



Iowa CONSERVATIONIST

July/August 1992

Department of Natural Resources



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Iowa CONSERVATIONIST

July/August 1992
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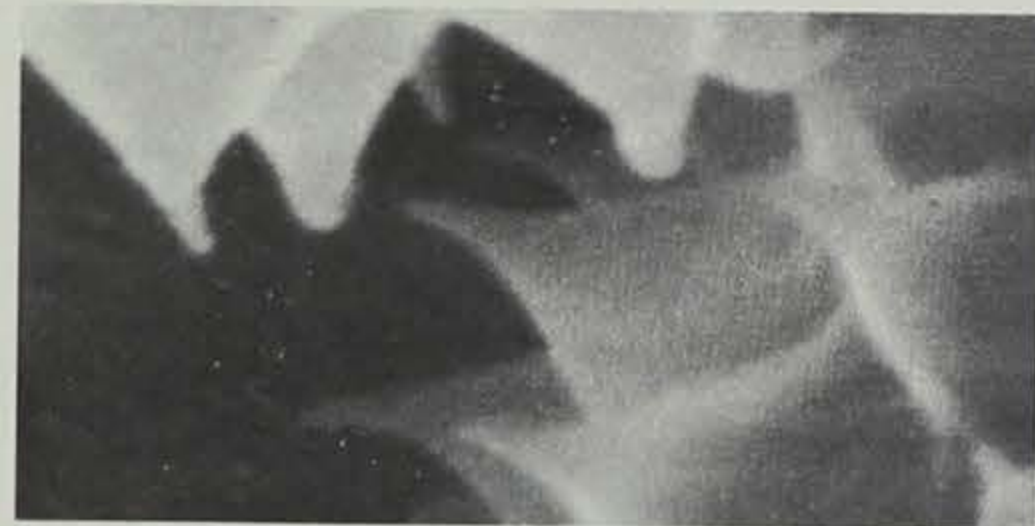
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The Solution Begins at Home

With more than 2.8 million residents generating three and one-half pounds of trash a day, the answer to Iowa's limited landfill space and waste stream problem lies at home.

Article and photos by
Lowell Washburn

I went to a little league game at Clear Lake the other day. The afternoon sun burned down with scorching intensity, and I was parboiling on a set of aluminum bleachers. The red-faced little leaguers were suffering a bit from the heat themselves, and by the fifth inning, the game seemed to have bogged down a bit.

My mind began to drift. And of all things, my thoughts went back to my childhood memories of when I accompanied my dad on excursions to the local landfill. Actually, the word landfill hadn't been invented yet. We simply called the places dumps.

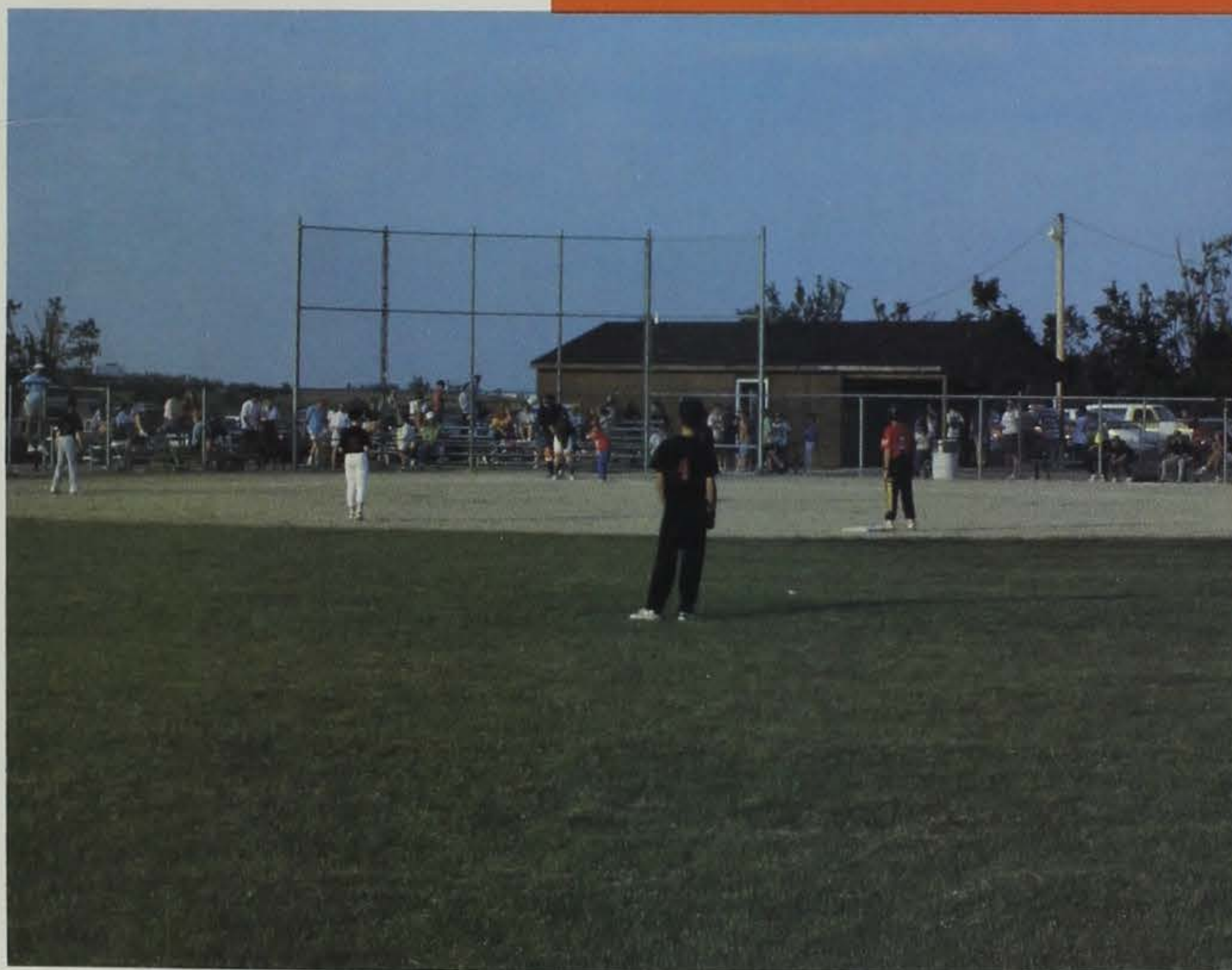
This dump was very typical of the day. It was run by the city and, as I recall, the only full-time employee was a big-boned, rib sprung mongrel dog. There were no regular hours at the dump and whenever the mood struck, people just backed up to the facility's unlined pit and deposited whatever they didn't want. Household and light industrial wastes, old tires, bedsprings, refrigerators, batteries -- anything and

everything all went into the same hole.

At any given time, it was likely that some part of the dump would be on fire. Depending upon which section was currently ablaze, billowing clouds of noxious yellow, white or black smoke towered into the sky. No one thought or talked about air quality, and the term "groundwater" was never used. The odor, particularly during hot humid summer weather, was a never-to-be-forgotten blend of chemical and decaying biological ingredients.

The local dump did provide excellent breeding and feeding habitat for a burgeoning population of Norway rats. Even during the daylight hours, a number of these vile creatures could be seen scurrying about. A favorite pastime among some local ne'er-do-wells was a sport known as "sluggin' rats." A .22 caliber rimfire was the preferred weapon. Although a tremendous amount of ammo was expended during these get togethers, the rodents seemed easily able to cope with the losses.

The former dump of my childhood has now been converted to a neat set of ball diamonds . . . The only visible clue to the area's dark past is the occasional rubber tire that still floats to the surface . . . I wonder if anyone questions where those things are coming from.



landfill. When compared to the old style dumps, sanitary landfills live up to their title. In order to eliminate odor and reduce blowing of refuse, regulations required landfills be covered with a six-inch layer of soil at

Such was life and waste disposal in the "good ol' days."

Oh yes, I almost forgot -- the reason that I happened to recall these memories was not because I was suffering a heat stroke, but rather because the aforementioned scenes had taken place on the exact same spot where I was currently sitting. The former dump of my childhood (an environmental abomination by today's standards) has now been converted to a

neat set of ball diamonds -- complete with cheering parents, hot dog stand and revved-up kids. The only visible clue to the area's dark past is the occasional rubber tire that still floats to the surface to sprout up like some sort of giant black toadstool. I wonder if anyone questions where those things are coming from.

In 1974, the last of Iowa's public open dumps were replaced with what is now known as the modern sanitary

the close of each business day. In 1987, further improvements were made when the Groundwater Protection Act mandated that Iowa begin seeking viable alternatives to landfilling. Two years later, legislation was established to reduce the waste stream by 25 percent by 1994, and by 50 percent by the year 2000.

The reasons for the ongoing concern and for the legislation regarding Iowa landfills are two-fold. One

The reasons for the ongoing concern and for the legislation regarding Iowa landfills are two-fold. One stems from a legitimate concern for the environment and natural resources. The other is that we are simply running out of available room . . .



Ron Johnson

stems from a legitimate concern for the environment and natural resources. The other is that we are simply running out of available room to put the trash. The two issues are inseparable.

According to the U.S. Environmental Protection Agency (EPA), at least half of the existing U.S. landfills will have reached their capacity by 1995. In 1988, a survey conducted by the DNR's Environmental Protection Division revealed that the average Iowa landfill will only last another 10 to 12 years. On the average, Iowa's 2.8 million residents generate around three and one-half pounds of garbage per person every single day of the year. According to Iowa State University, the total volume is

enough to bury an area the size of the Ames city limits to the depth of eight feet annually. The EPA estimates that at least one-third of the landfills in operation during 1987 will be closed by next year. New landfill construction is not an anticipated reality. Horizontal expansion is costly and is also largely unrealistic. Vertical expansion with its attendant "Mt. Trashmore" syndrome is also unpopular -- both with facility operators and the public.

But the good news is that there are a number of things that Iowans can do to significantly reduce the current waste stream and decrease the pressure on our landfills. The end result will mean a cleaner, healthier environment in Iowa's future. The ultimate solution begins at home.

"Most people just don't realize how much trash they generate, or how much space it will take to dispose of it," said Julie Kjolhede, planner with the DNR's Waste Management Assistance Division.

"One thing we know for sure is that once the garbage is in [the landfill], it's pretty much in there for good," she said. Kjolhede noted that explorations into existing landfills have produced some interesting, though alarming, information. For example, one excavation in Arizona yielded a 1952 newspaper that was so fresh "you could have read it over breakfast," said Kjolhede. Other research has revealed that, once it's buried in a landfill, the life of a plastic diaper may last an estimated 500 years.

Landfills were once thought to be a total solution to solid waste disposal. But the idea that an out-of-sight out-of-mind approach will work has long passed.

"In a properly designed landfill, few, if any, waste decomposes" says Kjolhede. "But one of the important things to remember is that a significant percent of what's currently going in there consists of household wastes. That's important, because that is where everyone can help.

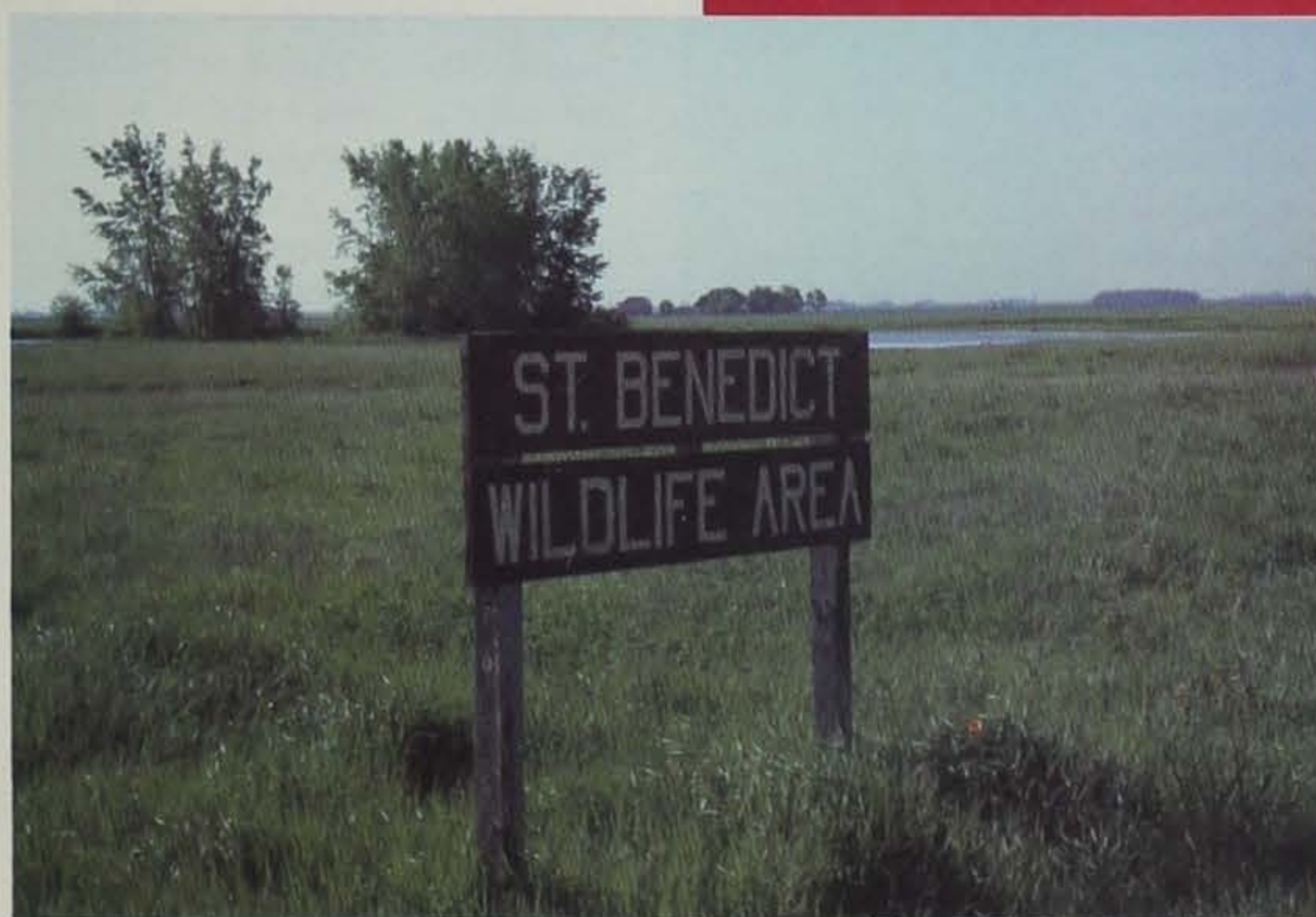
According to Kjolhede, "one of the easiest things a person can do is recycle. Recycling uses existing

resources instead of tapping new ones. I think we're to the point where most Iowans really do support the concept of recycling," said Kjolhede. But, there are still skeptics. The most frequent issue is cost -- especially if the expense of recycling equals or exceeds that of replacing the used item with a new one.

"There are those who say that we can't afford to recycle," says Kjolhede. "But before we can really make an intelligent decision, we need to weigh all the costs -- not just the immediate financial focus. We have to bear in mind that recycling is not necessarily a



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In 1981, this "local dump" in Kossuth County was converted to a county wildlife area.



In 1988, a survey conducted by the DNR's Environmental Protection Division revealed that the average Iowa landfill will only last another 10 to 12 years

... New landfill construction is not an anticipated reality.



Ron Johnson

People are realizing that although Iowa's landfill situation deserves serious thought it is far from hopeless. The main thing that needs to be communicated is that one person can and does make a difference.

revenue generator, but that it is a cost saver."

Those costs include environmental considerations which are, at best, extremely difficult to access. "The thing we have to ask ourselves is do we really want to rely on large tracts of land for precious metals and other natural resources," said Kjolhede. If the answer is no, then recycling is at least a partial solution.

"It's really every individual's personal responsibility to reduce waste," says Kjolhede. "It all gets back to making people conscious of a product's life cycle. When people go to sporting events or on a vacation, they tend to be more wasteful than when they're home. They tend to use more throw away, convenience-type items such as plastic cups, forks, paper plates, etc. By using common sense and planning ahead, much of this refuse could be avoided," she said.

Another thing that people need

to do is become more informed. For example, what material is currently being collected and recycled in your community? Let's say that you are in the grocery store and are picking up a bottle of catsup. There are a number of bottles to choose from -- both in plastic and glass. There may be many considerations to weigh, but if your community is only picking up glass bottles for recycling, then that is the one to choose, says Kjolhede.

Another thing to strive for is buying products already made from recycled material. This may, however, call for some minor personal sacrifices on the part of the consumer. Toilet tissue made of recycled paper currently costs a few cents more than tissue made of nonrecycled paper. But as more and more shoppers purchase recycled products, the prices drop.

"There is no question that manufacturers are beginning to take recycling more seriously," said Kjolhede. "Consumers just don't

realize the power they have." If you don't buy a product, it's going to be replaced by the retailer with a product consumers will purchase. We're already beginning to see that happen in Iowa's larger cities.

"Right now, there is the beginning of a real awakening out there," said Kjolhede. "People are realizing that although Iowa's landfill situation deserves serious thought it is far from hopeless. The main thing that needs to be communicated is that one person's actions can and do make a difference. One person can really have an impact. Even if you only recycle one glass jar, that one jar counts," she added.

"Once a person takes that first step, there's just no turning back," says Kjolhede. "Although you may continue to send glass to the landfill, the point is now you know better. When an informed person knows what's right for the environment, it's hard to resist and in the end they'll usually do what's best."

DANGER IN THE AIR?

by Patricia S. Cale and
Katherine D. Sibold

Imagine yourself faced with the choice of giving up your favorite food because you suspect it might cause you to develop heart disease 20 years from now. Will you give it up?

Whatever your decision, you will have done a risk analysis. You will have weighed the current inconvenience of not getting to eat something you like, against how likely it is that you will be harmed and how far in the future that might happen. If the risk doesn't seem great enough, you won't give it up. If it outweighs the pain of not ever having chocolate again, for example, you will.

Much is at stake in the controversy over electromagnetic fields. We need to carefully assess the risks involved with electromagnetic fields, weighing both the potential dangers of exposure and the benefits we get from electricity.

Giving up a certain type of food may not be more than a minor inconvenience. What if more were at stake?

