influenced by the high harvest rate. The oldest raccoon collected in the study was an 11-year-old female.

There is a theory among wildlife managers that with some species the more they are harvested, the higher the reproductive output the next year. Results from our studies initially



▲ A record high 390,000 pelts were harvested during the 1986-87 season, but the 1989-90 season was more than one-quarter million pelts below the record of four seasons earlier.

supported this theory, but later, data suggested, like many Iowa wildlife species, excellent food and cover result in reproduction near the maximum for the species. Further analysis will occur before final conclusions can be made about their ability to produce more young after years of high exploitation.

From 1983 through 1989, more than 1,200 raccoons were captured and ear-tagged in Guthrie County. Nearly 350 of these were rigged with radio collars to study their movements, habitat requirements and especially mortality factors. Radios were equipped with motion-sensitive switches that double the radio's signal pulse rate four to eight hours after death. This allows an opportunity to make a quick diagnosis of how the animal died. Because of rapid decomposition of the carcasses during the hot summer months, the quicker the animal is autopsied, the more reliable the results.

Nearly 80 percent of the raccoon deaths on the study area can be attributed to hunting and trapping. This, of course, varies with weather conditions and pelt prices. Road-killed raccoons account for about 10 percent of the overall mortality and is the primary cause of non-harvest losses. Other mortality factors included raccoons being killed by dogs, coyotes, drowning and death from distemper, parvovirus and internal parasites. In total, nearly 90 percent of the raccoon mortality was related to human activity.

Among raccoon young, survival was good with only one out of a litter of three or four dying before September 1. The

young are quite secure when they are in the dens in large trees and buildings, and most mortality occurs after they begin to wander — at about seven weeks old. Once they move outside the den, they



▲
Ear tagging a raccoon.

become vulnerable to dogs, cars and coyotes.

Dispersal is an important aspect of wildlife population dynamics. Most species undergo at least one dispersal period. It is often called a fall or spring "shuffle" because it occurs during those seasons of the year. It is probably nature's way of filling habitat voids and creating an interaction in the gene pool for survival of the fittest. In the study, Guthrie County raccoons dispersed in both spring and fall. The average distance was nine miles from their birth area, but extreme movements of up to 48 miles were seen.

Between two-thirds and three-fourths of the harvest occurs during the first three weeks of the season. Occasionally, January thaws will allow 10 to 15 percent of the harvest to take place then, however, the effective season is only the first four to six weeks. It is impor-

tant to the northern Iowa raccoon population that the season not start later than the first Saturday of November to insure good harvest conditions.

While extending the length of the fur-taking season may seem logical if an increased harvest is desired, in reality only a very small portion of the raccoons will be taken during the extension. In fact, other factors such as deteriorating late winter conditions and pelt quality would offset any positive gains if the season were extended. The study indicated there was no difference in survival between yearling and older raccoons. Mortality of adult males was greater than adult females. Juveniles showed no mortality difference between sexes. Hunters had a marginally significant effect on mortality in juveniles. Hunters returned more radio transmitters in years of high fur harvests than in years of low harvests. Trappers took 67 percent of the adults, but neither group, in particular, contributed to changes in harvest rates among adults. Because there are greater numbers of juveniles, and because of their inexperience and greater activity the first full season of life, they are more vulnerable to hunting and trapping than adults.

An important wildlife management question is what the maximum potential harvest can be before we begin affecting next year's crop. The Guthrie County data suggests about 40 percent is the maximum potential harvest of raccoons. Pelt values and weather conditions all affect that harvest rate; and even under optimum conditions, it ap-

pears unlikely sport harvest ever reaches the 40 percent level for an extended period of time. In fact, if we look at the harvest rate for all years, even with additional monetary reward incentives paid to hunters and trappers, the greatest we could average is 32 percent.

Another question of considerable debate is whether harvest by hunting and trapping is absorbed by the population (compensatory) or decreases it (additive). Additive means causing an animal population decline when harvest is added to other mortality agents like predation and disease. Compensatory means harvest replaces losses caused by other factors and the population does not decline. Research results indicate under very high exploitation conditions, harvest can be additive particularly among young raccoons. However, it appears for adults the mortality is highly compensatory. This is important because as we noted, the largest part of the reproduction comes from the adult females. Most importantly, in average years, with a 25 to 30 percent harvest rate, overharvest of either age group does not occur.

Does substantial harvest keep the population less vulnerable to outbreaks of diseases and parasites such as rabies, distemper and raccoon round worms? The research indicated a small proportion (10 to 15 percent) of raccoons have been exposed to rabies, although whether or not they transmit the disease is uncertain. Iowa public health records average fewer than three raccoons per year showing positive for rabies. The circumstantial evidence indicates few Midwest raccoons are responsible for transmitting this disease. Distemper is very unpredictable, and the study

population only experienced one outbreak during the seven years of research — and it occurred despite high harvest the previous year. Raccoon round worm is highly prevalent, occurring in more than 80 percent of all animals.

The Iowa study is the most comprehensive in the nation because it has been relatively long-term, and because such a large sample of raccoons have been marked. The cooperative effort of the DNR and ISU has enabled applications of the most modern quantitative techniques. Yet, in spite of all the knowledge gained, the mask on the raccoon remains intact, particularly regarding the role of disease. However, the results of Iowa's raccoon research has supported and added to the current raccoon management scheme.

With extremely low pelt values, we enter another era with raccoons, and it will be interesting to observe how this versatile and adaptable mammal will adjust to changing times. In spite of human influence on raccoons, it appears their numbers will remain high because they use

such a wide array of habitats. Perhaps the complete secret of this interesting Iowa mammal's success is hidden behind the built-in mask of this renewable and valuable wildlife resource.

Ron Andrews is a furbearer biologist for the department at Clear Lake.

Bill Clark is a professor for Iowa State University's animal ecology department.