A similar but real dilemma now involves the issue of electromagnetic fields (EMFs), the forces given off by electrical lines and appliances. There is no scientific consensus on the health effects of living near power lines or working at a computer. Suspicions have been raised, however, by studies showing an "association" between EMFs and cancer, particularly leukemia in children. An association does not prove that one thing caused another, only that the two have been seen together.

It is hard to imagine how different our lives would be if we didn't have easy access to electricity. Our "on demand" lifestyles require instant power. We need only have a power failure to be reminded that we take electricity for granted.

So, much is at stake in the controversy over electromagnetic fields. We need to carefully assess the risks involved with electromagnetic fields, weighing both the potential dangers of exposure and the benefits we get from electricity.

To better understand the controversy, first we must know what electromagnetic fields are, where they come from and how we're exposed to them.

Electromagnetic fields are forces that occur wherever electrical charges exist.

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The approach taken
by some investigators
is that *if* EMFs do play a role
in the development
of cancer,
it is a role shared with other
environmental factors.

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The earth has magnetism because of the electrical currents flowing through its molten core. The distribution lines that carry electricity from power plants to the home and from the home circuit box to the outlets produce electromagnetic fields.

The strength of the field depends on the potential voltage even if no current is actually coming through the line. So an appliance can still give off an electric field if it is plugged in but not turned on. A magnetic field is created when the current is flowing.

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Most of the research conducted on EMF exposure has focused on (a) studies of the incidence of disease in people working around power lines; (b) laboratory exposure of single cells and groups of cells and organs to EMFs; and (c) exposure of animals and humans to EMFs to examine changes in body function, chemistry, disease rate or behavior.

Some of the studies have found an association between EMFs and certain biological changes. For example, some studies have shown changes in how certain cells behave and in the levels of chemicals produced. Still uncertain is whether these changes pose a significant health risk. While none of the studies have shown any causal relationship, some scientists have concluded that there are some risks involved in long-term and intense exposure to EMFs.

Studies have been conducted by the electric power industry, by university and medical researchers and by non-affiliated persons with results, according to the U.S. Congress' Office of Technology Assessment, that are "complex and inconclusive." The approach taken by some investigators is that *if* EMFs do play a role in the development of cancer, it is a role shared with other environmental factors.

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Part of the difficulty in determining a "safe" level of exposure to EMFs is that their strength varies according to distance as well as voltage. The duration of exposure may also be a factor. For example, an electric shaver produces a much stronger magnetic field than an electric blanket, but the duration of exposure would be a few minutes versus all night.

High voltage transmission lines have been of concern because not only do they produce strong electromagnetic fields, but when they are located close to homes, residents are exposed to them day and night. In 1990, several homeowners in Waverly, Iowa, objected to the construction of a transmission line close to their properties, citing evidence linking EMFs and childhood cancer. In an earlier case in Texas, a judge actually ordered a utility to shut down a high voltage line near an elementary school.

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There are at least three options to deal with the issue of EMFs and health. The first is to do nothing, reasoning that because there is not conclusive evidence, action cannot be justified. The second is to assume there is some basis to the research findings and to operate on that basis. This means to limit exposure without going to great lengths -- that is to do things that make sense anyway.

MacWorld, a personal computing magazine, in its July 1990 issue took this approach in warning its readers about the potential hazards of working at a computer monitor. In an editorial titled, "Is Your Computer Killing You?" the editors pointed out that many computer users spend long days sitting next to a machine that is emitting strong electromagnetic fields. The magazine gave advice on how to set up computers to limit exposure, in addition to calling on computer

manufacturers and government to address the issue of EMFs.

Utility companies have also been advised to use "prudent avoidance" to guide their policies on EMFs related to transmission and distribution lines. Two attorneys, Scott Strauss and Susan Bernard, writing in the January/February 1992 issue of *The Electricity Journal*, an electric utility trade journal, explained this approach. Power companies can consider power line placement when planning transmission line expansions, upgrades and new construction. In addition, research is continually exploring the relationship between EMFs and health. In some states, standards for EMF exposure are being considered.

Strauss and Bernard advised states to develop state response plans that take into account "relative risk and science-based priorities." What is to be avoided is to, in the absence of solid scientific data, compel utilities to "respond to EMFs in erroneous, overly reactive, imprudent ways."

The third option is to determine that a major problem exists at the present and to make dramatic changes -- regulatory or operationally. To totally remove exposure to EMFs, however, people would have to remove all the electrical wiring from their homes.

The Office of Technology Assessment states that "it has not been conclusively proven that electromagnetic fields do not pose a health hazard . . . In our view, the emerging evidence no longer allows one to categorically assert that there are not risks. But it does not provide a basis for asserting that there is a significant risk."

With all the uncertainty about EMFs, what is certain is that they will remain a concern. The suspicions have been raised, and they will not easily be allayed. *MacWorld* magazine editor, Jerry Borrell, succinctly expressed this feeling: "I'll write several words or phrases;

you read them and see if you can find any theme linking them: lead, mercury, asbestos, radium, coal dust, cotton dust, beryllium, benzene, DDT, PCB, dioxin, ethylene dibromide, ethylene oxide. Any luck? No? OK, here are some hints. Name industrial chemicals that are capable of killing both workers who produce them and people who use them in their work. Substances that both government and industry have at one time claimed have no ill effects."

Clearly there is a need for more research. Since 1975, research sponsored by the Electric Power Research Institute (EPRI) on EMFs has exceeded \$25 million. The U.S. Department of Energy devoted \$3 million to EMF research in 1989. As more research is done, the uncertainty associated with exposure to EMFs will be reduced.

Until then, individuals can "prudently avoid" exposure to EMFs, just as we take other health and safety precautions. We can replace an electric blanket with a down or polyester comforter, or move the office computers around so that workers are farther away from EMFs.

Utilities and utility regulators can also assess the risks of high voltage lines, using the scientific data we have available now, as they continue to focus on research.

Patricia S. Cale is an information specialist for the department's energy bureau in Des Moines.

Katherine D. Sibold is a former section supervisor for the energy bureau's building energy management section in Des Moines.

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To totally remove exposure to EMFs, however, people would have to remove all the electrical wiring from their homes.

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Mastering WOODLAND MANAGEMENT

The Master Woodland Managers Program, sponsored by Iowa State University Extension and the DNR, is having an exponential effect on teaching sound woodland management.

Article by
Dean R. Prestemon and
Jerry Kemperman
Photos by Ron Johnson

"I now look at my woodland with very different eyes," is the way one individual described her experience following participation in a new forestry education program in Iowa. Forestry Extension at Iowa State University and the Forests and Forestry Division of the Iowa Department of Natural Resources launched a Master Woodland Managers Program in the late summer of 1988 at Starr's Cave Park and Preserve in Burlington. This new program was patterned after Iowa State University Extension's very successful Master Gardener Program. A group of 25 individuals were given 32 hours of intensive instruction on



woodland management emphasizing the land stewardship ethic. The training was provided over a period of several weeks. No registration fees were charged to the participants, but each individual agreed to contribute at least 32 hours of public service after completing the course.

Since that beginning, seven additional sessions have been sponsored — two during 1989, three in 1990 and two in 1991. Locations for the last seven were in Winneshiek, Jefferson, Montgomery, Boone, Linn, Dubuque and Sac counties. A grand total of 213 volunteers have now received this intensive forestry training, resulting in



Participants of the program are not charged a registration fee, but each agrees to contribute at least 32 hours of volunteer service following the course.



at least one "woodland ambassador" in each of 57 Iowa counties.

The program topics considered during this training run the gamut of

basic tree biology and identification, tree planting and culture to timber marketing and wood utilization. In a typical program, seven faculty members from Iowa State may be involved in teaching plus three foresters from the DNR, as well as professionals from the Soil Conservation

Service and staff of county conservation boards. Both indoor lectures and outdoor laboratories are included in the educational program. A textbook and reference notebook are provided. Field exercises and a written exam are given at the conclusion of the training to help

evaluate the effectiveness of the training received. A certificate is awarded to each participant upon completing the course.

The 169 individuals trained in the first six sessions have been asked to cumulate the number of public service hours contributed thus far and to give a brief description of their activities. Three-fourths of the participants responded and reported a total of 4,302 service hours. Based on commitments from all individuals receiving training in the first eight sessions, more than 6,800 public service hours are expected to be contributed.

A sample of the participants were recently contacted and asked to identify what public service activity they enjoyed most. Gary Wagner from Burlington responded that although he enjoyed speaking to high school groups and service organizations about forestry, the most fun came from "doing it" — planting trees on highly

Based on commitments from all individuals receiving training in the first eight sessions, more than 6,800 public service hours are expected to be contributed.

◀
Some of the topics covered in the Master Woodland Managers Program include basic tree biology and identification, tree planting and culture, timber marketing and wood utilization.

erodible ground that had been previously farmed. Wagner is working to develop a financial model to show that conservation is not only good for the land but can also be good business. He has already contributed 100 hours of public service.

Ron Meyers from Libertyville indicated that, out of the 107 hours contributed so far, his role as co-organizer and then co-chair for the Southeast Iowa Free Tree Program and the Fairfield Community Tree Enhancement Program was probably the most satisfying. Under Meyer's leadership and with the help of other interested individuals, more than \$10,000 was raised and several thousand trees were planted. This effort successfully involved many local people, particularly schools, in tree planting and care.

Nick Button from Adel had a unique idea to promote forestry in central Iowa, and had the enthusiasm and organizational ability to accomplish it. He recruited a few of his Master Woodland Manager friends to help him sponsor a "woodchoppers ball" at the county fairgrounds. This event featured dozens of demonstrations and displays on topics relating to many aspects of woodland management. The "ball" drew nearly 700 people to the Dallas County Fairgrounds one Saturday in February 1991. Button spent a total of 83 hours organizing and implementing this forestry program.

Floyd Sollien from Decorah has also been very busy since completing the course in 1989. He has reported 97 hours, which is probably a substantial underestimate of his public service efforts. His most recent activities have included considerable work on tree planting along U.S. Hwy. 52 and on Luther College property. He has hosted a forestry field day for local landowners. Sollien commented that it is hard to identify his most rewarding public

service program, but feels that the highlights were the times when he had school children at the farm during field trips. In addition, he has enjoyed speaking to older groups such as garden clubs.

Current plans call for continuing this very successful and popular educational program. Two additional sessions have already been held this year. A second program in Burlington and initial programs in Warren and Madison counties were held during May and June. A third program will be held during August and September in Butler County.

Based upon the success of the Master Woodland Managers Program, forestry and horticulture extensions at Iowa State University (in cooperation with the Forestry Division of the DNR and the Iowa Natural Heritage Foundation's Trees Forever Program) are initiating a new educational program focused on community forestry. The pilot Master Urban Tree Manager Program will be held this spring in the Waterloo/Cedar Falls area. This effort will also involve 32 hours of intensive training followed by a similar public service obligation.

The impressive multiplier effect resulting from training these volunteers makes this cooperative program both effective and efficient. The net result of their service activities should certainly be an expansion and an improvement in tree resources in the state of Iowa.

Dean R. Prestemon is an extension forester at Iowa State University in Ames.

Jerry Kemperman is a forestry services supervisor for the department in Ames.

Sollien commented that it is hard to identify his most rewarding public service program, but feels that the highlights were the times when he had school children at the farm during field trips.



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Article by Scott Cahail
Photo by Ron Johnson

A SLICK SOLUTION

Each year, the United States generates an estimated 1.4 billion gallons of used lubricating oil. This oil is handled in several ways, with more than half -- 56 percent -- being burned as fuel. Small percentages have been recycled or re-refined back into lubricating oil or put to some other use. The major concern, however, is the 36 percent, or 500 million gallons, of oil that is not recovered in any way but is sent to a landfill or is dumped on the ground or down storm sewers.

When used oil is dumped on the ground or in the water, it can cause severe contamination problems. Oil from a single oil change can ruin a million gallons of fresh water. Used oil is insoluble, persistent and can contain toxic chemicals and heavy metals. It creates a slick that inhibits the transfer of oxygen which is needed by aquatic animals. It also sticks to birds and other wildlife, matting fur and feathers, and threatening the survival of every organism that comes in contact with it.

The infamous Exxon Valdez oil spill in Alaska allowed 11.4 million

gallons of oil to enter Prince William Sound. Each year in Iowa, we have our own "oil spill" of an estimated 4.6 million gallons caused by people improperly handling and disposing of "waste" oil.

Used oil is a valuable resource. More than half of the used oil generated is used as fuel. Users of waste oil as fuel take on primarily two forms: large-scale industrial boilers and small scale "shop heaters." While there are concerns about the environmental impact of burning used oil, a positive aspect is the

*Waste oil no longer needs to remain a waste.
By turning in used oil to collection sites, so the oil can be recovered and
reused, "do-it-yourselfers" are playing a major role
in protecting the environment.*

recovery of the energy value and keeping the oil from directly contaminating the environment by improper disposal.

A better idea for recovering used oil is to recycle it back into oil, a process known as re-refining. Using this process, a gallon of used oil can produce 2.5 quarts of oil.

When starting from crude oil, 42 gallons must be refined to produce that same 2.5 quarts. Several new re-refiners have recently opened in the United States, and re-refined oil products are beginning to show up on some retailers' shelves.

While the issues surrounding used oil and how it should be managed are quite complex, a major problem that is easily identified is improper management and dumping by "do-it-yourselfers" or DIY. DIY means just what it says, someone who changes the oil in their vehicle themselves, usually at home. They can buy the oil and the filter at a discount store and perform a relatively easy, low-cost change at home. However, as opposed to the local service station or "quick-change" store, a homeowner does not have a ready outlet for the used oil.

Commercial establishments that generate significant quantities of oil usually have arrangements with an oil collection company to pick up their oil, either as part of a route, or on an as-needed basis. Historically, collection companies paid a few cents per gallon for the oil they collected because it was a commodity. But recent low crude oil prices and liability concerns slowed and even reversed that practice, causing some companies to charge generators for taking their oil. The situation has settled for the most part with companies now taking the oil, but not paying anything for it. This is, of course, subject to local variations.

The problem is that, without an economic incentive to take in DIY oil, many commercial generators choose not to accept DIY oil. Left with no where to go with their oil, people find all kinds of "innovative" ways to make it disappear. Dust control and weed control were common rural

mandated that all retailers of oil in the state must (a) accept waste oil from customers at the point of sale or post notice of locations where a customer may dispose of waste oil; and (b) post written notice that it is unlawful to dispose of waste oil in a sanitary landfill.

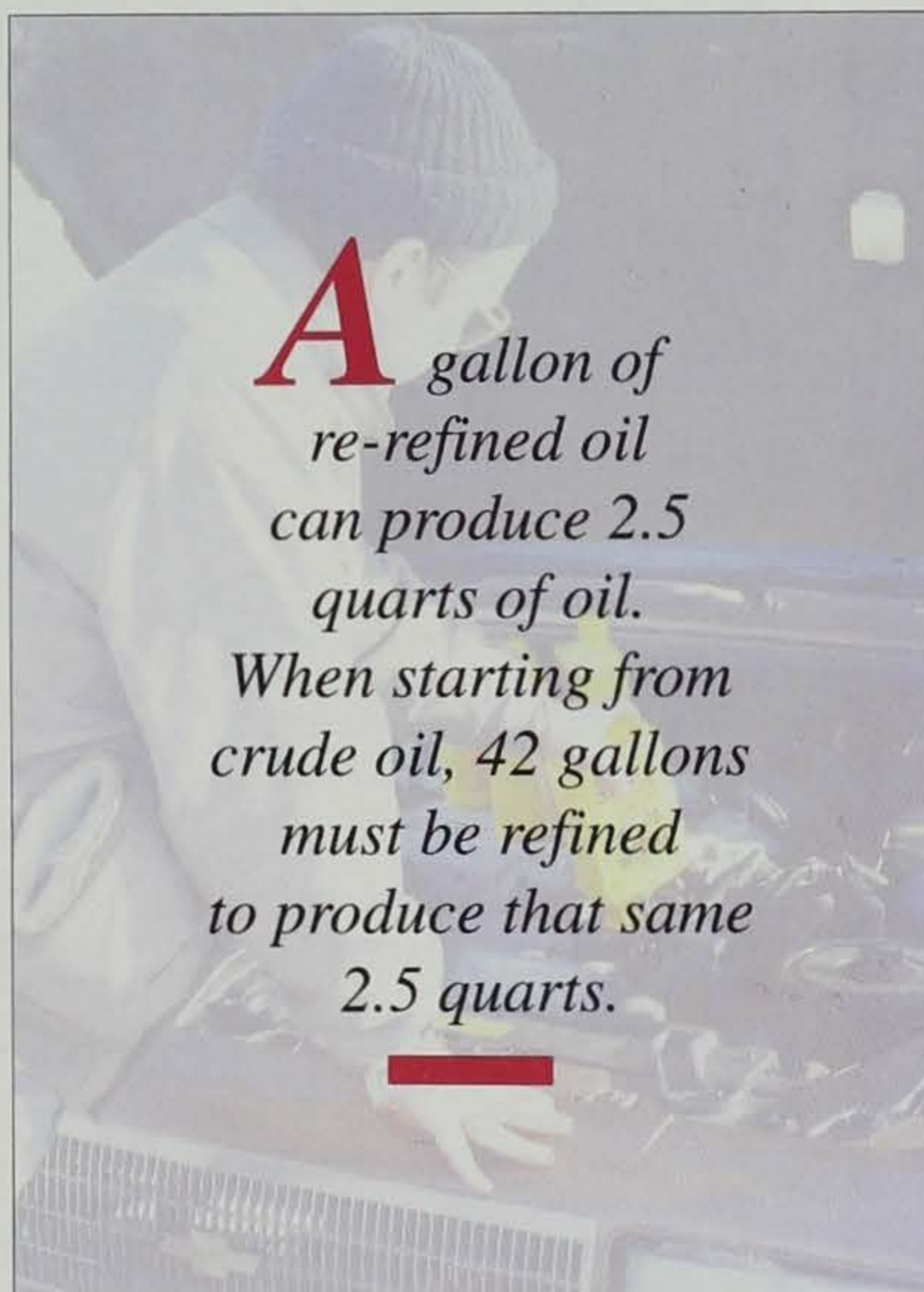
The Waste Management Assistance Division of the Iowa Department of Natural Resources implemented this provision by informing all retailers of the requirements and developing a sign that can be ordered from the DNR at no charge. It is then the retailer's responsibility to post the sign, after indicating on the space provided whether they accept used oil, or after identifying (on the sign) where the nearest used oil collection site(s) are located.

When the signs were ordered, retailers were asked if they were willing to be a used oil collection site. Those that indicated they were willing and able to be a collection site were added to a statewide used oil collection site list maintained by the DNR. Retailers having difficulty in identifying a local site,

or citizens wondering where they could go to drop-off used oil, can call the DNR to ask for sites from the list.

Like most recycled commodities, there needs to be a demand for the product before producers will provide a supply. Re-refined oil is produced by several companies in the United States. To help develop a demand, governments have started to provide for procurement preferences to be given for the purchase of re-refined oil in government vehicles.

The Iowa General Assembly passed such a law during the 1992 session. The law requires the Department of General Services to purchase



A gallon of
re-refined oil
can produce 2.5
quarts of oil.
When starting from
crude oil, 42 gallons
must be refined
to produce that same
2.5 quarts.

solutions which do return some benefits. However, the risks associated with such practices make them very questionable, and they can only be done on an individual's own land. In the past, the best available alternative was usually to deposit the oil in the trash for disposal in a sanitary landfill.

The Waste Reduction and Recycling Act of 1989 recognized the potential for contamination caused by oil disposed in a landfill and banned that practice beginning July 1, 1990. At the same time, the General Assembly acknowledged the need to provide collection outlets, so they

EPA Revises Regulations on Used Oil and Filters

On May 20, 1992, after an extended period of debate, EPA published final regulations for used oil and oil filters. The primary question has been if used oil should be a listed hazardous waste subject to all the requirements of the Resource Conservation and Recovery Act (RCRA). The final regulations, however, do not require waste oil to be a listed hazardous waste. This is considered good news to many involved in the handling of used oil who did not want to have to manifest the oil, pay associated fees, etc. EPA's decision maintains the status quo for how used oil is handled by generators and management companies. EPA deferred making a decision on whether to require residuals from oil re-refining and processing to be listed as hazardous wastes and whether to establish special management standards for the handling of oils that are to be recycled.

In a significant move, EPA did establish an exemption for most types of oil filters (all except terne-plated filters, which are high in lead). If all the free oil has been removed from the filter, it is not considered a hazardous waste, but just regular solid waste. EPA lists the following as acceptable methods of removing the free oil from filters:

1. Puncturing the filter anti-drain valve or filter dome and hot-draining*;
2. Hot-draining* and crushing;
3. Hot-draining* and dismantling; or
4. Any other equivalent method which will remove the oil.

EPA states that the filters, with the free oil removed, can then be recycled as scrap. EPA goes on to encourage steel mills and scrap metal recyclers to accept used oil filters, from which oil has been removed, for scrap metal recovery.

--SC

*Hot-draining refers to draining the oil filter at near engine operating temperatures.

How To Recycle Used Oil

Recycling used oil is easy. Once you have removed the oil from your vehicle, put the oil into a clean plastic container, such as a milk jug, and close the container with the proper lid. Then you need to identify a nearby used oil collection point. The store where you bought the oil may take it back, or they must post a sign indicating where there is a nearby collection point.

DO NOT dump oil down sewers.
DO NOT discard oil in the trash.
DO NOT pour oil on the ground.
DO NOT mix oil with other substances.

If you are having problems locating a collection site, the Department of Natural Resources may be able to help. Call 1-800-367-1025 and ask for the address of a collection site near you.

--SC

oils that have the highest recycled oil content, provided that the product is of equal quality. If the recycled oil is of comparable quality, General Services can pay up to five percent over the cost of virgin-based oil as a price preference. Governments can be a significant factor in creating a market demand for a product -- which results in a need for more of the "raw material" -- in this case, used oil.

However, when it comes to re-refined oil products, individuals can also make a big difference due to their collective buying power. Many stores are just beginning to carry re-refined oil products. Consumers should look for these products when making their buying decisions. Look for the American Petroleum Institute (API) seal of approval which will certify the quality of the product you are purchasing. Also compare prices. The price of a re-refined product should be competitive to regular oil, and once again, as the demand increases and more re-refining capacity is developed, the price should come down.

Waste oil no longer needs to be a waste. It is a resource that should not be discarded. Think twice next time you are wondering how to "dispose" of some oil.



▲ Retailers of oil products are required by law to display this sign. They must indicate whether they accept used oil or must list the nearest oil collection site(s).

Never introduce it carelessly into the environment, and if at all possible, provide it to a used oil collector so that it can be recovered and reused.

Scott Cahail is an environmental specialist for the department's Waste Management Assistance Division in Des Moines.

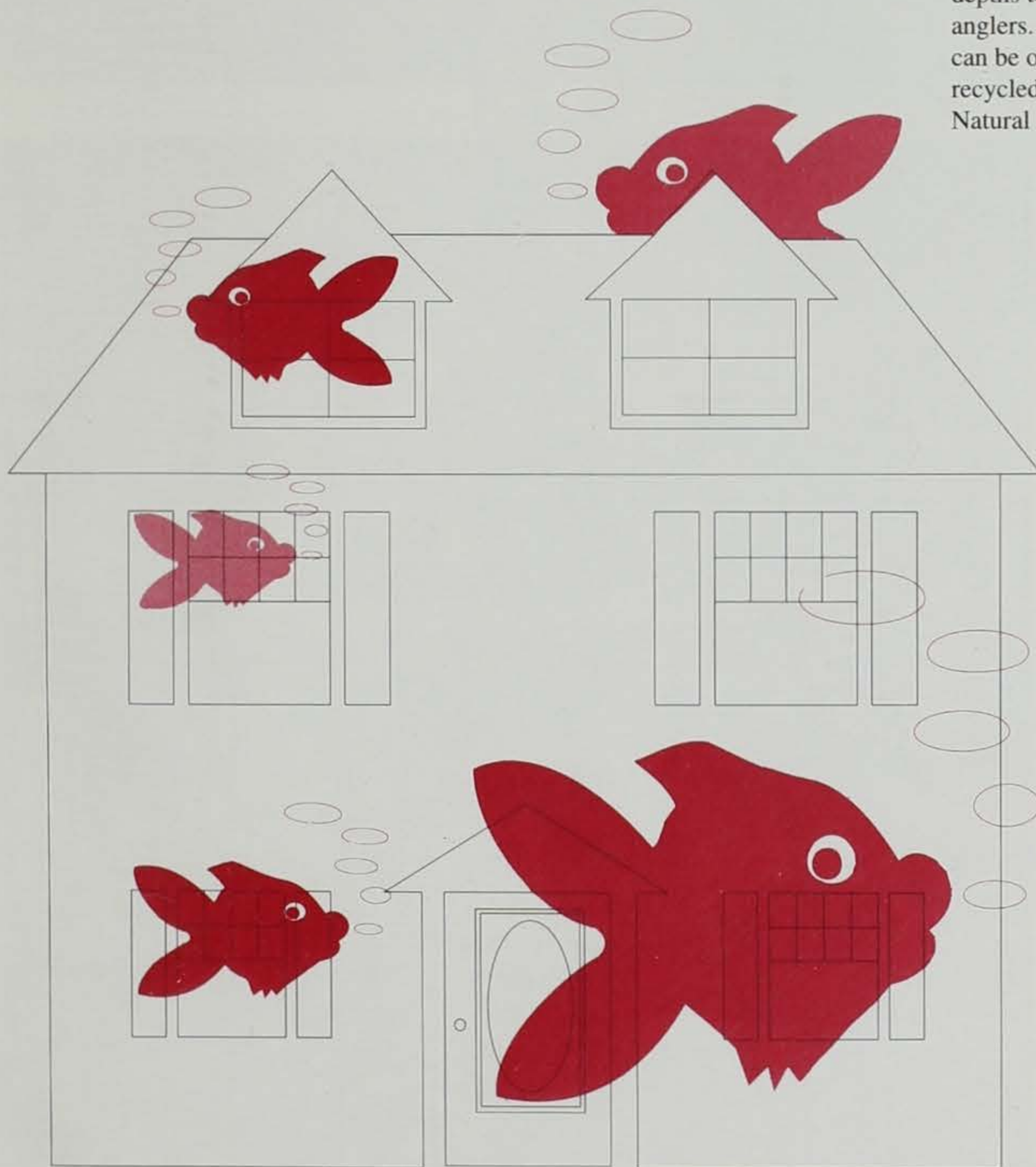
Article and photos by Paul Sleeper

Low-Cost HOUSING FOR IOWA Fish

Unlike today's fast-growing housing market, the underwater housing market for fish is often limited. Fish need more than water to survive. They rely on different forms of habitat within a body of water for reproduction, protection and feeding.

Over the years, many of these key features of a lake deteriorate -- shorelines begin to erode, wood decays and silt covers productive rock areas. All these factors have a direct impact on the quality of a fishery.

As fishery managers, we have made a concerted effort to replace this lost habitat. Structures are built and set into place in a variety of locations and depths to accommodate both fish and anglers. We have found materials that can be obtained for little or no cost and recycled into usable fish habitat. Natural materials such as Christmas



► **Oak stake bed fish attractors are ready to be placed in a lake.**

Pallet structure constructed by nailing oak stakes to pallets weighted down by concrete blocks. Christmas trees are added to provide attraction for smaller fish. ▼

trees, cedars, hardwoods and native field stone can be used. Artificial materials like oak stakes, wood pallets, tires, broken concrete and cement blocks also make excellent habitat.

Last year DNR habitat improvement projects were undertaken in 11 Iowa lakes. For example, at Lake Macbride in Johnson County, 25 brush piles were created using 125 pallet structures, 22 stake beds, 230 Christmas trees, 80 (25- to 30-foot) oak branches, 25 root systems and 40 cedar trees. In addition, 64 trees damaged by beavers were dropped along the shoreline and one rock reef was created. This large amount of habitat work could never be accomplished by fisheries staff alone. It has been a coordinated effort with fishing clubs, scouting groups, county conservation boards, and local anglers dedicated to enhancing fishing opportunities for everyone.

You may ask yourself why fish are attracted to these areas of brush and artificial structure. There are several reasons. First, fish use these areas for spawning sites and also escape cover for newly hatched fry. In addition to providing shelter from predators, the structures attract minute aquatic organisms, such as algae, zooplankton and benthic organisms, which are important food sources for small fish. Predatory fish like bass, crappie and walleye are then attracted to these areas by the numerous small fish within the structure. The



primary goal of habitat development is simply to concentrate fish. However these structures can actually add to the numbers of fish.

Whether you fish from boat or shore, you'll catch more fish around structure. You'll also lose more tackle. But you can minimize your tackle losses by learning the right way to fish various types of structure. Accurate casting to the edge of the structure using weedless lures, or using bobbers to stay just above the structure are effective ways to keep from getting snagged.

Remember also, fish move. So if you come up empty in one area, move to the next. Fish shallow structure in the spring and fall, but move to deeper, cooler water during the hot months. Locating structure in 10 to 15 feet of water can be extremely productive when larger fish are no longer cruising the shorelines.

This year, include underwater habitat structure in your fishing strategy. It may be your key to more fishing fun in the months ahead.

Paul Sleeper is a fisheries technician for the department at Lake Macbride.



◀ Tree dropped along shoreline creates shallow water spawning habitat.



▲ Custom-built boat with a flat work deck is used for hauling rock to create reef habitat.



◀ A typical habitat improvement area consisting of pallet structures, stake beds and brush placed on the lake bottom during a draw-down period.



T H E R E D F O X

A Controversial CHARACTER

The red fox has been at the center of the stage in the furbearer world since Ol' Red first laid paws on the

North American continent. People who have crossed trails with the red fox are seldom able to maintain a neutral attitude toward this animal. Clayton B. Seagers aptly described Ol' Red back in 1944 as "the best-loved and most hated, praised, berated, wisest, dumbest, smelliest, dantiest, thinnest, sleekest, most flea-bitten and most controversial creature ever to occupy the ardent attention of hound, hunter, trapper and henery owner in this

nation." The red fox has been slandered by many as a culprit, a villain, a chicken thief, a pheasant muderer and ravaging the uplands associated with wetlands of half of the nesting mallard hens. The fox has been the inspiration of more animal folklore than Aesop could ever have dreamed. Many childhood nursery stories that stereotype the red fox as nothing but a sly

and crafty "bad guy" would never have been written had the fox not been one of the North American actors.

Fortunately for even the worst "villains" there are a few sympathizers. The gardener and fruit grower welcome the fox when cottontails are chewing lettuce or girdling trees. Small grain farmers welcome Ol' Red on their property when the rodent populations begin to soar.

The image of the red fox has fluctuated at both extremes during the 1900s. Conservation agencies have also vacillated on their views of Ol' Red and how this creature fits into the picture. During the depression years of the 20s and 30s red fox fur, and that of other animals, provided many people with enough money to barely eke out a living.

During the 40s and 50s the fox's image was at a low ebb. Hunters, poultry raisers and fish and game agencies thought the only good fox was a dead one. The concern was that foxes were impacting pheasants, rabbits and quail and other small game at too high a rate. Bounty payments on the fox were at their peak at this time. In spite of this "reward" on the fox's head, numbers continued to flourish.

Then the 60s and 70s saw the pendulum swing and all began to think foxes played an important role in the wildlife community, and given adequate habitat, were not the crushing blow to wildlife populations that the previous two decades thought. Also, during this period, ol' Red's hide soared to historic values of \$80 plus, and in fact, even some landowners posted their property as "no fox hunting" zones. The quick swing upward in fox pelt values was met with an equally quick plummet in the late 1980s. Now the red fox is once again commonly seen throughout the state.

The pendulum swings again in the late 70s and 80s. Some waterfowl scientists studying the demise of North American ducks noted that Ol' Red was having a devastating impact on mal-

The image of the red fox has fluctuated at both extremes during the 1900s. Conservation agencies have also vacillated on their views of Ol' Red and how this creature fits into the picture.

Article by Ron Andrews
Photo by Roger A. Hill



lards on some wildlife areas with more than half of the hens being taken from the nest. Because of the concern for declining ducks in North America, some folks believe that red foxes and other nest predators must be "squashed" and that, along with habitat improvement, could help bring duck numbers back. Intensive management against the red fox, and its nest-destroying cousins — the skunk, raccoon and weasel, is probably necessary on areas where duck and other upland production is the management goal. Electric-fenced predator exclosures and predator removal may be in order. The potential for controversy is great.

The Conservation Reserve Program (CRP) of the late 1980s has brought back more than two million acres of grassland habitat to the Iowa landscape. Such habitat has been essential to the comeback of the Iowa ring-necked pheasant as well as many other ground-nesting species. Ol' Red

is reaping benefits from this lush cover and its smorgasbord of food items, including some bird life, but more importantly a delicacy of small mammals such as mice, voles and rabbits. Besides food, these grasslands are contributing to the fox's safety by providing both denning and escape cover sites. And interestingly enough, the old axiom holds that with enough habitat, in this case grassland cover, predator and prey can work out a compatible, sustaining relationship. The CRP and the reduced fox harvests of the late 1980s has seen populations soar to near all-time highs.

The red fox, like many of its furry country cousins, is also one of the star characters in the animal rights movement. There are those that want to give it complete protection and those that think the fox is a very harvestible critter. Mange, a scaly and often fatal disease in foxes, thrives when fox populations remain high. Dying a slow agonizing death from mange is not a

"humane way to go." The fact remains that fox fur is a fashionable renewable resource and that regulated fox hunting and trapping is a healthy part of wise fox conservation and management.

Quite frankly, regardless of management priorities, the versatility of the red fox on the North American stage will allow Ol' Red to survive adequately. The fox's swinging pendulum image will certainly keep Ol' Red center stage. As the pendulum swings from side to side, the red fox will continue to provide thought-provoking images and questions in the minds of those who study, see and dream about where the red fox fits into the great outdoor world. However, there is no question about the fact that staying in the limelight has been and will continue to be one of the notable traits of the red fox as Ol' Red leaves tracks across the countryside.

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

Catfishin'

A Respectable Sport

Monitoring a largemouth bass tournament on Lake Anita a short time ago, I witnessed an occurrence that some dedicated bass anglers would never admit to. The deed wasn't illegal or unethical, it just illustrates how some anglers are willing to exploit an opportunity to have a successful fishing day.

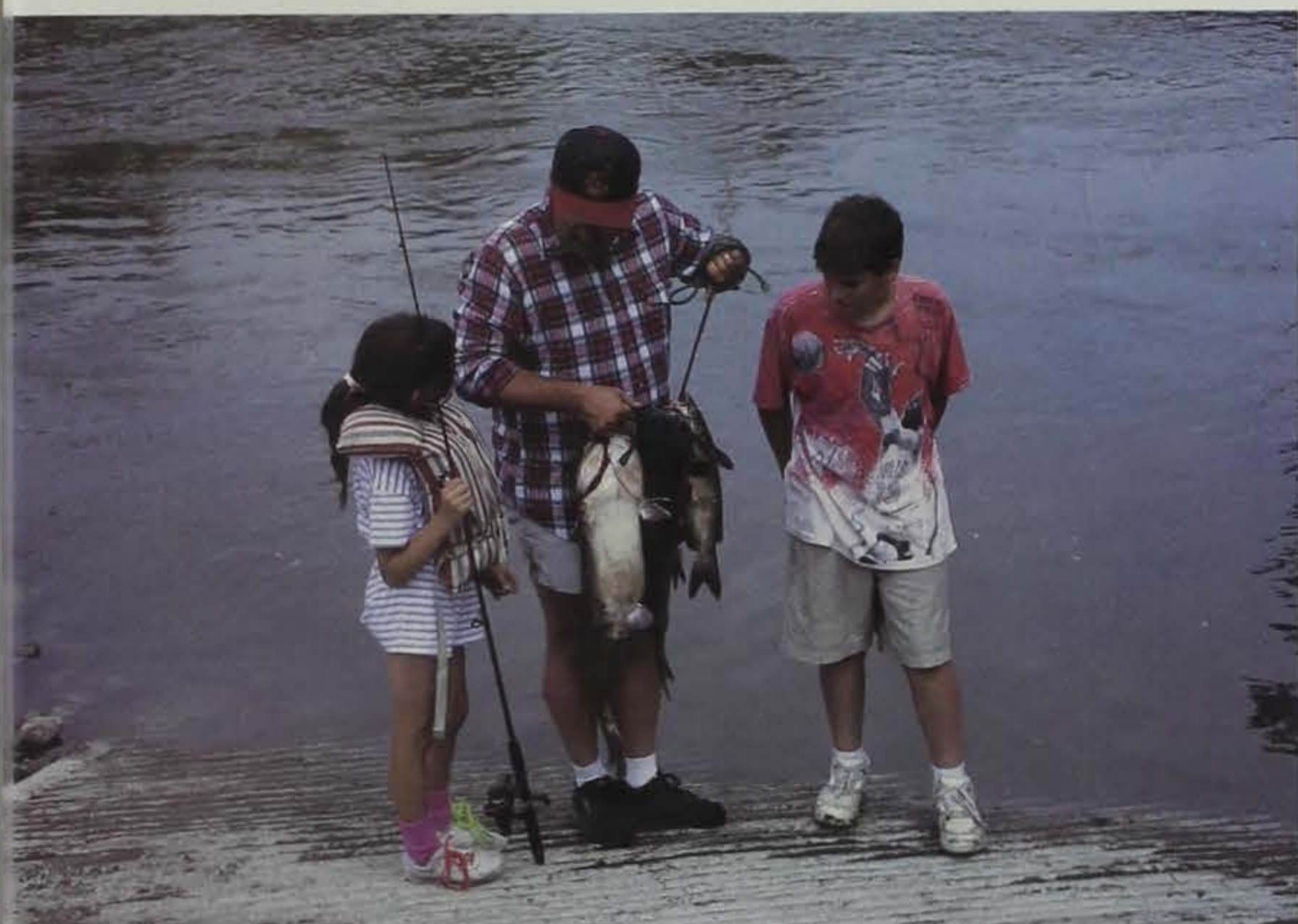
This particular Saturday was hot and humid and the bass just weren't hitting. Bites were few and far between or even nonexistent for some anglers. At the end of a disappointing eight-hour fishing tournament only four or five bass were weighed in to the disappointment of most participants. However, the occupants of one bass boat didn't mind. After the tournament ended and the other members departed for home, these persistent anglers produced four dandy channel catfish, each weighing four to six pounds. All four cats were taken on scented rubber worms off the face of the dam during the late afternoon using bass fishing techniques.