Raccoon Harvest and Average Pelt Price in Iowa

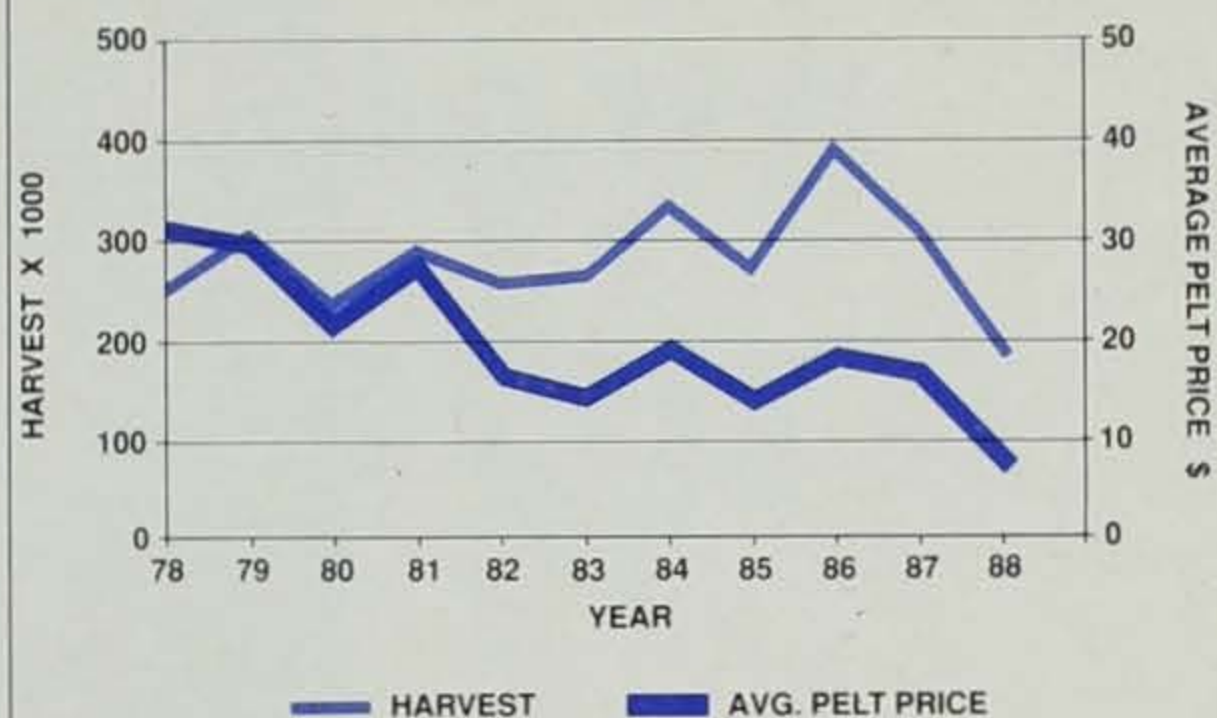


Table 1

Iowa Raccoon Spotlight Survey

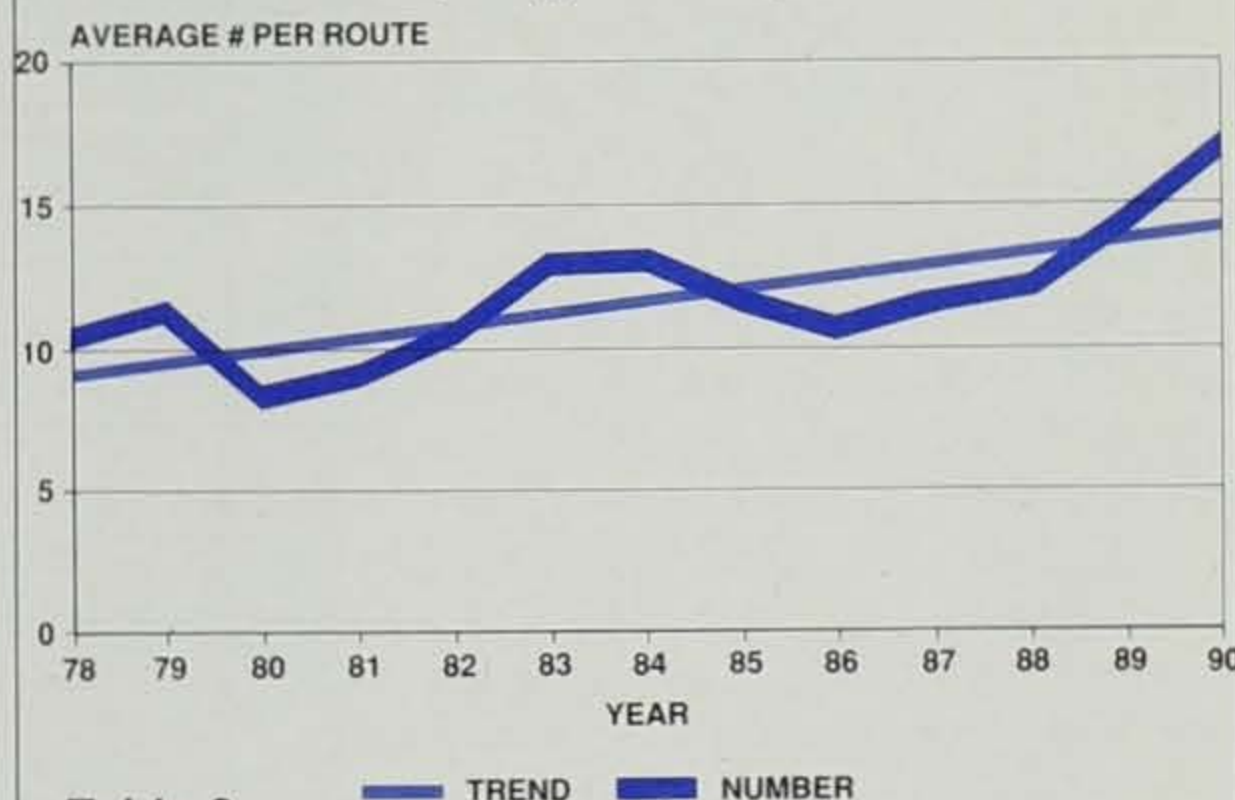



Table 2

▶ The photo at the right also appears on a 19 x 29" poster, complete with information about the Eastern bluebird and Iowa's Nongame Program. The poster is available from your tax preparer when you contribute to the Fish and Wildlife Protection Fund on the 1990 Iowa State income tax form, or with a \$5 donation to the Nongame Program (see page 18 for details).





Bluebird Days Return

Many people in Iowa, especially the younger generation, have never seen an eastern bluebird, even though they nest throughout the state. Some people, who spend a lot of time in front of "the tube," probably are more familiar with African elephants, manatees or some other "flashy" species than they are with bluebirds. They are really missing something because wild animals do not get much flashier than a male bluebird!

The eastern bluebird was never as abundant in Iowa as its relative, the American robin, but it could be found fairly easily up until about the 1930s. The bluebird was most often found near farmyards, around scattered wooded areas with dead trees near open areas, and along roadsides with wooden fence posts. Back in those days, there were nest sites in the form of dead trees and fence posts with cavities.

From about 1950 through 1980, bluebirds were seen much less frequently due to a number of factors. Potential nest sites decreased as wooden fence posts were replaced with steel posts and "unsightly" dead trees and farm groves were removed. The shortage of nest sites was made even more of a bottleneck due to competition from increasing populations of two very aggressive introduced species, the house sparrow and the European starling. Both species, in addition to taking over available nesting cavities, will destroy bluebird nests and, in the case of the house sparrow, even young bluebirds. In addition to these problems, bluebirds also were likely impacted up until the early 1970s by the increased use of pesticides in agriculture.

Fortunately, a number of people became aware of the decreasing bluebird population and realized that a shortage of nest sites was likely the main factor limiting their

Article by Jim Hansen
Photo by Carl Kurtz

numbers. Increasing numbers of concerned individuals have been spending many hours of their time constructing, erecting and maintaining bluebird houses across Iowa. Iowa's Nongame Program has compiled nest box records for Iowa since 1986, and 1989, the last year for which reports are complete, was a record year for bluebird production. In 1989, biologists received reports from 158 cooperators who reported maintaining 3,984 boxes which fledged 6,674 bluebirds. Over a four-year period, dedicated cooperators reported 21,093 bluebirds fledging from their boxes! It is not coincidence that it is now much more common to see a bluebird and hear their beautiful call than it was a decade ago.