While many tournament anglers would have been disappointed with this



Ron Johnson

Article by Jerry Hudson



Ron Johnson

catch, these bass anglers were not. Their fondness for channel catfish is shared by a great many Iowa anglers who find them to be aggressive fighters as well as excellent tablefare. They also grow larger -- 10-pounders are common throughout the state.

Granted, scented rubber worms aren't the best choice for catfish bait, but catfish occasionally hit the same lures that attract bass and walleye. Channel catfish are omnivorous and opportunistic in their feeding habits, consuming all types of insects, worms, fish, crayfish, plant matter or other living or dead material.

Catfish baits consist of almost anything. However, a general rule is to use a natural bait like worms and leeches or something a little more odorous to attract this fish species. Shad sides or shad entrails entice catfish just after ice-out and until the water warms in late spring. Later, liver, shrimp, crayfish or the prepared baits with blood, cheese or fish seem to be an angler's best choice. Any of these baits fished on or near the bottom can be deadly on channel catfish.

Talk to any good catfish angler and you'll soon discover that each has a favorite bait and several lakes or



Lowell Washburn

Talk to any good catfish angler and you'll soon discover that each has a favorite bait and several lakes or rivers they prefer to fish.

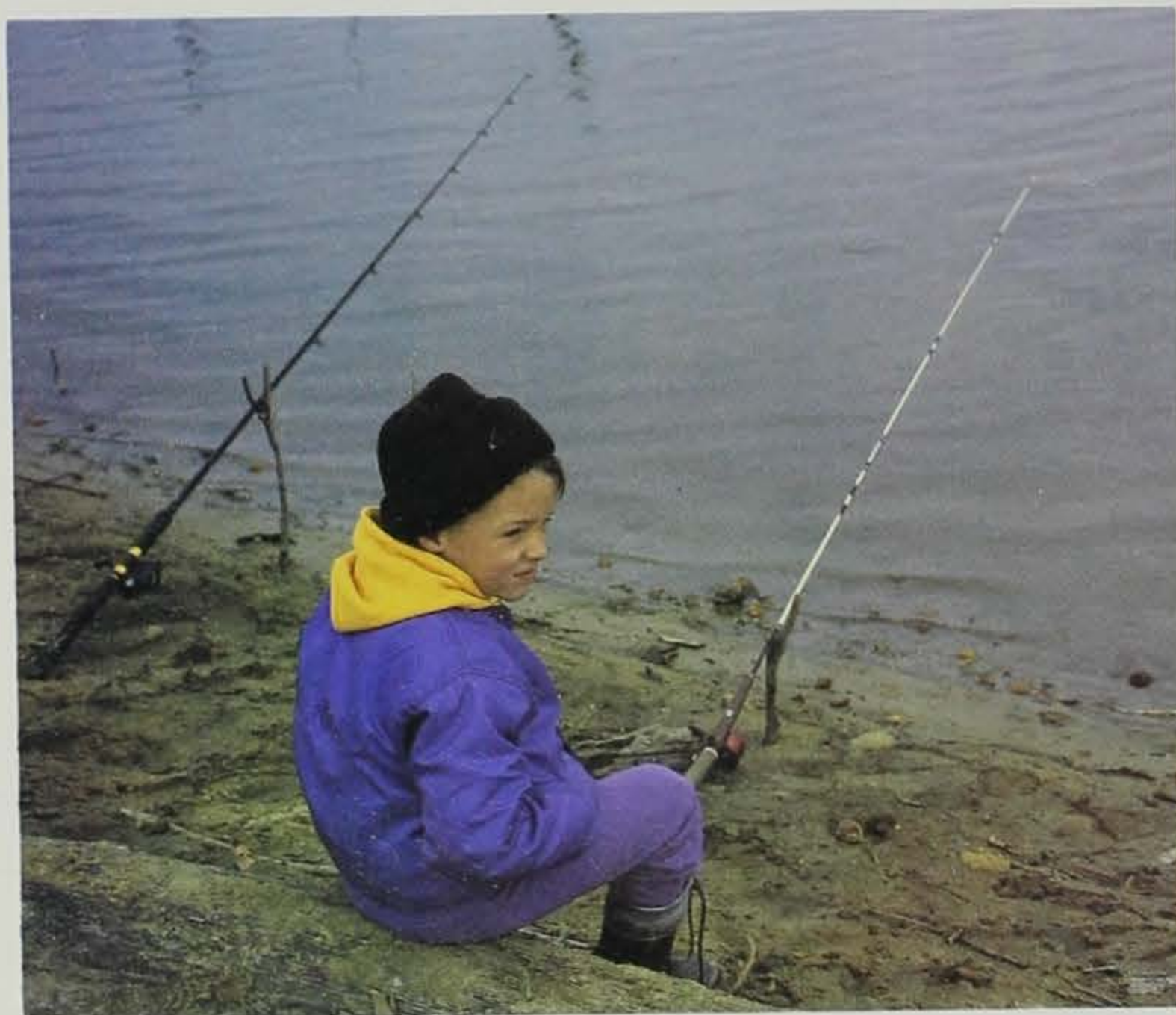
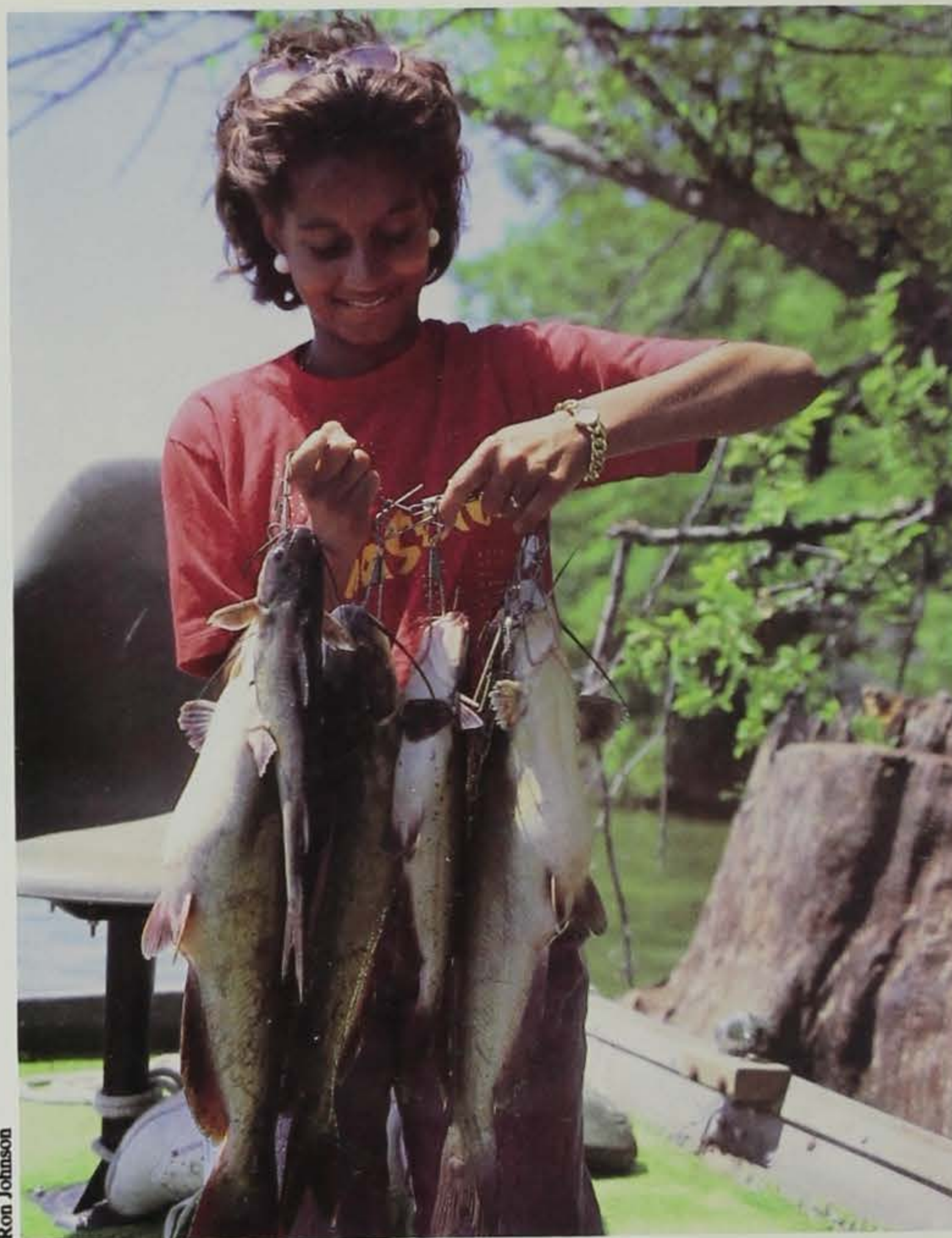


Lowell Washburn

rivers they prefer to fish. Frederick Drake, of Corning, is no exception. Although Frederick fishes Lake Anita and Binder Lake, his main preference is Lake Icaria where he has taken some nice stringers of channel catfish. "I live within five miles of Icaria," said Drake, "so I can get in a lot of fishing time. I typically use spincasting equipment with heavy line and slip sinker or several split shot depending on how far I want to cast." Drake comments that most of the catfish he takes are caught on dip-bait. This is his favorite bait whether fishing lakes or one of the local rivers.

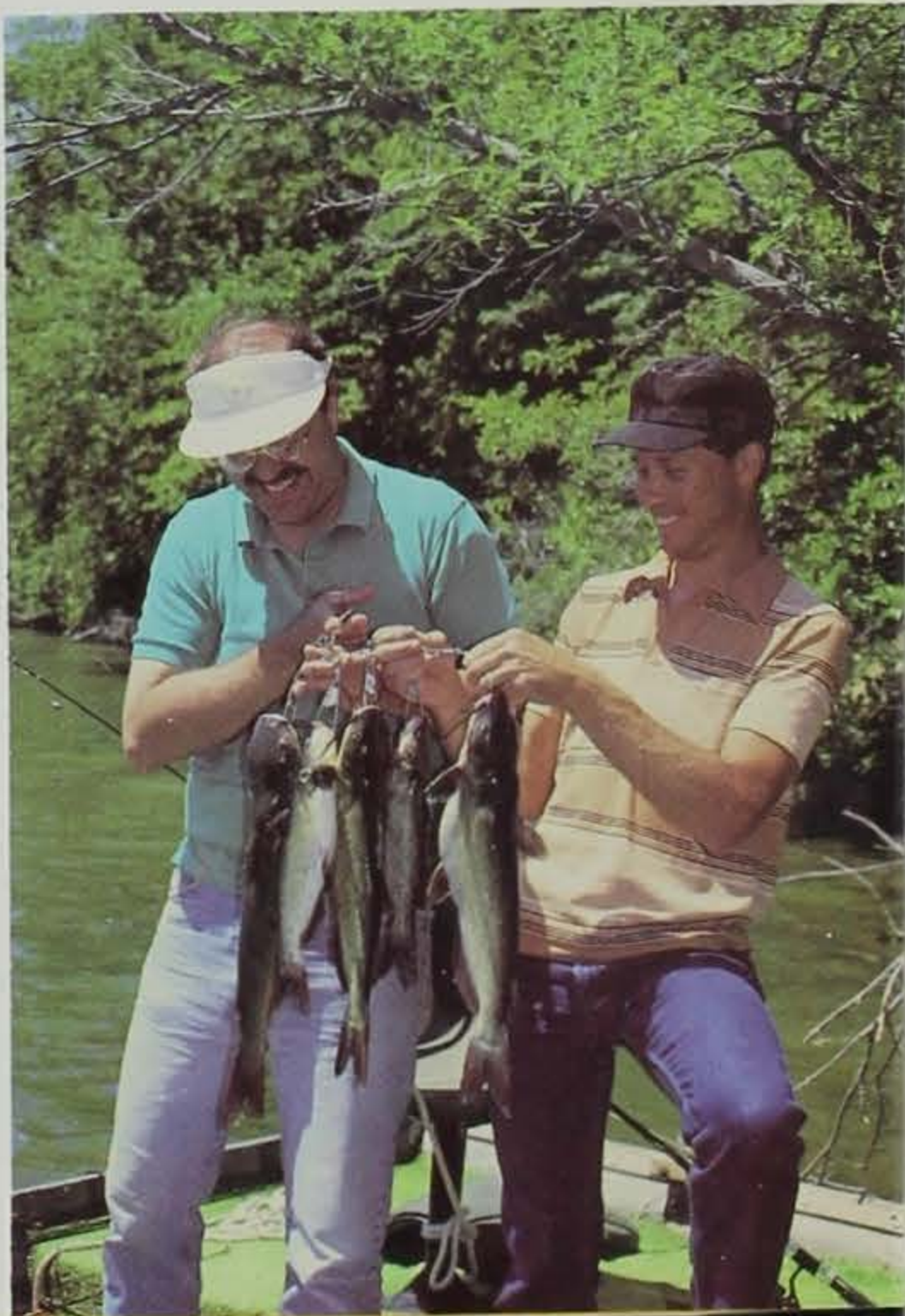
Larry Gepner, of Griswold, also fishes several good southwest Iowa lakes that are fairly close to home. Lake Icaria, Greenfield, Meadow Lake, Mormon Trail and Littlefield Lake top Gepner's list for producing channel cats.

Ron Johnson



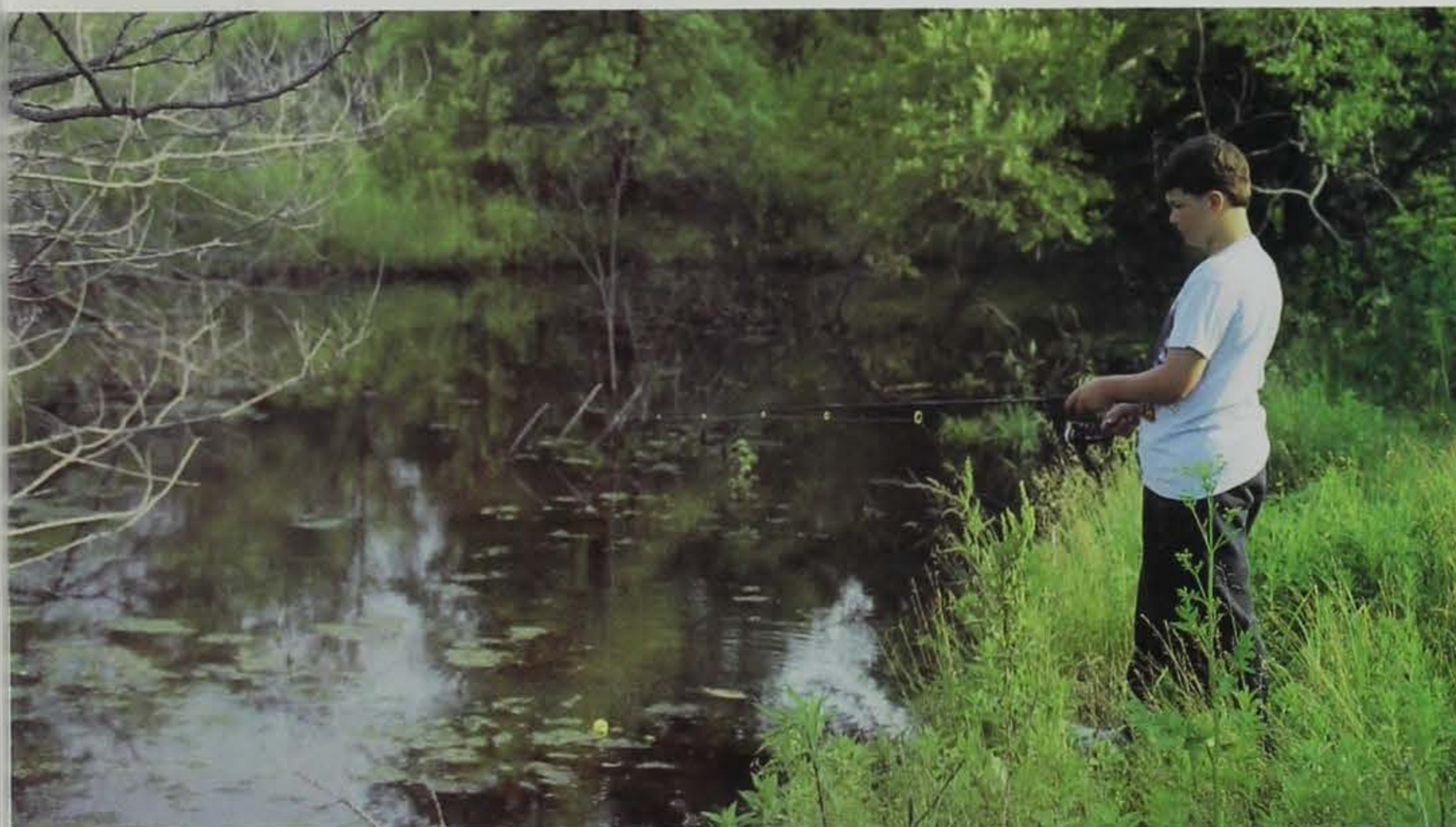
Ken Formanek

Lowell Washburn





Iowa anglers have always known that channel catfish are one of the most important sportfish in the state. Not only does this species abound in all the major river systems, but it is stocked annually in nearly all of Iowa's public lakes.



"Catfishermen are Tops" (CAT), an organization that promotes tournament fishing with catch and release of channel catfish," said Cartwright. "CAT was formed to promote catfishing as a sport and bring about new respectability to catfish anglers."

Iowa anglers have always known that channel catfish are one of the most important sportfish in the state. Not only does this species abound in all the major river systems, but it is

"My philosophy is to fish where the wind is blowing into the shoreline," said Gepner. "I use spinning equipment with 10-pound test line, a slip sinker and a 1/0 hook." Gepner revealed that his favorite bait during the late spring and early summer is turkey or chicken livers. Gepner also uses liver for bait when fishing current breaks and chutes off the main channel of the Missouri River.

Mac Cartwright's catfish bait consists of his own secret concoction, but his fishing tackle and fishing techniques remain similar to that of other catfish anglers. However, Cartwright, of Omaha, fishes for channel catfish in Lake Manawa with a slightly different twist. He is a tournament fisherman who specifically targets and has taken many large catfish. "I am also assistant vice-president and co-founder of

stocked annually in nearly all of Iowa's public lakes. Catfishing in southwest Iowa is wonderfully simple. All you need is a lake or river, fishing rod, your favorite bait, and a few quiet hours to catch a channel catfish and enjoy a respectable sport.

Jerry Hudson is a fisheries management biologist for the department at Lewis.



▲ Sail the waters of Big Creek State Park and Recreation Area.

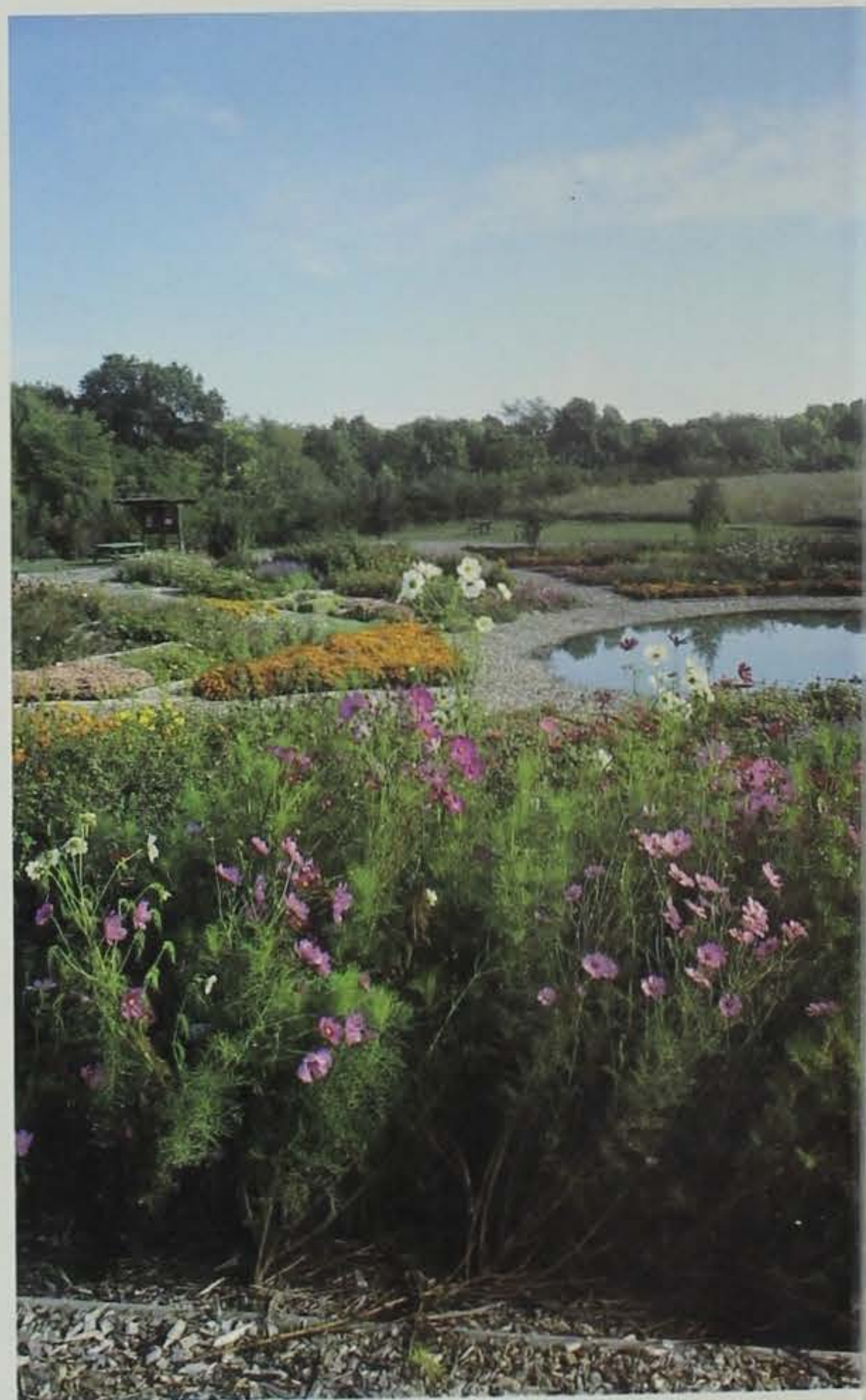


▲ Camp in one of the many state park campgrounds.

► Bike the Des Moines River Trail.



Ken Formanek



We're Having Summer Fun Now !

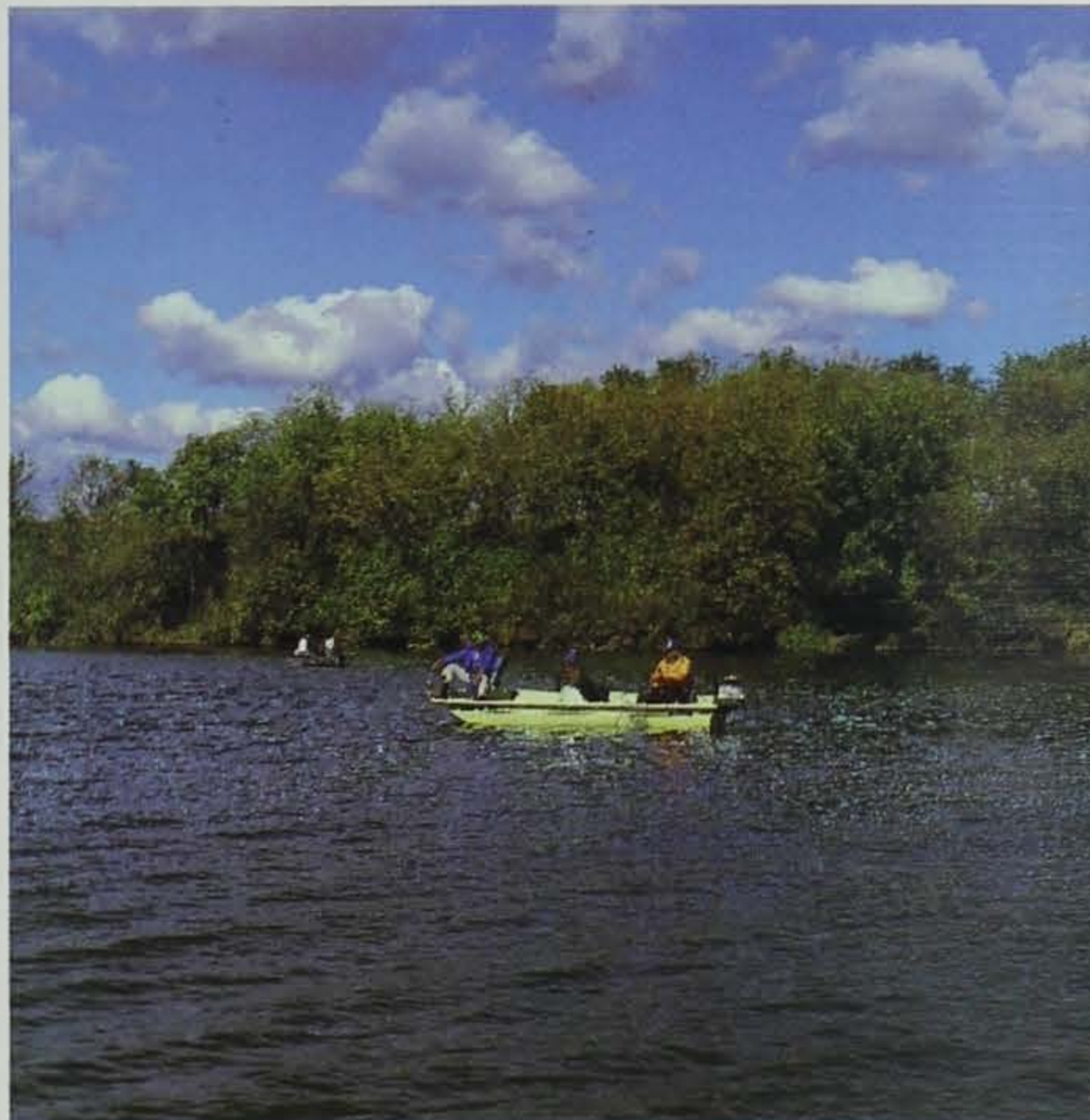


▲ Take a hike.



▲ Have a picnic.

◀ Stroll through the Bellevue State Park butterfly garden.



▲ Catch a keeper.

Iowa has more than 70 state parks and recreation areas to picnic, play, camp and relax in. These areas offer natural summer fun.

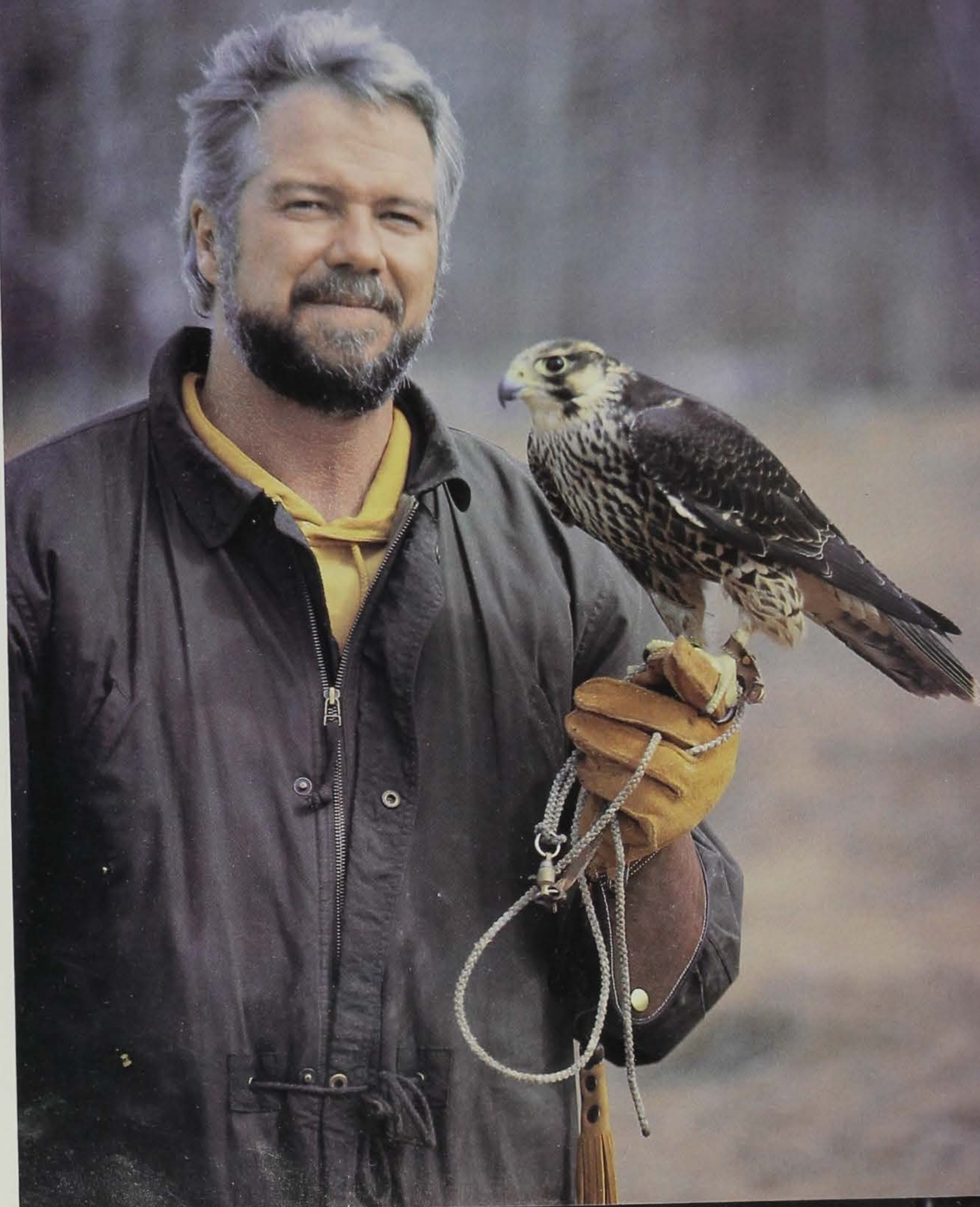
The lakes and rivers within and along these parks provide plenty of fabulous fishing, not to mention sailing, boating, skiing, canoeing and swimming.

Hundreds of miles of trails, with more under development, give visitors a chance to hike, jog, bird watch, study nature or just stroll along. There are trails for bicyclists, equestrians and ATV riders.

Campgrounds range from the large modern facility to the secluded hideaway.

Whatever your pleasure, Iowa's state parks and recreation areas are bound to have it. Join the fun. Iowa's great outdoors is an inviting place to spend the summer.

Photos by Ron Johnson



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the determination and the talent to artificially produce and rear significant numbers of peregrine falcons within a captive setting. And it is these birds that have provided the means for conservationists to embark upon one of the most ambitious and far-

However, in 1972, two events occurred, almost simultaneously, that would avert this tragedy. The first was that the use of DDT was banned in the U.S. The second significant event was that an American falconer named Tom Cade was success-

programs in history.

has long been regarded as one of the most iconic life forms. The peregrine was the favored falconer, and remains so today in the United States. The aerial prowess of the legendary "duck hawk" is virtually unexcelled, and while in pursuit of prey the falcon's stooping dives are said to reach or exceed 200 miles per hour.

Peregrines are great travelers, and with the exception of Antarctica, they have been recorded at every major land form. Historically, they nested across the U.S. and Canada. But as a result of pesticide (DDT) contamination, their numbers declined sharply after World War II. By the mid-1970s, the bird had completely vanished from the eastern United States. Experts predicted that extinction was



Holiday Gift Order Form

Please include payment with order.
Additional gift orders may be enclosed on a separate sheet.

FIRST GIFT:

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FOURTH GIFT:

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(November/December 1992 issue)

Please make checks payable to the Iowa Department of Natural Resources.
Please allow eight weeks for subscriptions to begin and to receive calendars.
Quantities are limited. Offer expires December 31, 1992.

THE PEREGRINE FALCON

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

ON

programs in history.

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THE PEREGRINE FALCON

MAN ON A MISSION

Article and photos by
Lowell Washburn

To say that Bob Anderson is a man who takes his work seriously would be a classic understatement. When we met at his Hugo, Minnesota, home last summer, Anderson was putting in 12 to 16 hours per day, had not had a day off in 8-1/2 months, and, as I later learned elsewhere, hadn't turned a profit in more than five years.

But if the fatigue showed at all, it was largely overshadowed by the man's energetic and positive attitude. For in spite of the load, the enthusiasm for his calling rarely falters. You see, Bob Anderson is a man on a mission. His single-minded, all-consuming purpose is to see a secure, free-ranging population of peregrine falcons restored to North America. It is a task which has kept him clearly focused for nearly 20 years.

Anderson is among a dozen or so individuals that possess the determination and the talent to artificially produce and rear significant numbers of peregrine falcons within a captive setting. And it is these birds that have provided the means for conservationists to embark upon one of the most ambitious and far-

sighted wildlife recovery programs in history.

The peregrine falcon has long been regarded as one of the most stunning and dynamic life forms. The peregrine was the "bird of choice" for Medieval falconers, and remains so today in Europe and elsewhere. The aerial prowess of the legendary "duck hawk" is virtually unexcelled, and while in pursuit of prey the falcon's stooping dives are said to reach or exceed 200 miles per hour.

Peregrines are great travelers, and with the exception of Antarctica, they have been recorded at every major land form. Historically, they nested across the U.S. and Canada. But as a result of pesticide (DDT) contamination, their numbers declined sharply after World War II. By the

mid-1960s, the species had completely vanished from the eastern half of the U.S. and experts predicted that extinction was eminent.

However, in 1972, two events occurred, almost simultaneously, that would avert this tragedy. The first was that the use of DDT was banned in the U.S. The second significant event was that an American falconer named Tom Cade was success-





▲ Anderson "scopes" out the nest of MF1 in Minneapolis. MF1 was one of the first peregrines produced by Anderson to be released into the wild. This year -- her sixth year in the wild -- she again nested on a downtown building in Minneapolis where she produced four young.

ful in artificially hatching a baby peregrine at Cornell University in Ithaca, New York. The first hatchling was followed by others, and as success begat success, Cade became caught up in the dream of returning captive-reared falcons to the wild in order to reoccupy the now-empty peregrine eyries. Anderson was intrigued.