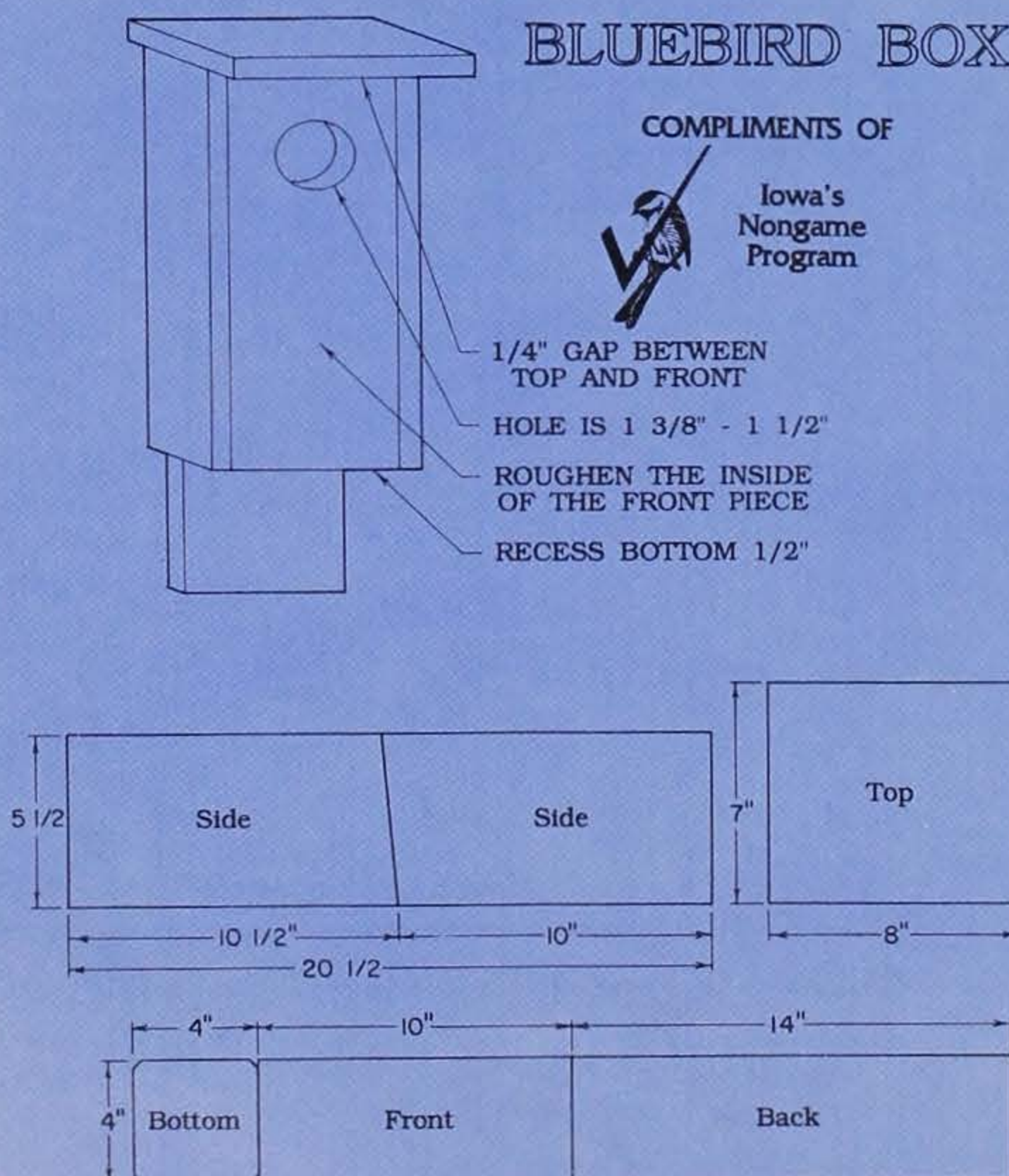
If you maintain bluebird houses and have not been reporting your results to us but would like to, we would be glad to hear from you. A report form is included in "Nongame News," which you can receive by writing to the Nongame Program, Wildlife Research Station, Route #1, Ledges Road, Boone, Iowa 50036. You can request plans for a bluebird box from the same address.

In honor of the beautiful "blue gem," the eastern bluebird is featured on our 1991 nongame poster (page 16). The photograph was taken and donated by Carl Kurtz of St. Anthony, Iowa. You can receive a poster by donating, through your tax preparer, to the "Fish and Wildlife Protec-

tion Fund" (Chickadee Checkoff) on your state income tax form, or by mailing a \$5 donation to the Nongame Program at the address provided above. The program receives some donations, but depends almost entirely upon the checkoff for funds.

Bluebirds will be returning to Iowa early in the spring, often during the first half of March. Thanks to the dedication of the many people who have provided houses for them, you should have a good chance of seeing one.

Jim Hansen is a nongame biologist for the department at Clear Lake.



Recommendations

1. Interior dimensions -- 4" x 4" x 10" high
2. Bottom should be recessed 1/2" with cut corners to ensure dryness.
3. Blunting nails by striking the point with a hammer will minimize wood splitting.
4. Ring shank nails or galvanized screws are preferred.
5. Two-inch overhang on top, good steel post with metal flashing to discourage predation by cats, raccoons and snakes.
6. Place box in open, away from brush and trees to discourage wren nesting.
7. Bottle gourds provide adequate alternative nesting cavities for wrens.
8. Face box opening toward bush or tree or some structure within 50 yards for fledglings' first flight.
9. Redwood or cedar is good wood, paint pine wood a light-colored earth tone.
10. House sparrows are not protected by law. Boxes placed away from buildings, feedlots or typical house sparrow haunts are best.

WARDEN'S DIARY

CHUCK HUMESTON

WHY WE DO WHAT WE DO

This year marks 100 years of service by conservation officers in Iowa.

Obviously, many things have changed since the first Iowa game warden moved around the state, many times by train, enforcing fish and game laws.

But right now, it is important to look to the future rather than the past. When the *Warden's Diary* column was started, I, like the writers before me, didn't want it to become a collection of "war stories." Rather, we hoped to allow you to experience the job as the officers experience it day to day -- to see what we see, and to feel what we feel. So as we face a second century of service to the people of the state of Iowa in the protection of its resources, some names come to mind.

Luc Guindon, Andy Krakow, Barry Decker, Bruce Hill, Murray Doell. You don't know these men. They were conservation officers killed in the line of duty in the United States and Canada last year. Guindon was killed by someone with a crossbow in Quebec. Krakow was shot by a 13-year-old boy while helping another agency during a domestic disturbance in Wisconsin. Decker and Hill were killed in a boating accident in Texas while on navigation patrol. Doell was killed in a helicopter crash

during a forest fire in Saskatchewan.

Iowa has not been without losses in its 100-year past. Maurice Baggs drowned. Harry Blomquist was killed in a car crash.

No, I did not know these men personally, but the fact they wore the badge of a conservation officer means I can assume certain qualities about them.

These men chose to accept a profession of service to others. One thing I have learned is one cannot be in the position of service without also caring.

These men cared along with the men and women I work with about intangibles. How do you put a price on a flock of geese lifting off the

**How do you put a price
on a flock of geese lifting
off the marsh at dawn?
Of what value is the wild
turkey seen moving fur-
tively along the hillside
in the timber?**

marsh at dawn? Of what value is the wild turkey seen moving furtively along the hillside in the timber? Of what lasting significance is the look on a child's face sharing a hunt with their mother or father?

Things like this are our concern. I remember while attending the University of Iowa

in the early 1970s, the "Save Our Environment" pleas. Where are all those people now? One thing I have also learned is that it is easy to talk about caring about our resources. It is entirely different to do something about it. I have seen officers translate their talk into action, many times at the cost of their privacy, their health, their families and, as with these men, their lives.

As with any law enforcement job, this caring is sometimes unpopular. It brings to mind the officer issuing a waterfowl hunter a citation, upon which the officer was asked, "Whose side are you on?" The officer pointed at the ducks overhead saying, "I'm on their side."

Some would say wildlife is not important in the face of progress. Some cannot see the value in a swamp. Some would say the hunt is a dying tradition. For 100 years, we have said these things are precious and needed for the basic quality of life. They keep slipping from us, and in the next century of service we face increasing obstacles to their protection.

So, personally, I look back at the great sacrifices made by these officers. I look back at the job done by those who have worked the badge before me. I look at the men and women wearing the badge now and feel pride at being associated with individuals of such a level of dedication. Then I look at the delicate, easily lost, beauty that is Iowa, and remember *this* is why we do what we do.

CONSERVATION UPDATE

PUTTING GAS PRICES IN PERSPECTIVE

by Richard Ney,
energy data analyst

On Aug. 2, 1990, Iraqi tanks rolled through the tiny country of Kuwait. Minutes to hours later, the gasoline prices at pumps in the United States rose an astonishing 10 cents per gallon. What is the connection between those tanks thousands of miles away and the gasoline already in neighborhood gas stations' tanks?

Part of the answer can be found another thousand or so miles from Iowa, at the New York Mercantile Exchange, or NYMEX. At the NYMEX, as well as at the exchanges in London and Singapore, speculators bid for current delivery of products, called spot market purchases, and they bid for supplies for the future. Prices for both the spot and futures markets are determined by what those speculators are willing to pay to ensure supply.