"You have to understand that I grew up thinking that I would never even be able to see a wild peregrine during my lifetime,"

It is [Anderson's] birds that have provided the means for conservationists to embark upon one of the most ambitious and far-sighted wildlife recovery programs in history.

said Anderson. "When I heard what Cade was doing, I became totally captivated," he said.

During the early 1970s, Anderson made several trips from his Minnesota home to visit Cade at Cornell's "peregrine palace." Soon, he too was obsessed with the vision of restoring wild, free-flying peregrines to the American landscape.

By the late 1970s several other falconers across the country had also become smitten with the concept of restoring the peregrine falcon. Soon, a small nucleus of devotees had become very serious about the idea of producing birds for release.

"What's really interesting is that here is a group of private citizens who essentially said, 'Let's pool our resources and put our personal hunting birds together and try to produce some young that could survive in the wild,'" said Anderson. "At first, we were just scoffed at by the scientific community. They said that [falconers] were just looking for an excuse to play with the last few peregrines."

Leading ornithologists and even the U.S. Fish and Wildlife Service were very skeptical.

"Now that I look back on it, I guess the idea of rearing one of the continent's wildest and most critically endangered forms of wildlife in captivity and in significant quantities did sound pretty far out," laughs Anderson.

By now, Anderson had begun to experiment with producing large falcons in captivity. Although he could not find a source of peregrines, he was successful in producing a "prairie falcon" chick in 1975.

"I knew in my heart that this dream of restoring peregrines

could become a reality, and at that moment I knew that I had to be a part of it," said Anderson. In 1979, he sold a new home at White Bear Lake to move into what he refers to as "the old farm house." But the house didn't matter. What Anderson was really after was the acreage that went with the place, and he immediately began to build peregrine breeding facilities for birds he didn't have. "I had no idea where the stock would come from. I just had to believe that it could come," he said.

To make a difficult undertaking even more complicated, Anderson decided to concentrate on producing anatum peregrines, the subspecies that historically nested in the Midwest. "I've felt all along that we would have the best chance for success if we tried to duplicate what naturally occurred here," he said. But pure anatum peregrines were an extremely rare commodity and could hardly be obtained at the corner pet store. After four years of dead ends, Anderson was still searching for the bloodlines he needed. Finally, in 1983, the Minnesota Department of Natural Resources helped put through the paperwork that allowed Anderson to import two pairs of pure anatum peregrine falcons from British Columbia. Later he obtained a third pair from within the U.S.

Anderson still painfully recalls how the original stock was obtained. "Essentially I had to trade my personal gyrfalcon and some of its babies for the peregrines," said Anderson. That really hurt at the time, and some people said I was crazy. But in the end it was all worth it, he added. "At that time, obtaining peregrine falcons was about the equivalent of trying to get a pair of California condors today," he joked. "The fact that we got the birds in at all is really quite remarkable."



▲ Anderson decided to concentrate on producing anatum peregrines, an extremely rare subspecies that historically nested in the Midwest. After four years of searching, Anderson was finally able to locate, and obtain, two pairs of pure anatum peregrine falcons from British Columbia.

◀ Peregrines rest on the Traveler's Insurance Company's "umbrella" in downtown Des Moines.

released into the wild along the Mississippi River at the Weaver Dunes. The next year, 1986, he produced 11 peregrines, of which 10 were released.

"That first big year was really incredible for me," said Anderson. Of the 10 falcons released that year, four are known to have survived to adulthood, and three lived to become breeders. Two of those birds still nest in the Twin Cities, and one is in Chicago.

One of the birds released that year lived to become one of the best-known peregrines. The bird was a female known as MF1 in honor of her sponsor (Minnesota Falconers' Number 1). Upon reaching maturity, MF1 successfully nested on the Multifoods Tower in downtown Minneapolis, and produced the first wild peregrines to be hatched in Minnesota in more than a quarter century.

The only female produced from that nest also survived to produce young of her own. Today, MF1's offspring are occupying territories and producing young of their own from Minneapolis to Winnipeg. During 1992, MF1 enjoyed her sixth season in the wild. She again nested on the Multifoods Tower and produced four young. "I really feel as if she is one of the most important birds in the entire recovery effort," said Anderson. "Regardless of what becomes of her now, MF1 has left her mark on the planet."

In 1987, Anderson produced a total of 34 peregrines, followed by a dismal hatch of 18 birds in 1988. By now the physical and mental stress of producing peregrines while also holding down a full-time "real job" had become impractical.

"My wife, Kathy, told me that I'd have to make a choice," said Anderson. "I could see that she was right. We chose the falcons."

In 1989, after 18 years at the 3M Corporation, Anderson quit his job to devote his time to the peregrine recovery. That year he raised 23 falcons, followed by 36 produced in 1990. A cold, wet spring dropped production to 18 birds during 1991.

In addition to becoming physically exhaustive, Anderson's work had also become a financial liability as well. As the number of breeding pairs increased, so did the need for expensive housing, incubators, lab and other equipment. Food costs had also escalated, and the quail bill alone had now reached \$10,000 a year. (see "Captive Breeding Is Key To Success," page 38.)

"It was apparent that producing birds for conservation had put me in a rather precarious position," Anderson said. "Those two poor production years were what hurt the worst. They almost put me and the project away."

However, in spite of the obstacles, Anderson remains upbeat. "When things really get bad I just think about MF1 and the impact she's having," said Anderson. "I also think of the other falcons produced here that are now pioneering nests in places like Winnipeg, Kansas City, Chicago, Detroit and several other midwestern states. When I think of those free-flying peregrines coming back to nest, I guess my batteries just sort of get recharged and I'm ready to go again."

Due largely to the insistence of fellow peregrine enthusiasts, Anderson has recently helped form a non-profit organization

called the Raptor Resource Trust. According to Frank Taylor, one of the trust directors, the trust is involved in a wide variety of conservation activities that include building and placing nest boxes for peregrines, augmenting peregrine nests by replacing broken or dead eggs with downy chicks, and raptor education.

"Another of our objectives is to try and gain support for Bob's work by seeking grants from large groups or through donations from private individuals," said Taylor. "We could see that Bob was just go-

ing to burn himself out on this thing," he added. Not only had the guy given up his career at 3M, but he had also invested, and lost, all of his personal savings, all of his stocks, his IRAs -- everything. He had literally put everything he had on the line so he could play a role in restoring peregrines. "No one should have to shoulder that burden out of their own pocket," said Taylor.

"Most people know Bob Anderson as a peregrine producer but there's a lot more to his work," said Taylor. "For example, Bob took it upon himself to conduct the first survey of suitable nesting sites along the north shore cliffs of Lake Superior. He successfully mapped 80 miles of shoreline, operating alone from a 14-foot boat. Anderson has also logged in thousands of miles to install peregrine nest boxes on skyscrapers and smoke stacks across the Midwest -- especially along the Mississippi River. He once traveled 1,500 miles round trip to erect a nest box in Detroit because there was a pair there and no one else to do it. Anderson also manages to present an average of two to three educational



"There's no question that the peregrine falcon has come a remarkable distance during the past 10 years."



▲ A female peregrine falcon feeds her young.

Iowa's Peregrine Falcon Reintroduction Program

Majestic and capable of hurtling through the sky at speeds of more than 200 miles per hour, the peregrine falcon nearly dived to extinction during the 1950s and '60s. DDT and related pesticides which became widely used after World War II, inhibited the falcon's ability to produce enough calcium for its eggs. Eventually, people recognized DDT and its by-products might also be harmful to humans as well as wildlife, and the chemical was banned in 1972. In 1989, the Nongame Program established a reintroduction project to re-establish the endangered falcons. To date, 23 peregrines have been released in Cedar Rapids and 19 have been released in Des Moines. In 1992, peregrines will be released in the Quad Cities as well. (The release is a cooperative effort of the Iowa Department of Natural Resources, Illinois Department of Conservation, Iowa Falconer's Association and Quad Cities Conservation Alliance.)

The releases have been very successful. Eighty percent of the young birds have survived to independence. Iowa-released falcons have been observed throughout Iowa, as well as in Minnesota, Nebraska and Canada. "This year, we had our first peregrine nest in Iowa in nearly 30 years," said Laura Spess Jackson, nongame biologist for the DNR. "A



◀ Marked falcon is placed back into hatch box. Des Moines, 1991.

pair of peregrines nested in Des Moines. Although they produced two eggs, neither egg hatched. The pair bond, however, is still strong and may attempt to re-nest. We also had a pair apparently nest under a bridge in the Quad Cities. And a third pair underwent courtship and may nest in Cedar Rapids."

The goal of the reintroduction program is to establish five nests in Iowa by the turn of the century to keep peregrines from facing extinction again.

For more information on the peregrine falcon reintroduction program in Iowa, contact the Nongame Program, 1436 255th St., Boone, Iowa 50036, (515) 432-2823. A brochure on the peregrine falcon and a recently published booklet, *Nongame Accomplishments 1982-1992 -- The First Decade*, are available free of charge.

because there was a pair there and no one else to do it. Anderson also manages to present an average of two to three educational programs per week. On an average year he speaks to more than 40,000 people on behalf of the peregrines. His theme is that individuals can and do make a difference. Environmental wrongs can be righted, and the peregrine is a classic example.

"This guy's energy is limitless, and he's become a very positive force in the peregrine recovery," said Taylor.

However, Anderson is hesitant to dwell on past accomplishments. "There's no question that the peregrine falcon has come a remarkable distance during the past 10 years," he said. But he is also quick to note that the species still has a long way to go. Last year there were 17 successful breeding pairs in the Midwest region including a bird in southern Canada. "There were also a dozen or so pairs that did not produce young," he said. "That's extremely encouraging. But any way you cut it, the fact remains that we're still dealing with a very young, very fragile population. MF1 has had three different mates in five years, and I know another falcon that has had five mates in four years. Although many breeders migrate, some tend to stay north all year. We haven't had a really severe winter since 1984, and we don't know what impact that could have. Basically, we are still dealing with a founder population group of birds, and a lot of questions remain to be answered.

"I hope to continue producing peregrines for the next three or four years," said Anderson. "Then maybe we'll step back and see where we're at. Maybe one of these days we can feel as if the mission is accomplished, and the peregrines are secure and back home for good. But that day isn't here yet and I'm not ready to quit."

Bob Anderson does indeed take his work very seriously. Perhaps S. Dillon Ripley of the Smithsonian Institute has best described the qualities of people like Anderson. Describing those who work with peregrines and other endangered wildlife, Ripley writes: "One of the essential points in the understanding of captive rearing is that it can only be done by a green thumb person. Such people are probably born -- not made -- like the great collectors of art or the artists themselves. Certain horticulturalists and certain animal breeders have an innate skill which can probably never be learned and certainly has nothing to do with the possession of a higher educational degree . . . A sense of kinship with nature and a single-mindedness of purpose appear to be the touchstones of success in this work."

Bob Anderson is an individual who certainly possesses that unique kinship and purpose. He is a man consumed by a passion for the peregrine falcon and by an over-riding desire to see this magnificent bird returned to America. To see that desire fulfilled he has invested his time and all material possessions. Anderson has played a significant role in the return of the peregrine falcon and is an unsung hero of that endeavor. Americans owe him a debt that will likely remain unpaid, but whose dividends will be reaped by generations to come. Anderson doesn't dwell on such matters, however. He thinks only of the peregrines. He is a man on a mission.

THE PEREGRINE FALCON

Captive Breeding Is Key To Success

During recent years, the peregrine falcon has provided the focus for one of the most intriguing and glamorous recoveries in the annals of conservation. The effort has been loved by the media and the public, and has captured the attention of Americans from coast to coast.

Success of the recovery has been dependent upon a reliable supply of captive reared baby falcons. Immediately prior to attaining the powers of flight, the young birds are placed into hack boxes located in what is hopefully suitable breeding territory. As the young learn to fly, they are allowed to roam at will while periodically returning to the hack box to feed on a diet of fresh quail provided for them. After learning to hunt independently, the now-wild peregrines strike out on their own -- hopefully to one day produce young for themselves.

Although nearly everyone is familiar with the ongoing recovery, few question where all those baby birds come from. Most people would rightly assume that propagating peregrines is more difficult and complex than say raising leghorn chickens or mallard ducks. But if these same folks knew exactly how demanding and detailed the process was, they would likely shake their heads in disbelief. The fact that peregrines can be artificially produced at all is nearly as remarkable as the restoration itself. Without exception, the projects are costly and labor-intensive.

Bob Anderson of Hugo, Minnesota, is a devout falconer, raptor propagator and conservationist. He is one of a handful of people who possess the level of dedication needed to raise peregrine falcons in captivity. Only 15 individuals in the U.S. and Canada currently produce peregrines for release.

"The first thing that is needed to successfully produce peregrines in captivity is to create a completely stress-free environment," said Anderson. Each pair of breeding falcons is placed into an individual chamber that measures at least 14 feet by 20 feet with a height of 20 feet. The room allows ample light to enter through spacious vertically barred windows, and is equipped with specially designed perches and an artificial nesting platform that simulates a natural cliff ledge.

"The annual breeding cycle actually begins in January," said Anderson. In order to bring the birds into breeding condition, mentally as well as physically, each pair must be fed at least five times daily. The male gets the food and delivers it to the female. "That interaction is crucial in order to bring the pair into the state of mind needed to produce," he said.

Diet is critical, and Anderson tries to provide his birds with food that is high in nutrients and as varied as possible. The diet



◀ **Courting pair in one of Anderson's breeding chambers.**

cal incubator. If the egg hatches, the chick is hand fed pureed quail every two hours for about seven days. The chick is then given back to its parents or to another falcon pair.

"One of the hardest aspects of captive breeding is to program the young to behave as wild birds," said Anderson. Giving the chicks back to be raised by real birds prevents them from imprinting on humans.

At 30 days of age, the young peregrines are taken from their parents and placed into quarters of their own -- a potentially traumatic experience for all involved. Here the falcons learn to tear food on their own. To avoid human contact, the birds are fed through a remote chute. "Actually when it's all said and done, placing the young by them-

includes duck, chicken and fresh quail. During the peak of the breeding season, his birds consume more than 100 quail per day.

"The thing to keep in mind is that these are not domestic birds, and we do not have the benefit of domestic genes working in our favor," said Anderson. "It takes three full years of daily feedings before a bird is ready to be put into a project, and at least half of the falcons that are put up will never breed," he said. For those that do, artificial insemination is often required. Raising falcons is hardly a cost- or space-effective enterprise.

The fact that peregrines can be artificially produced at all is nearly as remarkable as the restoration itself.

For those birds that do produce, egg laying begins in early March. Some nestings may occur as late as late May. A normal clutch consists of four eggs. Incubation takes 33 days.

After the eggs are laid, they are allowed to incubate naturally for 7 to 10 days -- either under the falcon or under a bantam hen. The eggs are then placed into a very sophisticated mechani-

cal incubator. If the egg hatches, the chick is hand fed pureed quail every two hours for about seven days. The chick is then given back to its parents or to another falcon pair.

When the birds are 35 days old, they are turned over to Dr. Pat Redig and Dr. Harrison Tordoff at the University of Minnesota's Raptor Resource Center. Redig has served as a liaison and release site coordinator with state agencies (including the Iowa Department of Natural Resources), and Tordoff has monitored the fates and destinies of released falcons.

"These individuals have really been the driving force behind the recovery program," said Anderson. "They are very dynamic people to work with and are completely dedicated to peregrines. Their work has been essential," he said. "Without their efforts the restoration could not have succeeded."

Although the breeding cycle lasts for about five months, Anderson works virtually nonstop from late November through August. The facilities and the birds require a lot of maintenance.

So what keeps him going? One is an overriding love for the peregrines themselves. The other is an annual autumn pilgrimage to the prairies of North Dakota to hunt with his beloved falcons.

"Actually, the sport of falconry and the peregrine recovery program have been very closely linked from the beginning," says Anderson. "[Propagators] are usually referred to as breeders, biologists or scientists. We may be some of those things, too, but we're all falconers at heart. In fact, no one other than a falconer has every produced a peregrine in captivity. Everything, even the technique of hacking, has its roots in falconry. The two are inseparable.

"There isn't a day that goes by that I don't dream of my setters on point and my peregrine flying high overhead, waiting for me to flush a grouse or partridge," said Anderson. "That's what keeps me ticking."

--LW

IOWA'S OUTDOOR COOKBOOK

by Julie Sparks and Tammra K. Pavlicek

Ah, summer. Nothing more signifies that summer has arrived than the smell of barbecued meat sizzling on an open grill. And what better place to grill out than in one of Iowa's state parks or recreation areas.

Picnic areas, complete with grills and picnic tables, are available at all state areas. For the location nearest you, call (515) 281-5145.

And, keep in mind the **BYOB** program -- bring your own trash bag to remove your wastes after visiting a state area.

Do you have a favorite outdoor recipe you would like to share with our readers? Send to "The Outdoor Cookbook," *Iowa Conservationist*, Wallace State Office Building, Des Moines, Iowa 50319-0034. We regret that we cannot acknowledge receipt of recipes or return recipes. We will print as many as space allows.

Fisherman's Delight

- 2 lbs. pan-dressed yellow perch or other small fish
- 2 tablespoon lemon juice
- 2 teaspoons salt
- 1/4 teaspoon pepper
- 1 lb. sliced bacon

Clean, wash and dry fish. Brush inside of fish with lemon juice. Sprinkle with salt and papper. Wrap each fish with a slice of bacon.

Place fish in well-greased, hinged wire grills. Cook on barbecue grill about 5 inches from medium-hot coals for 10 to 15 minutes or until bacon is crisp. Turn and cook for 10 minutes longer or until bacon is crisp and fish flakes easily when tested with a fork.

Makes 6 servings.

Fish Fillets in Foil

- 2 lbs. fish fillets
- 2 green peppers, sliced
- 2 onions, sliced
- 1/4 cup butter or margarine, melted
- 2 tablespoons lemon juice
- 2 tablespoons salt
- 1 teaspoon paprika
- Dash of white pepper

Cut fish into serving-size pieces. Cut 6 squares of heavy-duty aluminum foil, 12 inches each. Grease lightly. Place each portion of fish, skin side down, on one-half of each square of foil. Top with green pepper and onion, dividing evenly among portions.

Combine remaining ingredients. Pour sauce over fish, using approximately one tablespoon for each portion. Fold other half of foil over fish and seal edges by making double folds in the foil.