When the availability of future supply is



Ron Johnson

▲ Shortly after Iraq invaded Kuwait last August, fuel prices skyrocketed worldwide. Although Americans are paying more than they were six months ago, prices are still much less than those in Japan and Europe.

in question, as it was following the invasion, those who are purchasing futures are generally willing to pay more for that assurance. Think of it this way. If you think the price is going to be \$60 in three months, then you will probably be willing to set a contract at \$50 for that same period. Both prices are higher than the current \$25, but you think you are getting a deal on that futures contract.

In the weeks following the invasion, every news report which even

remotely indicated the possibility of further hostilities led to higher prices because the speculators were quick to react by bidding high to lock in supply they perceived would be short. With time, the hysteria and panic of this kind of market wears out. Speculators seem to tire of rushing to bid every time there is a new announcement concerning the situation, and it gets to be a "boy-cried-wolf" reaction.

Eventually the market changes. Recently we have

seen the market "psychology" change from a war-news reaction to a peace-news reaction. Now the market is reacting more strongly to peace prospects than to war. Another oddity in the crude oil market is the emotional basis behind nearly every action in the world's major oil producing region, the Middle East. When the Florida citrus crop is forecast to freeze, prices of that commodity skyrocket overnight, but the market is not stirred by such an emotional event as a crisis which threatens oil supply in the Middle East.

When the prospect of military conflict is raised, the market is even more emotional and thus more reactive than ever. In the long run, this feature of oil price volatility also runs its course and we are allowed to fall back once again on true supply and demand principles. But until that time passes the normally volatile oil market has every change magnified by the effects of emotion.

How does the

market in New York affect prices at the local gas station in what seems like only a matter of minutes? The Midwest market does not possess the very large refineries common in the coastal areas, so refinery-owned stockpiles are relatively limited. This means that a good portion of our product supply (gasoline,

prices rise more quickly than in other areas of the country.

On the flip side, our prices also tend to fall faster. There is talk that in the future, wholesale gasoline prices will be directly tied to the NYMEX spot price. It will be sold at some margin above the spot price current at the time supply is picked up from the

cents, including zero taxes. In 1990 we are paying near \$1.40 per gallon, including taxes totalling 29 cents. When accounting for inflation since 1949, that 26.8 cents becomes \$1.14 and when you add today's 29-cent tax figure, it becomes \$1.43. Thus, the actual price of gasoline itself, a much better

in total. Even now, in the face of the third major supply crisis in the last two decades, Americans are still using cheap gasoline. --*Iowa Energy Bulletin, December 1990*

New Trapping Law In Effect

Trappers are reminded of a new law that requires all animals caught in any type of trap or snare must be removed from the trap or snare by the owner within 24 hours of the time the animal is caught.

According to officials with the Iowa Department of Natural Resources, only those animals which are caught in a trap placed entirely under water and designed to drown the animal immediately do not have to be removed within the 24-hour limit.

The trapping season continues through Jan. 20, 1991, for mink, muskrat, raccoon, weasel, striped skunk, badger, opossum, red and gray fox and coyote. The season for beaver runs through April 7, 1991.

Comparison of U.S. and International Gas Prices and Taxes, October 15, 1990 (U.S. \$ per Gallon)

	Gasoline Price	Tax Component	% Tax
Italy	\$5.10	\$3.57	70
France	4.54	3.12	69
United Kingdom	3.66	2.09	57
Germany	3.47	1.99	57
Japan	3.79	1.39	37
United States	1.34	.25*	19

*Average tax paid in U.S. is \$.25 per gallon. Tax in Iowa is \$.29 per gallon
Source: International Energy Agency.

diesel, etc.) is purchased based on the spot, or cash, market price, and the supply has to be replenished much more frequently than the rest of the nation. The net result is that Midwest prices are very closely tied to the NYMEX and in times of rapidly rising prices, our

wholesale terminal.

Other crucial factors to consider in the price of gasoline are taxes and inflation. The effects are not seen as dramatically as a war threat in the Middle East, but their effects are cumulative, and very long lived. In 1949 the price of a gallon of gasoline was 26.8

product now than it was in 1949, is actually lower than it was in the "good-old days."

Americans still pay only about one-third of what Japan and the European nations pay for gasoline. Many of those countries charge more in tax than Americans pay

CONSERVATION

UPDATE

Upcoming NRC, EPC and Preserves Board Meetings

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

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

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

Natural Resource Commission:

--Feb. 6-7, Des Moines
--March 7, Dubuque
--April 4, Council Bluffs

Environmental Protection Commission:

--Jan. 22-23, Des Moines
--Feb. 18-19, Des Moines
--March 18-19

State Preserves Advisory Board:

--March 12, Des Moines

Iowa Hunters Fight Hunger

Hunters can help fight hunger among Iowa's needy this winter. As part of its "Sportsmen Against Hunger" campaign, the Safari Club International is asking 20 million U.S. hunters to share their game meat with the hungry by donating it to local Salvation Army outlets.

Iowa hunters are asked to have their game meat commercially processed into two-pound packages (no mixtures of domestic meats) at their own expense and drop it off at one of three Salvation Army locations:

Cedar Rapids --
2920 First Avenue NE,
(319) 365-1491 (Capt. Doug Stearns)
Davenport -- 420 W. River Dr., (319) 323-2748 (Maj. J. Arnold Miller)

Des Moines -- 133 E. 2nd St., (515) 243-4277 (Maj. Gerald Smelser)

Each location operates a 24-hour drop-off service for hunters' convenience.

According to Bruce Hupke, Iowa coordinator for the Safari Club International campaign, the program was launched in the fall of 1989. In the first six

months of the program, more than 50 tons of deer, elk, antelope, bison and other game has been donated nationwide.

"This is Iowa's first year for contributions," said Hupke. "We are asking hunters to please fill out the donation forms when delivering meat to the Salvation Army. We would like to keep track of Iowa's contribution to the "Sportsmen Against Hunter" program."

Ice Fishing Shelter Laws

Ice anglers are reminded of the laws regarding ice shelters on state-owned land or waters.

Ice fishing shelters left on the ice overnight must have the owner's name, street address and city in four-inch or larger block letters on all sides in a color contrasting to the background. This owner information will act as a permit.

All fishing shelters left on the ice after sunset must have amber reflectors attached to all sides of the structure. Also, the structure must not be locked while in use.

Shelters must be removed from all state-

owned land or waters on or before ice out or by Feb. 20, whichever comes first.

Warden's Cookbook Supplements Available

Supplements to the *Warden's Cookbook* are now available. The supplement includes many new recipes as well as the top three place winners in the 1990 Iowa State Fair "Wild Game Cook-off," and a section on the care and cleaning of wild game.

The supplement and cookbook can be purchased from your local conservation officer for \$5 and \$10 respectively or can be ordered from George Hemmen, Rte. 2, Box 259, Guthrie Center, Iowa 50115. Please include \$2 for postage and handling for each supplement or cookbook ordered by mail.

Iowa Trophy Deer Records

Deer hunters who successfully bagged a deer with trophy-sized deer antlers are encouraged to enter the rack in Iowa's annual big game records registry.

Award certificates and patches will be issued to eligible entries



which meet minimum standards set by the Iowa Department of Natural Resources. A list of deer taken and measured each year will be printed in the *Iowa Conservationist* magazine.

In order to qualify for an award, however, a rack must be measured and scored by an official scorer for the Boone and Crockett (firearms) or Pope and Young (archery) clubs, or by a wildlife biologist, conservation officer or other individual certified by the DNR. The scoring system used for Iowa records is identical to that used by the Boone and Crockett or Pope and Young clubs.

Award certificates will be presented in six classes. The classes, with minimum scores for each, are:

Shotgun

Typical -- 150 Points
Non-typical -- 170 Points

Muzzleloader

Typical -- 150 Points
Non-typical -- 170 Points

Archery

Typical -- 135 Points
Non-typical -- 155 Points

Deer hunters possessing trophy racks which have not been officially measured may contact the Iowa Department of Natural Resources, Wallace State Office Building, Des Moines, Iowa 50319-0034, (515) 281-5145.

Because of shrinkage in varying degrees, racks taken during the recent hunting season cannot be measured for at least 60 days in order for the antlers to dry properly.

CLASSROOM CORNER

by Robert P. Rye

We spend about 90 percent of our time indoors -- at work, home, school and play. We are bombarded with thousands of household chemicals, gases and pollutants that we breathe, touch or eat daily. How much do you know about items in our homes and alternatives to them?

1. Air fresheners will remove harmful smells from your home.
2. Natural gas combustion in your home is a major source of indoor air pollution.
3. Lead exposure is increased by lead carried by our shoes attaching to household dust.
4. Radon is an invisible, odorless, tasteless and harmful gas which can be removed from homes with ventilation.
5. The best treatment for insects in the home is to remove the food they are after.
6. Aerosol sprays are made safe with modern chemical changes.
7. Glass cleaner with ammonia is to be used with good ventilation and sprays should be avoided.
8. Scouring powders may have harmful chlorine bleach and acid and should be avoided.
9. Brass and copper cleaner can be made from lemon juice or combining lemon juices and salt or baking soda.
10. Moth balls are a safe way to prevent insect damage.

ANSWERS:

1. False. They send a concentrated chemical into the air. 2. True. It produces nitrogen dioxide, nitrogen oxide, carbon monoxide, formaldehyde, etc. 3. True. 4. True 5. True. In some cases additional cleaning and washing will be necessary. 6. False. Most aerosols are inhaled in the home and contain petroleum distillates. If they must be used, select non-toxic and non-flammable ingredients. 7. True. Vinegar is a safer substitute. 8. True. A good substitute is liquid dish soap and baking soda. 9. True 10. False. Use sachets of dried lavender -- equal parts of rosemary and dried tobacco, whole peppercorns or cedar chips.

COUNTY CONSERVATION

DICKSON TIMBER PRESERVE

Article and photos
by Joe Halbur

Even before 1970, when the 155-acre woodland area became a county park known as Dickson Timber Preserve, this land supported people at different times in many ways.

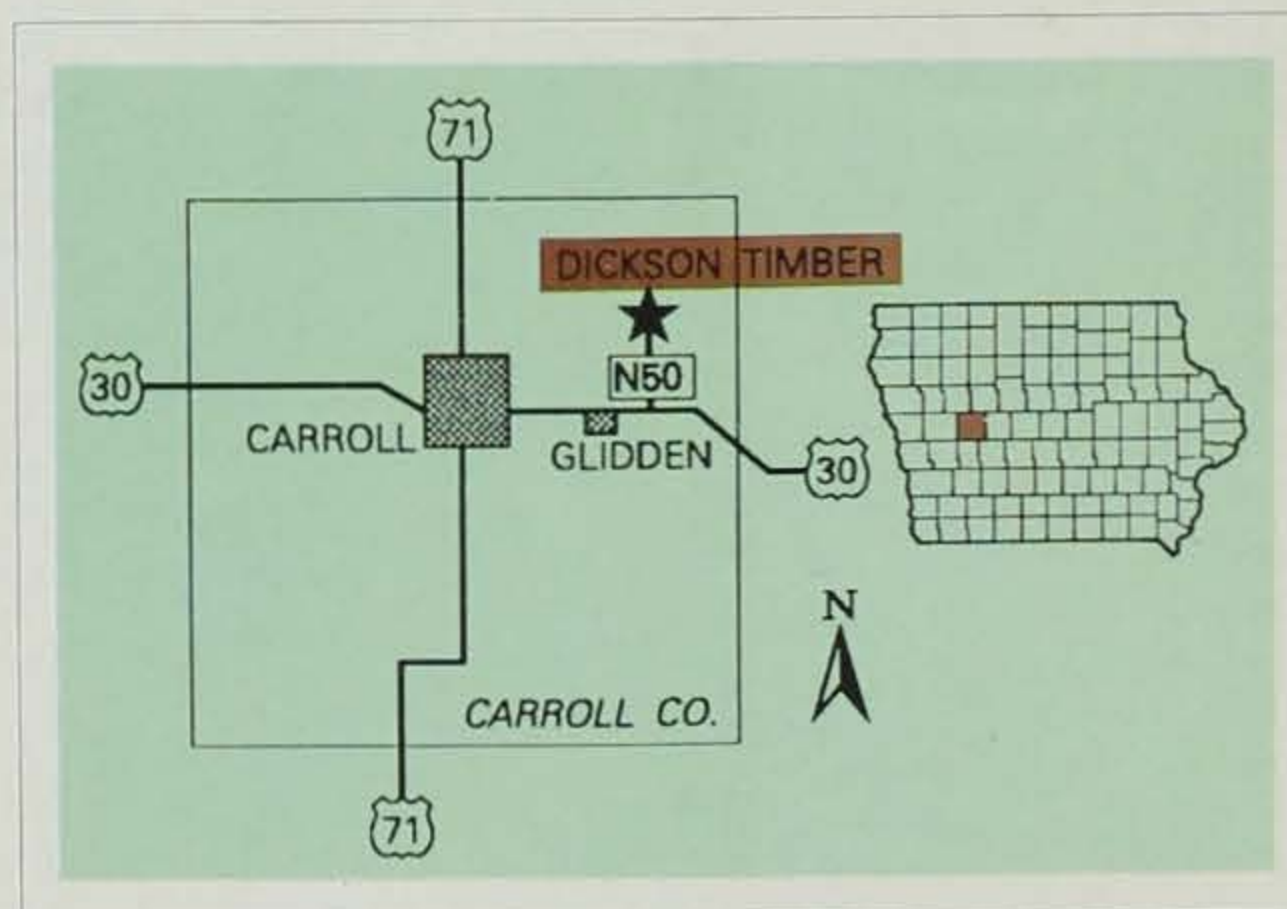
Long before the arrival of European settlers in 1855, several Native Americans tribes and their ancestors used the woodland as an over-wintering home, protected in a small valley created by a glacier and its run-off waters some 8,000 years earlier. Occasionally, a pottery shard or projectile point is found in the bed of the stream flowing through Dickson Timber, evidence of these early inhabitants.

When Robert Dickson and his family came to the territory in 1855, he, like others before him, looked upon this land as a place of sanctuary and hope. He built a small cabin for his family on the southern edge of the timberland. Using the oak, walnut and hickory timber from the woodland, he built a one-story, one-room house that he would use until 1876 when he built a two-story, multiple-room house, again using the native lumber of this woodland.

As the northeast corner of Carroll County became



▲ The Dickson Timber Preserve offers a variety of outdoor activities -- from camping and picnicking to bird watching and hiking.



▲ Dickson Timber is located two miles east and four miles north of Glidden in Carroll County.

more populated, the woodland became a meeting site for various activities -- hunting, church services, picnics and even the site of a sawmill. Today many activities are still available to residents of Iowa who visit Dickson's timber.

Entering on the east side of the preserve from a local

county gravel road, an enclosed shelter and playground equipment greet visitors. Primitive camping and several campsites with electrical hookups are available at a minimal charge. Several miles of hiking trails criss-cross the hills and valleys of Dickson Timber Preserve, allowing



▲ **Dogtooth violet.**

visitors to enjoy its natural beauty and serenity. For bird watchers and lovers of native flowers, Dickson Timber's trails offer opportunities to wander and explore. Some of the farm buildings from the time of Robert Dickson still stand on the south edge of the timber.

To enjoy some of the natural beauty of the 1850s, take time to hike the trails of Dickson Timber. You won't be disappointed.

Dickson Timber is located two miles east and four miles north of Glidden in Carroll County.

Joe Halbur is a naturalist with the Carroll County Conservation Board.

CALENDAR

JANUARY 13

Big Creek Ice Fishing Tournament. Two-person team tournament on Big Creek Lake. Entry fee of \$8 per team. Grand prize is a portable ice fishing shelter with complete gear. For more information, contact Big Creek State Park, Rte. 1, Box 37, Polk City, Iowa 50226, (515) 984-6473.