Place packages of fish on barbecue grill about 5 inches from medium-hot coals. Cook for 45 minutes or until fish flakes easily when tested with a fork. To serve, cut a big crisscross in the top of each package and fold the foil back.

Makes 6 servings.

Grilling Tips: To judge the temperature of coals for grilling, hold your hand, palm side down, above the coals at the height your food will cook. Start counting seconds, "one thousand one, one thousand two." If you need to withdraw your hand after two seconds, the coals are considered hot; after three seconds, medium-hot; after four seconds, medium; after five seconds, medium-slow; and after six seconds, slow.

Grilled Basil Burgers

- 1 slightly beaten egg
- 2/3 cup chopped onion
- 1/2 cup grated parmesan cheese
- 1/4 cup snipped fresh basil or 1 tablespoon dried basil, crushed
- 1/4 cup catsup
- 2 cloves garlic, minced
- 1/4 teaspoon salt
- 1/4 teaspoon pepper
- 2 pounds ground raw turkey, venison or beef
- 8 hamburger buns, split and toasted
- 8 tomato slices

In a mixing bowl combine egg, onion, Parmesan cheese, basil, catsup, garlic, salt and pepper. Add ground meat; mix well.

Shape meat mixture into eight 3/4-inch-thick patties. Wrap patties individually in plastic wrap or foil if refrigerating or toting. To tote, pack the patties with ice in a cooler for up to 4 hours.

To grill, place patties on the grill rack directly over medium coals. Grill for 15 to 18 minutes or until juices run clean, turning once. Serve patties on buns with fresh tomato slices.

Makes 8 servings.

Potatoes Roasted Over the Coals

- 6 medium potatoes, unpeeled
Butter or margarine, softened

Scrub potatoes, dry, rub with a small amount of butter. Wrap in foil.

Place on grate over moderate fire and roast 50 minutes. Potatoes can also be placed directly on coals, around outer edge of fire. Turn potatoes two or three times. Pierce through foil with fork to test for doneness.

Makes 6 servings.

Cooked Dandelion Greens

- 1 grocery bag full of dandelions
8-12 strips of bacon, to taste
Salt and brown vinegar, to taste

Dig dandelions before they blossom. Leave large white center root attached (looks like a small green onion). Peel back outer brown leaves and cut lower roots off, leaving enough of the root so that the plant remains intact. Then wash thoroughly with cold water.

Bring water to a boil; add dandelions and cover. Boil for 5 to 10 minutes. Drain. Fry 8 to 12 strips of pre-cut bacon into small pieces. Do not drain bacon grease. Add dandelions and stir. Cook over medium heat for 15 to 20 minutes. Stir occasionally. Serve with salt and brown vinegar, to taste.

Makes 2 to 4 servings.

--Warden's Cookbook

Campfire Bread

- 4 cups flour
8 teaspoons baking powder
3 cups cold water, approximate
1 teaspoon salt
1 tablespoon sugar

Mix ingredients thoroughly and stir in enough water to make a thick, but pourable, batter. Stir rapidly with spoon until smooth.

Pour batter into large greased fry pan, set on hot coals. Turn when bottom is partly brown.

--Warden's Cookbook

Raspberry Pie

Pastry for 9-inch, two-crust pie

- 1 cup sugar
1/3 cup flour
4 cups fresh raspberries
2 tablespoons butter

Prepare pastry. Stir together sugar and flour; mix lightly with raspberries. Pour into pie shell. Cover with top crust and cut small slits in top crust. Seal and flute.

Cover pie crust edges with strips of foil. Remove foil the last 15 minutes of baking. Bake at 425 degrees for 35 to 45 minutes or until nicely browned.

Raspberry Pudding

- 3 cups raspberries
1-1/2 cups sugar
1 cinnamon stick
Cornstarch
Whipped cream

Bring raspberries, sugar and cinnamon stick to boil. Stir 3 minutes. Remove from stove and strain through sieve into a pot. Do not mash berries through sieve. Place pot with berry juice on stove and boil. Thicken with cornstarch and pour into pudding dish. Top with whipped cream.

--Warden's Cookbook

Sumac Lemonade

- 2 handfuls red sumac berries
Sugar to taste

Pick 2 generous handfuls of clusters of red sumac fruit during late summer or early fall. Place in pan and mash.

Cover with boiling water and set aside to steep. When liquid is well colored, strain through folded towel to remove fine hairs, which were on the berries.

Sweeten sumac lemonade to taste.

--Warden's Cookbook

Wild Rose Tea

- 2 teaspoons fresh wild rose petals

Steep petals in boiling water for 5 minutes.

Note: Avoid dark red petals as they are stronger tasting than light pink petals.

--Warden's Cookbook

Warden's Cookbook

Warden's Cookbook can be purchased for \$10 plus \$2 shipping and handling by writing to Fish and Game Officer Association, George Hemmen, Rte. 2, Box 259, Guthrie Center, Iowa 50115. A supplement is also available for \$5.

CONSERVATION UPDATE

by Kathryn Stangl

PESTICIDES IN IOWA PRECIPITATION

by Brenda K. Nations

Iowans know the importance of rainfall, especially after the droughts and floods of the past several years. The quality of this rainwater became an issue when studies in other states showed evidence of atmospheric pollutants being deposited via rainfall, especially in the Great Lakes area. Later studies in both the Midwest and along the East Coast showed that agricultural pesticides commonly occur in rainfall, especially during the summer months. In 1987 the geological survey bureau of the Iowa Department of Natural Resources began a study to determine if rainfall in Iowa contained any agricultural chemicals.

Iowa is an ideal setting for examining the presence of pesticides in rainfall. Most of the state's land is farmed, and it is estimated that more pesticides are used here than in any other state. Pesticides already have been detected in the state's groundwater and surface water, and because these chemicals volatilize (or vaporize) into the atmosphere after being applied, a study of rainwater is necessary to a more complete understanding of their transport and fate in the environment.



J. Meeker

▲ Pesticide detections in Iowa's precipitation clearly showed a seasonal trend in the geological survey bureau's study.

Three different sites were chosen for taking rainfall samples. Two of these sites are rural: the Big Spring basin in northeast Iowa (Clayton County) and the Bluegrass Creek watershed in west-central Iowa (Audubon County). The third site is in urban Iowa City (Johnson County). Between 1987 and 1990, samples were taken after each rainfall and were analyzed for the 18 most common pesticides used in Iowa. Rainfall samples were collected throughout the year, and snow was occasionally sampled during the winter months.

Fourteen pesticides were detected in rainfall

samples during the three-year period. Ten of these pesticides were herbicides, and four were insecticides. The most commonly detected herbicides were atrazine, alachlor, metolachlor and cyanazine; common product names for these chemicals are Aatrex, Lasso, Dual and Bladex. These results correspond directly with the high use of these farm chemicals in Iowa. The concentrations were usually small, with most detections under one ppb (parts per billion), but larger amounts, up to 40 ppb, occasionally were detected. Concentrations of pesticides in rainwater were usually less than the drinking water standards set by the U.S. En-

vironmental Protection Agency for all of the chemicals detected.

Pesticide detections in Iowa's precipitation clearly showed a seasonal trend. The agricultural chemicals were found in almost every rainfall from mid-April through July, the same months when pesticides have the greatest potential of volatilizing into the atmosphere. The appearance of these chemicals as early as mid-April, before farmers in Iowa begin applying them, may be the result of volatilization of carry-over residues on fields because of the warming soils, or perhaps the result of transport from southern areas where these

chemicals are applied at earlier dates. Detections decrease after July, when they are no longer applied, and only occasionally do pesticides occur in fall rains. No detections occurred during the winter months, and no pesticides have been found in snow.

Most of the pesticides found at the two rural sites, Big Spring and Bluegrass Creek, were also found in rainfall at Iowa City. This suggests that pesticides are being transported to areas where they are not applied. Detections in Iowa City, however, were not as high as in the rural areas, indicating that concentrations become lower with increasing distance from the source. Detections at the two rural sites were similar to each other, except that the western site had herbicides not detected at the other two sites, which related to local use of those products.

Pesticides are present in rain because they volatilize, making them available in the atmosphere to combine with precipitation. Each chemical has properties that affect how long it will exist in the environment before breaking down, as well as how easily it vaporizes. All these properties play a role in the occurrence of each pesticide detected in rainfall. Also, weather conditions such as temperature, wind, and humidity at the time of applica-

tion affect how much of the pesticide volatilizes and is transported.

Studies have shown that pesticides can travel great distances in the atmosphere, as they have been found in such remote areas as the West Indies, the Canadian Arctic, the Swiss Alps and Pacific Ocean islands. Pesticides detected in Iowa are most likely applied within the state or perhaps surrounding states. It is not yet known if the high usage of these chemicals in Iowa and the Midwest accounts for any of the atmospheric movement to more distant locations.

Although the concentrations of pesticides found in precipitation are probably not enough to pose a health risk, it is important to realize that these chemicals are being transported in a variety of ways within the environment. Iowans, concerned about the impacts of agricultural chemicals on their environment, are looking for methods to reduce high pesticide usage. These studies on the fate of pesticides in the environment will bring us closer to an understanding of how to use these chemicals while maintaining or improving environmental quality.

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Brenda K. Nations is a geologist with the department's geological survey bureau in Iowa City.



Roger Hill

Rare Sandhill Crane Sighted in Iowa

Rare sandhill cranes have returned to Iowa according to DNR biologists. Sightings this month confirm too, that for the first time in nearly a century, young cranes are being reared in the state. The sandhill cranes have been seen at the DNR's Otter Creek Wildlife Management Area near Chelsea. "This is exciting news," said DNR nongame biologist Laura Jackson. "They have not nested here since 1894 when a nest was documented in Hancock County. Before that it was 1878 in Sac County," Jackson said.

DNR wildlife workers suspected sandhills might have returned when they noted three of the cranes near the Otter Creek Marsh last fall. At that time, one of the three appeared to be a sub-adult bird. Monitoring was stepped up this year and workers discovered an adult pair with two young. Adding to the discovery, a second pair of adults and one

young have been reported on the 3,000-acre area in Tama County along the Iowa River.

Sandhill cranes, though common in the Platte River region of Nebraska, other states to the north and west and some Canadian provinces, have been gone from Iowa for so long that they were not considered for the state's endangered species list when it was compiled in the 1970s.

"This large bird is 37 inches high and has an 89-inch wingspan. It requires large expanses of wetlands, cattails and sedges to survive," Jackson noted. "That kind of wetland habitat has disappeared in the last 100-plus years."

DNR biologists emphasize that the return of the crane underscores their efforts to manage wildlife areas to benefit diverse species, not just game animals. "Sandhill cranes have been gone for nearly a century, yet we managed to save at least one area for them," said Jackson. "In this age of continually losing species, it is nice to see a turnaround, a return of a species. This gives us hope there may be more species returning in the future."

DNR biologists will continue to monitor likely areas for sandhill cranes. Jackson says until the DNR sees developing patterns it is too early for specific management recommendations to increase crane numbers.

CONSERVATION UPDATE

Fall Deer Seasons Set

The fall deer season has been set by the Natural Resource Commission of the Department of Natural Resources. The seasons and daily bag and possession limits are listed below. There are special provisions early muzzleloader season hunters should note.

The deer seasons are as follows: Muzzleloader -- Oct. 10 to 18 (early) and Dec. 21 to Jan. 10, 1993 (late); Bow -- Oct. 1 to Dec. 4 and Dec. 21 to Jan. 10, 1993; Shotgun -- Dec. 5 to 9 (early) and Dec. 12 to 20 (late).

Deer season shooting hours for early and late muzzleloader and bow seasons are 1/2 hour before sunrise to 1/2 after sunset. Shooting hours for shotgun seasons are sunrise to sunset. Daily bag and possession limits are one deer per license.

Note that hunters purchasing a muzzleloader early season license may not purchase any other gun license.

Early muzzleloader licenses will be issued first-come, first-served through Aug. 14. Applications for early muzzleloader licenses will be processed as they are received through Aug. 14 unless the quota of

7,500 fills prior to that time. Once the quota is filled applications and fees for the early muzzleloader license will be returned to the sender. If an early muzzleloader license application is returned and the Aug. 28 regular application deadline has not passed, the applicant may apply for a regular gun or late muzzleloader season license.

Hunters hunting in the first shotgun season in zones 1, 2, 7, 8 and 10 and the south portion of zone 9 will receive buck-only permits. Bow hunters, second season shotgun hunters and late season muzzleloader hunters may purchase a second license valid for taking antlerless deer only in zones 4A, 5A and 6. Details are explained on the license application.

Applications are available at county recorder offices, DNR offices and many regular hunting license outlets. The application deadline for all deer licenses, other than early muzzleloader is Aug. 28. The license fee for all deer licenses is \$25.

New Youth Deer Season

A special youth deer license is available only to Iowa residents who will have reached their twelfth birthday by Sept. 1 and who will not be 16 by Sept. 1.

The youth must have completed a hunter education course and must carry a copy of their certificate in the field. The youth must be accompanied by an adult possessing a valid hunting license and habitat stamp (if required). The adult must not carry a firearm and must be in direct company of the youth at all times. There must be only one youth per adult.

Season dates for the youth license are Sept. 12, 13, 19, 20, 26 and 27. The method of take is shotgun or muzzleloading rifle. The license is valid statewide for one deer of any sex. A youth who is a residing member of a landowner or tenant family may obtain a free youth license restricted to the family farm unit. This will count as the only free deer license available to the landowner or tenant family for any deer season.

Youths who obtain the youth license may apply for one additional gun or bow license for any other deer season and the additional license will not be considered a second license. This means it will not have the second license zone and sex restrictions.

Youth license applications are available at county recorders and DNR offices. The application deadline is July 24. The license fee is \$25.

Fall 1992 Toxic Cleanup Days Schedule

The DNR has scheduled the 1992 Fall Toxic Waste Cleanup Days.

Toxic waste cleanup days provide urban and rural households with an outlet for safely disposing of household wastes that cannot otherwise be used up, given away, reused or recycled.

Again this fall, people who need to dispose of their household wastes will be asked to call ahead to schedule an appointment according to Marilyn Krogulski, of the Waste Management Assistance Division of the DNR. "The telephone scheduling system means faster service to toxic waste cleanup participants and provides more one-to-one information on the disposal of household hazardous materials," said Krogulski.

Assistance will be given to help residents use up, give away, reuse or recycle what they can. This method is more effective because only those materials that have no other safe outlet for disposal are disposed of by the hazardous waste contractor. Consequently costs are lowered and usable materials are not wasted.

Dates and locations for the toxic waste cleanup days are:

◆ Sept. 12, Cerro Gordo County, Cerro Gordo County Fairgrounds, Mason City

◆ Sept. 12, Monona County, Monona County Recycling and Transfer Station, Highway 37 E, Turin

◆ Sept. 12, Plymouth County, Plymouth County Maintenance Building, LeMars

◆ Sept. 19, Allamakee County, Allamakee County Fairgrounds, Waukon

◆ Sept. 19, Winnebago County, Forest City Maintenance Building, Forest City

◆ Sept. 19, Palo Alto County, Palo Alto County Fairgrounds, Emmetsburg

◆ Sept. 26, Shelby County, Shelby County Fairgrounds, Harlan

◆ Sept. 26, Cass County, Cass County Fairgrounds, Atlantic

◆ Sept. 26, Sac County, Sac County Fairgrounds, Sac City

◆ Oct. 3, Jones County, Jones County Fairgrounds, Monticello

◆ Oct. 3, Cedar County, Cedar County Fairgrounds, Tipton

◆ Oct. 3, Howard County, Howard County Fairgrounds, Cresco

Watch local newspapers later this summer for phone numbers to call for appointments.

Remember to store household hazardous materials safely until the events are held.



Joe Baze (on the left) and his son Fred are shown holding the record 81-pound flathead catfish.

New State Record Flathead Catfish

There is a new state record flathead catfish but the new record holder has waited a long time for his award. Joe Baze caught the fish in Lake Ellis in Lucas County at 6:30 p.m. June 7, 1958. It weighed 81 pounds and was 52 inches long with a girth of 33 inches. It took one and one-half hours to land on 12-pound test line using shrimp as bait.

Although the fish was weighed and there were witnesses to the weighing the state did not have a state

record fish program at the time. However, Baze's granddaughter, Pamela Baze Honken, spent years tracking down all the necessary information and got the record confirmed in June. Former fisheries bureau chief, Jim Mayhew, was a fisheries biologist in Lucas County at the time and witnessed the weighing of the fish. Using a vertebra from the fish, Mayhew estimated its age, at the time it was caught, at 34-plus years.

Baze was fishing on the bank and his son Fred, home on leave from the Army, was fishing for bass just off shore in a boat.

Baze hollered to his son that he thought he had hooked something big and Fred hurried back to shore to be among the many to watch the fish eventually landed. Baze brought it close to shore and they attempted to get it into the boat.

On the first attempt to bring the fish into the boat the hook on the gaff was bent straight, the fish fell back into the water and they thought it was lost. They eventually managed to get the fish into the boat. "A fish of that size in five feet of water looked like a great white shark," said Fred Baze. He recalls that the fillets from the back of the head were the most tasty and had the least fat.

Two of the people witnessing the catch were Florence Clark and her grandson Jimmy, who was three at the time. They stood on the bank and in her words watched Baze "wrestling it out there for the longest time." When Jimmy saw the fish and she told him it had a mouth big enough to eat him, he was too scared to come back to the lake for a long time.

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:

- August 6, Lake Mills
- September 3, Des Moines
- Oct. 1, Manchester

Environmental Protection Commission:

- July 20, Des Moines
- August 17, Des Moines
- September 21, Des Moines

State Preserves Advisory Board:

- September 8, Des Moines

Free Tot Life Preserver Loan Program

How important are personal flotation devices (PFDs) for children? Federal and state laws require a U.S. Coast Guard-approved PFD for each person onboard a boat. Some people feel that the "expense" of a PFD for an infant or toddler is not worth the cost. How valuable is the life of a child in your care? The ticket you receive for failure to have the required PFDs means nothing if a life is lost.

Adult or even child-sized life vests are normally far too big for an infant or toddler and will slip off them quickly and much too easily in the water. Do not take that chance.