JANUARY 19 AND 20

Bald Eagle Days. Keokuk will be hosting its seventh annual Bald Eagle Days. Indoor programs and displays will be at the Keosippi Mall on Main Street in Keokuk. Outdoor observation areas will also be available. For more information, contact the Nongame Program, Iowa Department of Natural Resources, Wildlife Research Station, Rte. 1, Ledges Road, Boone, Iowa 50036, (515) 432-2823.

JANUARY 27

Cedar Rapids Bass Masters' Winter Fishery. Pleasant Creek State Recreation Area is the site for this winter event, featuring an ice fishing tournament with prizes for species and size. For more information, contact Pleasant Creek State Recreation Area, Drawer C, Palo, Iowa 52324, (319) 436-7716.

FEBRUARY 2 AND 3

Bald Eagle Days. The Quad Cities will hold their Bald Eagle Days at the RIMCO Building. Displays and indoor programs as well as outdoor observation areas, will be available. For more information, contact the Nongame Program, Iowa Department of Natural Resources, Wildlife Research Station, Rte. 1, Ledges Road, Boone, Iowa 50036, (515) 432-2823.

FEBRUARY 9

Winterfest 90. McIntosh Woods State Park is the location for a festival of winter activities such as snowmobiling, cross-country skiing, snowshoe races, ice fishing tournament and ice sculpture contest. For more information, contact McIntosh Woods State Park, Ventura, Iowa 50482, (515) 829-3847.



Ron Johnson

▲ **Bald Eagle Days at Keokuk.**

V • O • L • G • A

A Lake To Be Reckoned With

by Gaige Wunder

For many anglers, a trip to northeast Iowa does bring to mind lake fishing. An outing to Decorah, Manchester or Fayette means catching smallmouth bass, trout or channel catfish -- not bluegill or largemouth bass. Well, there are lakes here, but in this bluff and valley setting they are a little hard to come by.

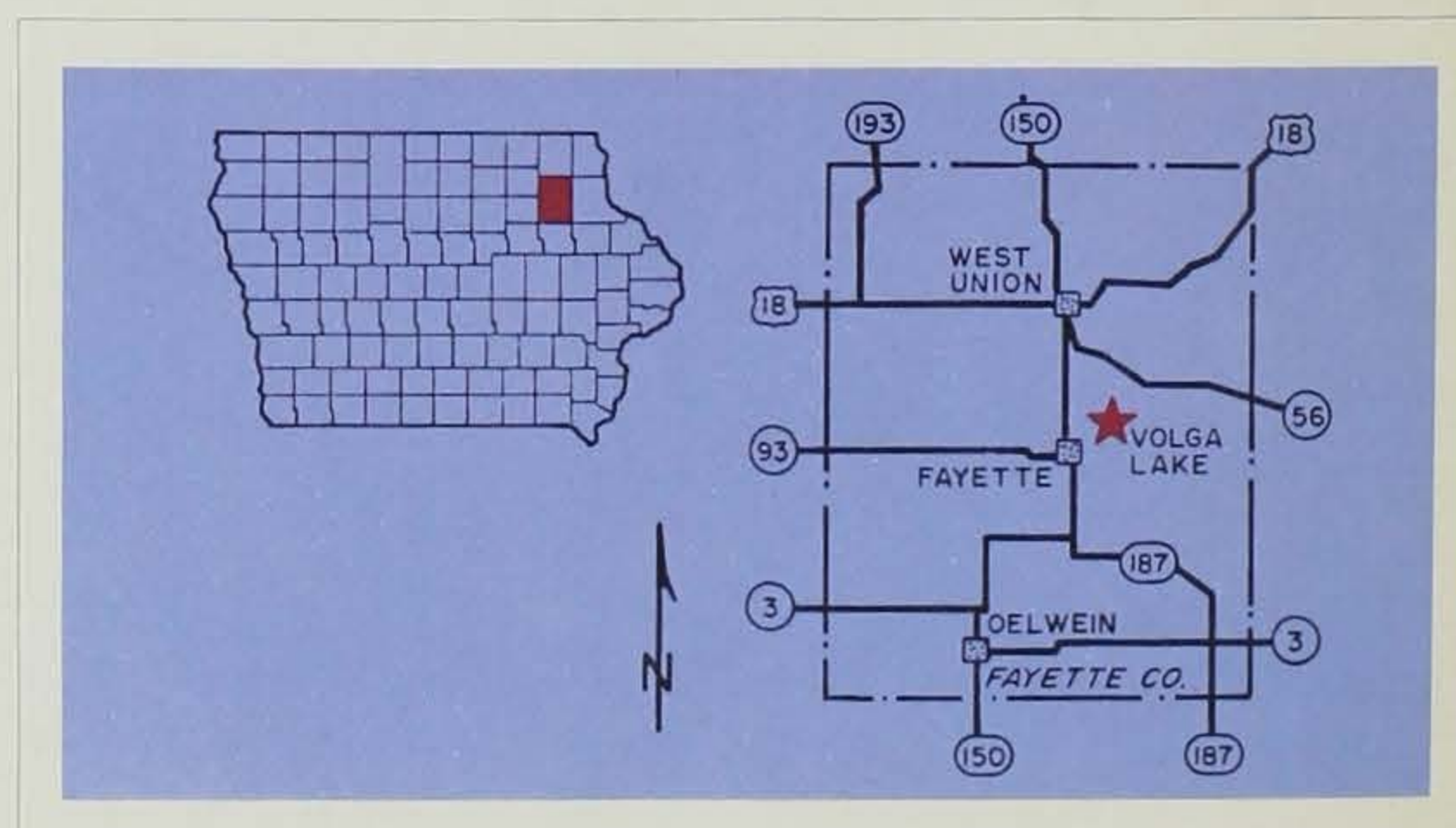
Volga Lake is one such lake located in Fayette County midway between West Union and Fayette. It is situated just off Highway 150 in the far northwest corner of the beautiful 5,432-acre Volga River Recreation Area. This multiple-use complex is managed not only for fishing and boating on the lake but for many other outdoor activities such as hunting, camping, picnicking, horseback riding, hiking and snowmobiling.

Acquisition of property for a lake began in the late 1960s and was completed by the mid-70s. Originally, planners envisioned a large lake -- perhaps several hundred acres -- but local topography and soil types posed problems. Engi-

neers determined none of the proposed lake sites on the area would hold water. Exposed limestone and sand deposits provided natural drainages in dozens of spots that would have to be eliminated or otherwise plugged before any lake could be developed. It would be like trying to fill a bathtub with the drain plug missing.

Several proposals for sealing the lake bottom were explored to plug these natural drainages and assure the lake would hold water. All of the solutions had a

similar characteristic -- they were expensive which meant the lake had to be small to be affordable. Finally, it was decided to construct a 135-acre lake at its present location and seal the lake bottom with a thick layer of clay subsoil. A clay deposit was located just west of the lake site to provide the material for the seal. The clay was spread over the lake bottom at depths varying from four feet near the dam to about one foot deep in the upper portions of the lake and shore-

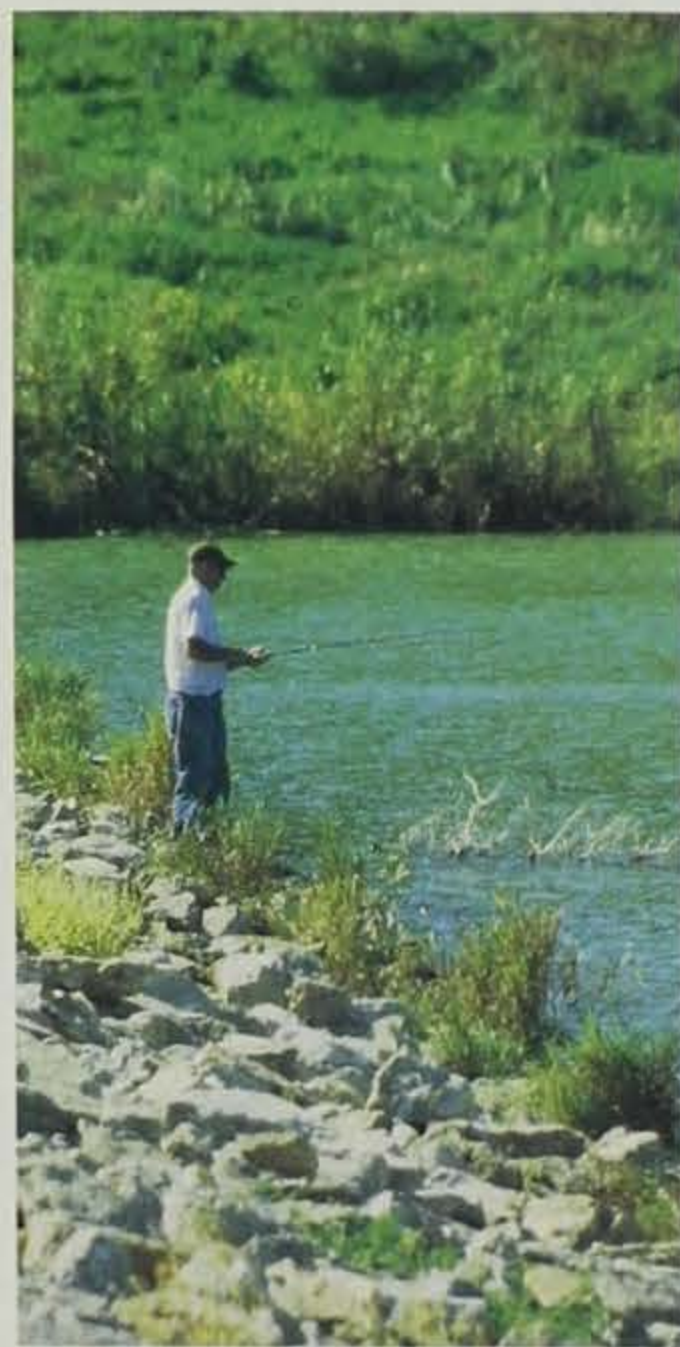




line. As part of the sealing process, all trees and vegetation which would decay and provide a possible waterway through the seal were removed. The grubbing and sealing process provided a watertight lake bottom, but created a rather sterile, uniform and inhospitable habitat for the first aquatic organisms to inhabit this new lake.

The dam was closed and the lake filled late in 1979. Water clarity in the new 135-acre lake was very good, with visibility of up to eight feet of water. But the water had a greenish-grey cast reminiscent of the sterile, unproductive water often found in gravel or sand quarries. Some local predictors saw a dim future for fish and fishing in this lake.

In the 10 years since im-



DNR Photo

▲ After many improvements in both fishery resources and facilities, only one thing seems to be missing from Volga Lake -- anglers.

◀ Lake fishing in northeast Iowa is a little hard to come by. One exception is Volga Lake

poundment a great deal of change has taken place in Volga Lake. The lake was initially stocked with largemouth bass, bluegill and channel catfish. An additional year class of largemouth bass was added to assure a vigorous population and reproductive success. Multiple "maintenance" stockings of channel catfish finger-



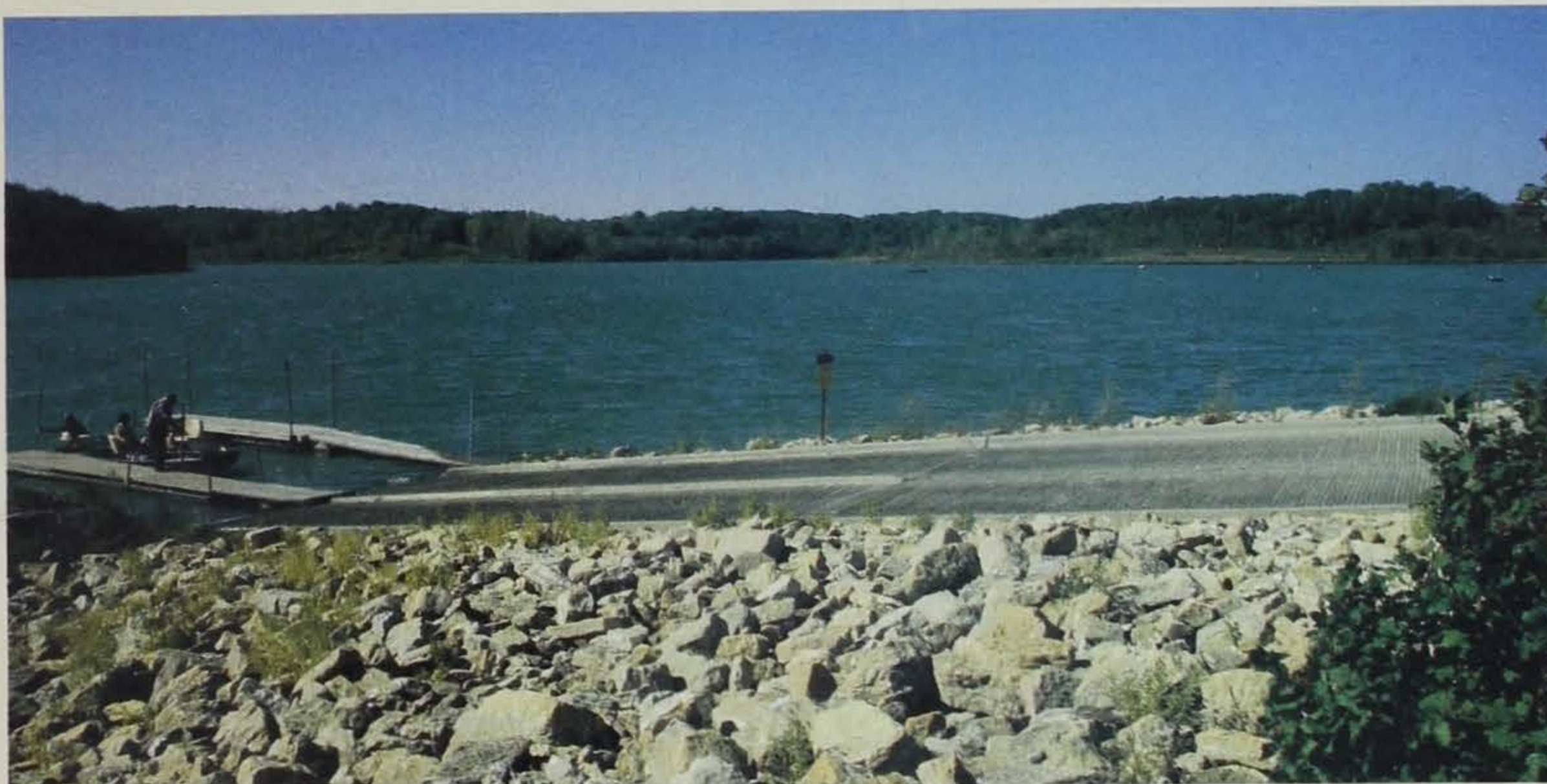
Ken Formanek

lings have been supplied over the years to replace those removed by anglers and natural mortality. White amur were stocked for vegetation control in the shallow sections of the lake. Several types of fish hides or attractors have also been added to provide cover and diversify the lake habitat. These include concrete culverts, brush bundles, stake beds and used-tire triangles. A two-lane boat ramp with docks, a paved parking lot and rest room facilities have been completed. And finally, a contour map of the bottom was published to assist anglers plying the waters of Volga Lake.

Growth and reproduction of all aquatic life was slow in the first years. The lake remained relatively clear and had few signs of the richness usually associated with Iowa lakes. Plankton and bottom-dwelling invertebrates which normally form the base of a lake's food chain, were absent or nearly so. Fish grew in the lake but never showed the real "boom" in either size or numbers that is usually associated with new lakes.

But time heals all ills and the lake has gradually become richer and more fertile to where it now rivals most Iowa waters. Plankton blooms occur occasionally and the lake bottom is bustling with assorted fauna perfect for a feeding fish. Angling that was subpar in the

◀ Channel catfish have provided good fishing in Volga Lake for many years. Future plans include continued stocking of large channel cat fingerlings.



DICK FLOD

early years has improved steadily and has been excellent in the past two years.

Bluegill anglers particularly at Volga Lake have benefited from the improvement. Although the 'gills were not large, they were abundant, especially for anglers drifting across the old creek channels in the upper bays of the lakes. Fish baskets with several dozen six- to seven-inch bluegills were common from late May to mid-July. Throw in a few crappies for variety and the panfishing could not have been much better.

Largemouth bass also had a slow start in the lake but have improved in size and numbers to support a moderate fishery. Volga Lake, like a majority of Iowa lakes, has a 15-inch size limit on largemouth bass. Most of the bass are under this size limit and must be returned to the water, but offer an excellent catch-and-release fishery. Like

the bluegill population, the bass are smaller but plentiful.

Channel catfish have provided good fishing in Volga Lake for many years. These fish are opportunistic feeders and apparently use whatever food items are available in the lake and have never shown the slow growth of the other fish species. Volga Lake catfish were almost all taken from dusk to late evening with most fish in the two- to three-pound class.

Other improvements on the surrounding recreation area include paved major interior roads, construction of a primitive campground and silt retention structures in the lake watershed. Future plans call for improving the existing campground and adding a combination campground and beach facility on the west side of the lake.

What is ahead for Volga Lake? The fish populations and

▲ **A two-lane boat ramp with docks is just one of the many new facilities at Volga.**

associated habitat will be monitored for changes in quality. Large channel catfish fingerlings will continue to be stocked and white amur will be added as needed to control vegetation. Muskies will be stocked annually over the next several years in an effort to establish a new and exciting trophy fishery in the lake.

Otherwise, the only thing missing in Volga Lake's future is anglers. Why not stop by and wet a line?

Gaige Wunder is a fisheries biologist at the Decorah Fish Hatchery.

Contending with a Crisis

by Sharon A. Tahtinen

The world watches the escalating tension between Iraq and Iran with more than mere curiosity. In fact, a U.S. ship has already hit a mine in the Persian Gulf and the U.S. has retaliated by bombing an Iranian naval base and nerve center for the Iranian electric grid which prevents crude oil from being pumped.

Intelligence sources indicate a terrorist attack is being planned for the U.S. -- presumably in a major metropolitan city or petroleum refinery region such as Texas. Instead the strike is made right here in the heartland, targeting fossil fuel plants in Cedar Rapids and Marshalltown. The result is three bulk power substations and 12 power circuit breakers sustain extensive damage. Lack of power is critical to Rockwell International and several other local industries which are defense suppliers.

The situation is complicated because a major natural gas pipeline, compressor station and control room in Nebraska are also hit resulting in a 20 percent loss in supply. Although there was a crude oil surplus on the market when the events began, the U.S. demand increased sharply and with the loss of Iranian supplies, the oil spot market price rapidly doubled.

The above scenario is a simulation exercise sponsored by the Department of Natural Resources in October 1988 to analyze the Energy Emergency Preparedness Plan for the state of Iowa. Twenty-six "players" examined the internal disruption of electricity and natural gas in Iowa, and an international disruption of oil (closing the Persian Gulf) that would lead to the possibility of releasing oil from the Strategic Petroleum Reserve (SPR).

The Energy Emergency Plan was developed in 1980 to define emergency conditions, identify actions to address emergencies, coordinate a plan for public information and define key players in the implementation of the plan. The overall goal of the plan is to assure the welfare and safety of Iowa's citizens.

Iowa's plan is compatible with federal energy emergency planning efforts, activities and philosophies. These plans are intended to become operational only when private markets cannot provide for the health, safety and welfare of the state. The shared federal/state strategy is to allow market principles to guide action to the maximum extent possible. The strategy further focuses on the reduction of federal involvement in the affairs of state and local governments. And finally, the plan relies on strategic crude oil stockpiles as the first line of defense, with a policy to draw down the SPR early and in large volumes in the event of an oil supply disruption.

There are four phases outlined in the plan: the readiness, verification, pre-emergency and emergency phases.

◆ **Readiness** -- "business as usual," with normal monitoring of national and international events and conditions that could create an emergency.

◆ **Verification** -- increased attention to existing situations -- closely watching for possible shortages to determine severity, duration and supply/price impacts. DNR staff are ready to make recommendations to the Energy Emergency Advisory Council (administrators from the Departments of Natural Resources, Public Defense and Commerce) who advise the Governor of alternative plans.

◆ **Pre-Emergency** -- entered when shortages or supply disruptions worsen. The Governor will appeal to the public to voluntarily participate in

1992 campaign for military support

energy conservation efforts which can help in offsetting the shortage.

♦ **Emergency** -- entered when the crisis has gained enough momentum and severity that mandatory emergency response measures are required and the Governor may proclaim a state of emergency.

Mandatory measures may include regulation of operating hours of public and private businesses, establishment of a system to distribute and supply energy resources, and curtailment of public and private transportation that uses energy.

The Governor may also elect to activate the state's set-aside program if the emergency has created an imbalance in the distribution of liquid fuels. The lack of these needed fuels can cause undue hardship and threaten the well-being of the state's citizens. In response, the set-aside program is designed to help priority end-users, such as public services and national defense, to acquire sufficient quantities of propane, gasoline and heating fuel.

Under this program, a prime supplier is required to reserve a percentage (5% gasoline, heating oil and diesel oil, and 3% propane, aviation fuel and residual oil) of its projected monthly release of liquid fuel for qualified priority users at market prices. Along with public services such as emergency health, fire, police and the national defense, residents will be given top consideration to meet demands for heating fuel. Again, the program, like the entire energy emergency plan, is to be used only if the petroleum industry is unable to respond adequately to emergency and hardship needs during a shortage.

While the state has its set-aside program, the federal government's most important emergency response program is the release of the Strategic Petroleum Reserve (SPR). The SPR was created in 1975, to reduce the risk and hardships of an oil crisis. It consists of government-owned crude oil stockpiles in below-ground caverns, which can be removed in the event of a severe oil supply disruption. The government's goal is to establish a reserve of 750 million barrels of crude oil. As of July 1990, there were 590 million barrels in reserve, with a withdrawal capability of 3.5 million barrels per day. Before the SPR can be used, the resident must declare a severe energy supply

interruption exists or the use of the SPR is necessary to fulfill U.S. obligations.

For the use of SPR to be effective, the sale and distribution of the the reserve must operate quickly, allowing successful bidders to obtain the oil. The Department of Energy estimates it will take a minimum of 30 days from the President's authorization for the first barrel of oil to be shipped to the first cycle of bidders.

Governmental programs can help to aid in the event of severe supply disruptions but individuals become key players in conserving energy. Consumers can have an impact on supply, and therefore prices, by carpooling, reducing their trips and maintaining their vehicles.

In the home, furnace tune ups, reduced water/space heating consumption or use of energy at off-peak times can also significantly impact prices. Conservation is particularly meaningful to Iowa, which imports 98 percent of its energy.

In addition, an integral part of any preparedness is "gaming" exercises such as the one described at the beginning of the article. This exercise readied the "players" for real life occurrences and affirmed several key points:

- ♦ Government involvement of emergencies should be limited to coordinating and support of local governments.
- ♦ The development of a good public information plan and the transfer of information is critical.
- ♦ Prioritizing who will get fuel first is necessary.
- ♦ Government should become involved only as a last resort -- when the private market can no longer provide for the health, safety and welfare of the state.

The DNR has made emergency planning and preparedness a priority and is developing an annual exercise to be ready to activate the energy emergency plan and the set-aside program if necessary. For a state that imports 98 percent of its energy, it makes sense to reduce our dependence on foreign oil and indeed pays to be prepared in the event disruptions do occur.

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