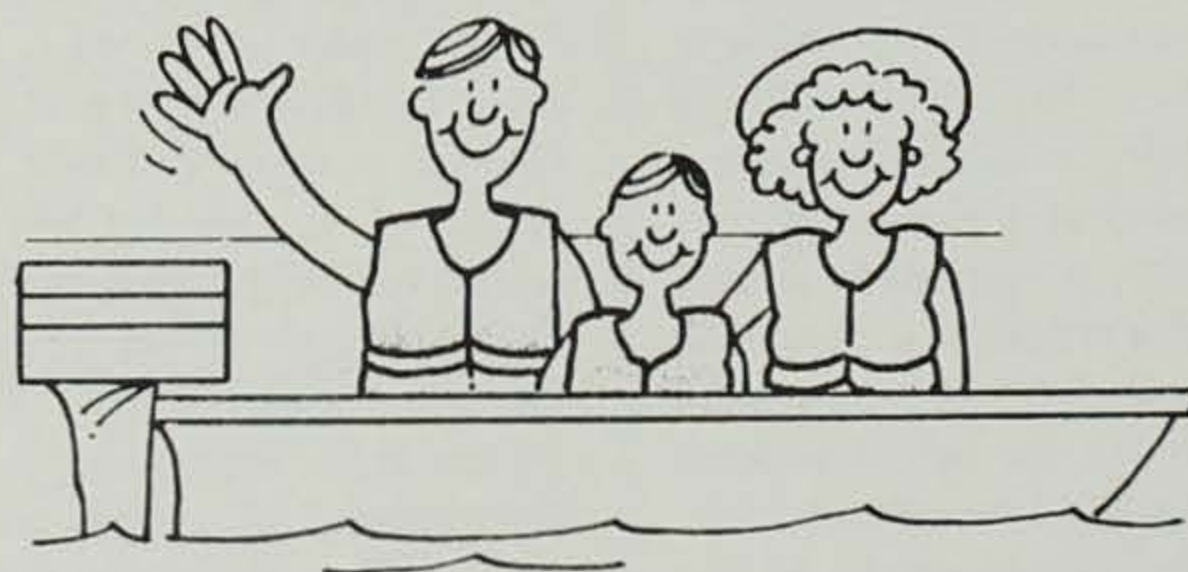
The Midwest Regional Water Safety Council has a free life vest loan program

at many marinas across the state. More than 20 marinas across the state are involved in the program. Call your local marina to see if they are participating.

Remember that anytime anyone goes boating there is a chance to fall overboard. A PFD is designed to keep your head above water and to help you remain in a position which permits proper breathing. Pick a lifejacket that fits you and fits the type of boating you will be doing. More than 90 percent of deaths in boating are from drowning and 80 percent of those drowning victims were not wearing a PFD.

The tot life vest loan program can help ensure that even the littlest of those last-minute guests on your boat can enjoy the water safely.

For more information call Sonny Satre, DNR recreational safety coordinator at (515)281-8652.



Fall Turkey Season Set

The fall turkey shotgun season for combination gun/bow licenses is Oct. 17 to Nov. 29 in zones 3 and 6 only. Zone 3 is the Yellow River State Forest area and zone 6 is bounded by Highway 63 on the west and Interstate 80 on the south.

The application deadline for a combination turkey license is July 24.

The bow-only season runs from Oct. 1 to Dec. 4 and Dec. 21 to Jan. 10, 1993. Shooting hours are 1/2 hour before sunrise to 1/2 hour after sunset for archers but end at sunset for shotgun hunters. Daily bag limit is one turkey per license and possession limit is one turkey per license.

Combination gun/bow license applications are available at county recorder offices, DNR offices and many regular hunting license outlets. Bow-only licenses are available throughout the season at the DNR central office, 900 East Grand, Des Moines, Iowa 50319-0034. The license fee for combination and bow-only licenses is \$22.

Correction -- The list of current license fees on page 26 of the June 1992 *Iowa Conservationist* is incorrect. The lifetime combined fishing and hunting license for 65 and older or disabled is no longer available as of license year 1992.

CLASSROOM CORNER

by Bob Rye

Background

All around us, and all over the planet, wildlife habitat is being lost. Whenever an area of land is paved for a shopping center, divided and excavated for homes, and sometimes plowed to grow crops, small animals lose their homes, and frequently their sources of food and water.

As these small animals disappear, so do the larger animals that previously depended upon smaller animals in the food chain. Animals that cannot tolerate human intervention may also disappear without any direct relationship to disruptions in the food chain.

Students can observe this phenomenon near their homes and schools, or at least in the region. This process is happening in large and small ecosystems all over the planet. For example, many wetlands have been filled in and drained to make room for farming and homes. When they are filled in, many kinds of birds, reptiles, amphibians, crustaceans and other life forms, including a wide variety of vegetation, are lost. Sometimes the animal forms can move on, most often they cannot.

Some habitats, such as tropical forests, have become extremely vulnerable in recent years. Scientists estimate huge numbers of plant and animal forms, which have not yet been identified, exist in these forests. These habitats are tremendously important sources of the earth's biological diversity.

Some scientists warn that as these genetic pools are reduced, the flexibility and thus capacity of the remaining plants and animals to survive will ultimately be reduced.



DNR photo

▲ Any human development has an impact on plants and animals inhabiting the particular area. However, with careful thought and planning some of the negative impacts can be avoided.

Age

Grades 4-7

Objectives

Students will be able to:

1. describe effects of human land development on plants and animals previously living in the area; and

2. recognize that the loss of habitat is considered the most critical problem facing wildlife.

Method

Students simulate a process of land development in a physically involving activity.

Materials

Two colors of paper, five to six sheets or blankets, garbage bags and an open area such as gym or school yard.

Extensions

1. Repeat the activity with students in different roles and see how the results change.
2. Select a specific habitat (wetland or prairie) and do the activity.
3. Ask the students to discuss where they would build their house.

Resource Materials

Iowa's Natural Heritage, Iowa Academy of Science and the Natural Heritage Foundation, 1982, The Graphic Corporation, Des Moines.

Land Forms of Iowa, Prior, Jean, Iowa Department of Natural Resources.

Procedure

1. Review the elements necessary for a habitat such as food, water, shelter and suitable space.
2. Define *vegetation*, *herbivores*, *carnivores*, *omnivores* and *land developers*. Make sure the students have good, working definitions of these terms and can name several examples of each kind of plant or animal and several types of possible *development*.
3. Assign the students to roles. For example, assign two students as *developers*, three as *carnivores*, nine as *herbivores* and six as *vegetation* (additional students can be placed in this group). Plan for three times as many *herbivores* as *carnivores* and only a few *developers* in relationship to the other groups.
4. Have the *vegetation* move into the open area. Discuss the reasons for the *vegetation's* placement. Factors such as the availability of water or fertile soil in the area are extremely important.
5. Have the *herbivores* move into the area. They take with them and place on the ground two garbage bags representing shelter, three sheets of paper representing food and one sheet of the other color paper representing water.
Discuss the reasons for the *herbivores'* location in the area and what effect their presence had on the vegetation and what effect the vegetation had on their presence.
6. Have the *carnivores* move into the area. They take with them and place in the area three garbage bags for their space and shelter (they can cover the area of the herbivores showing that they occupy the same area as their food) and one piece of the paper representing water.
Discuss the *carnivores'* placement and what effect it had on the herbivores and vegetation and vice versa.
7. Have the *land developers* move into the area. They take with them the sheets and place them on the ground. They can use the space of three herbivores and will use the sheets to cover over the herbivores to show that their space has been used. Students are developing neighborhoods, shopping centers and roadways of their choice.

Discuss what is shown by the *land developers'* placement in the area. Many changes can take place.

Did animals die? What caused their deaths? What could have been done differently? Could the *developers* have better used several small areas? What are the positive consequences to wildlife? Have new forms of wildlife moved into the area? Has more habitat been created? Have students give examples of similar development going on in their communities. What is the worldwide effect of such changes?

Bob Rye is a training officer with the department's Conservation Education Center in Guthrie County.

This activity is a modified version of "Shrinking Habitat" from the *Project Wild*, secondary manual, © 1985.

FOSSIL PLANT LIFE AT KLUM LAKE

Organic deposits found in the bottom of Klum Lake include fossil seeds and pollen that are used to interpret changes in vegetation, climate and landscape during the last 10,000 years.

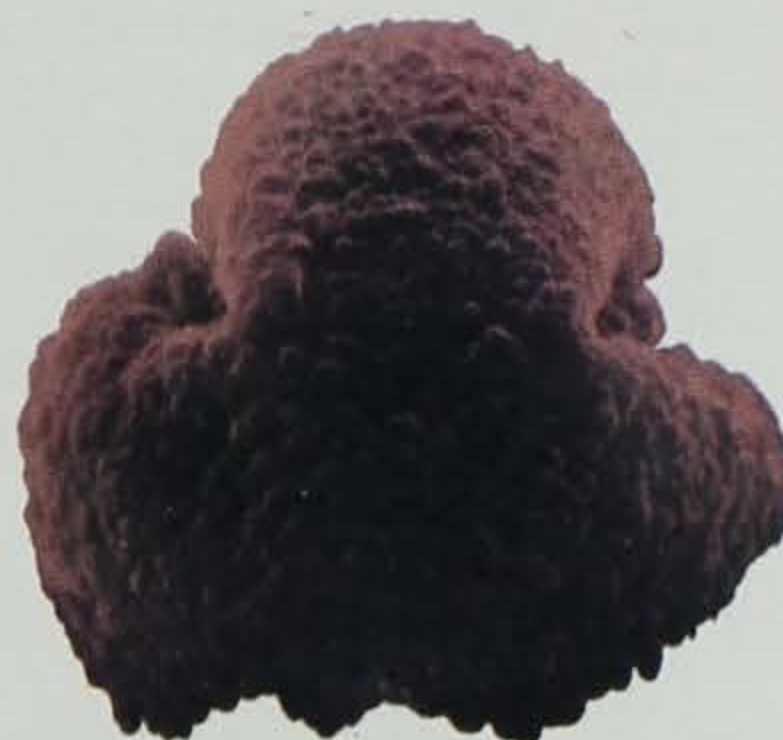
by Brenda K. Nations

There are many types of Iowa wetlands, such as marshes and fens, found in various landscape settings, each with its own vegetational history. The details of these past plant communities are unique to each site and related to the local geographic and topographic conditions. At the same time, the vegetational history preserved in wetland deposits also records broad similarities which reflect regional vegetation patterns. Klum Lake is a riverine wetland located along the Mississippi River valley in Louisa County, south of Muscatine, Iowa. The wetland is within the Klum Lake State Game Management Area, a public-access and hunting area managed by the Iowa Department of Natural Resources. Beneath the existing marsh vegetation lies a peat deposit nearly 10 feet thick, containing a wealth of information that has enabled paleobotanists to interpret earlier vegetation communities within the Upper Mississippi Valley. Cores of accumulated sediment taken from Klum Lake contain microscopic grains of fossil plant pollen, as well as larger plant remains such as seeds and leaves. This fossil evidence establishes the sequence of vegetation on and around the wetland during the last 10,300 years, and reveals that Klum Lake has changed dramatically over this period of time.

Klum Lake is located at the base of steep bluffs which form the western wall of the Mississippi Valley. The lake is actually a remnant of a more widespread wetland which once occupied the west side of the Mississippi floodplain from Muscatine south to Lake Odessa, an area known today as "Muscatine Island." Most of the area has been drained to facilitate agriculture, and only the deepest segments, such as Klum Lake and Lake Odessa, as well as the Muscatine Slough drainageway, remain today as wetlands.

Klum Lake originated as a channel of the Mississippi River that was abandoned sometime between 10,500 and 10,300 years ago, as determined by radiocarbon dating of buried organic deposits. At that time it became a lake, similar in character to present-day Lake Odessa to the south. The lake began as an open body of water and slowly filled with sediment as it evolved to a shallow wetland area. Because the lake was isolated from periodic flood waters of the Mississippi, organic matter such as peat was deposited rather than mineral silts or muds. It is these organic sediments, containing fossil pollen and seeds, that are favorable materials for interpreting the area's vegetation history.

By studying fossil pollen and seeds produced by once-living plants, the



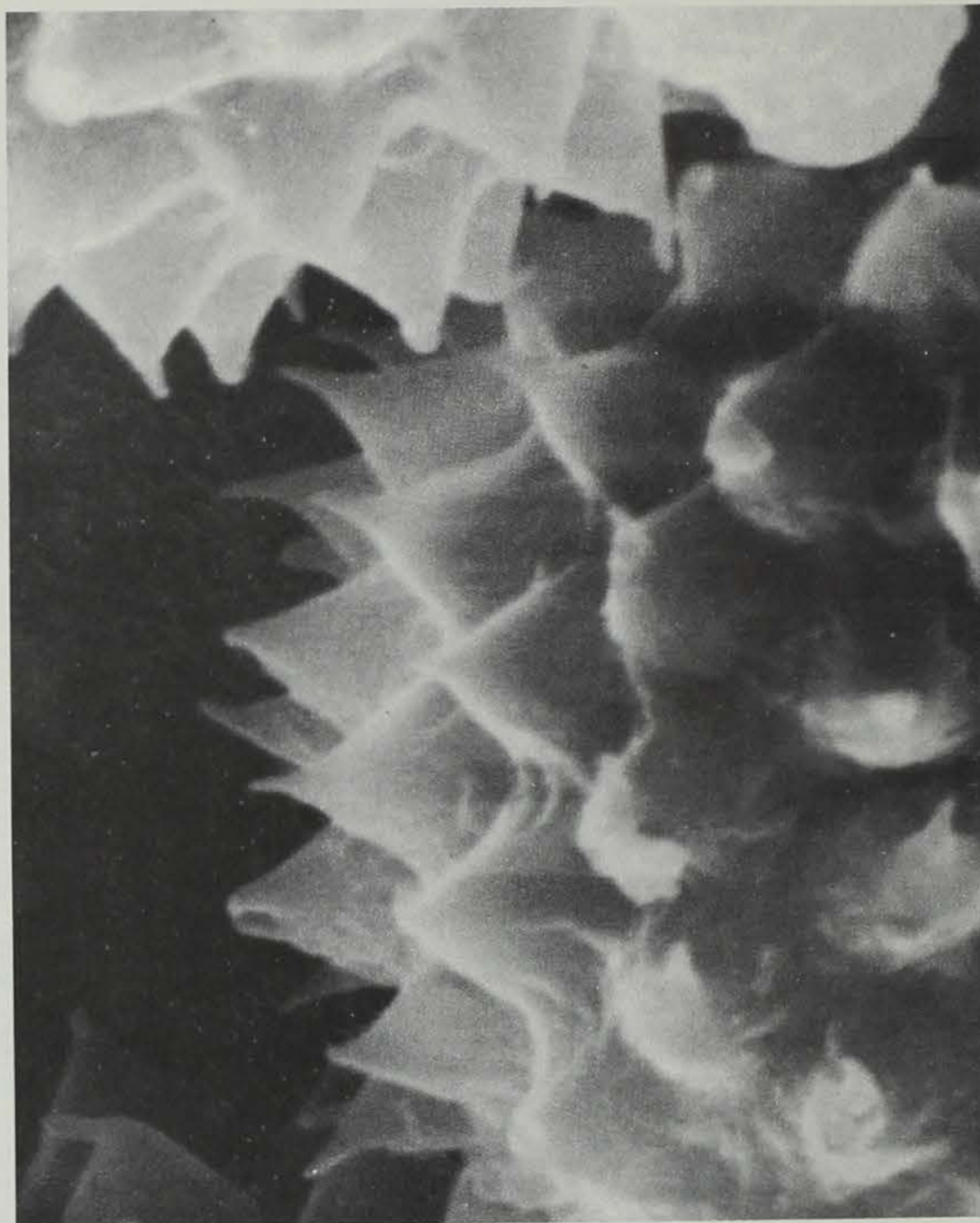
▲
Top: Goosefoot seed (15x) indicates disturbance around the shallow wetland margins; these plants possibly were cultivated by Indians for food.

Middle: Oak pollen (2,000x) was abundant 7,000 to 10,000 years ago as deciduous trees replaced ice-age coniferous forests.

Bottom: Goosefoot pollen (1,800x) increased, along with grass pollen, in response to warm, dry climates that culminated about 6,000 years ago.

vegetational history of an area can be reconstructed and even climatic inferences can be drawn. Pollen is transported by both wind and insects; wind-pollinated plant species are most commonly found in deposits because of their greater pollen production. The interpretation of regional vegetation patterns is then possible from pollen analyses because its long-distance transportation provides a good picture of the vegetation types existing over a broad area. Seeds, on the other hand, are not transported far from where they grow. Fossil seeds can assist paleobotanists with interpretations of which plant species grew locally and how the vegetation changed through time in a specific area. Seeds also are more readily preserved as fossils, mainly because they are more durable than leaves and other fragile plant parts. Therefore, by using both fossil pollen and seeds, a picture of both regional and local vegetation types emerges. The ability to use Carbon-14 dating methods on these organic deposits further enables scientists to examine the timing of vegetation changes as well as facilitating comparison with other strata containing fossil pollen and plant material.

Results of the fossil pollen and seed studies from Klum Lake made possible the identification of three distinct zones within the deposit. Each zone represents a different stage in the wetland's evolution as well as accompanying changes in local and regional vegetation communities. The lowest and oldest zone, dating from about 10,300 to 7,300 years ago, contains pollen that shows deciduous trees were the dominant vegetation type in the region. Oak and elm were abundant, while hickory, willow, maple, birch, and pine also were present. Pollen from other eastern Iowa wetlands, such as marshes in abandoned Mississippi River channels near Savanna and Rock Island, Illinois, also indicate similar vegetation conditions during this time. This period was one of general climatic warming which followed glacial conditions. Early during this warming period, hardwood forests replaced the coniferous forests that had existed during glacial times. Klum Lake came into existence after this vegetation change had occurred.



R. Sanders Rhodes II

▲ The ragweed pollen grain shown here (enlarged 10,000 times) was photographed through a scanning electron microscope. A dramatic increase of ragweed pollen in deposits at the bottom of Klum Lake indicates regional disturbances of natural vegetation communities and marks the onset of agriculture in Iowa about 1840.

Seeds and other fossil plant remains from this oldest zone are representative of an aquatic environment. The seeds indicate that from about 10,300 to 7,300 years ago Klum Lake was an open body of water rimmed by pondweed, cattails, mud-plantain, and arrowhead. Wild rice probably grew in the deeper, southern end of the lake. Several of these species were used by Native Americans for food and fiber and, with other aquatic resources, made this an attractive area for prehistoric occupation. Also found at this level with the deposit were fish

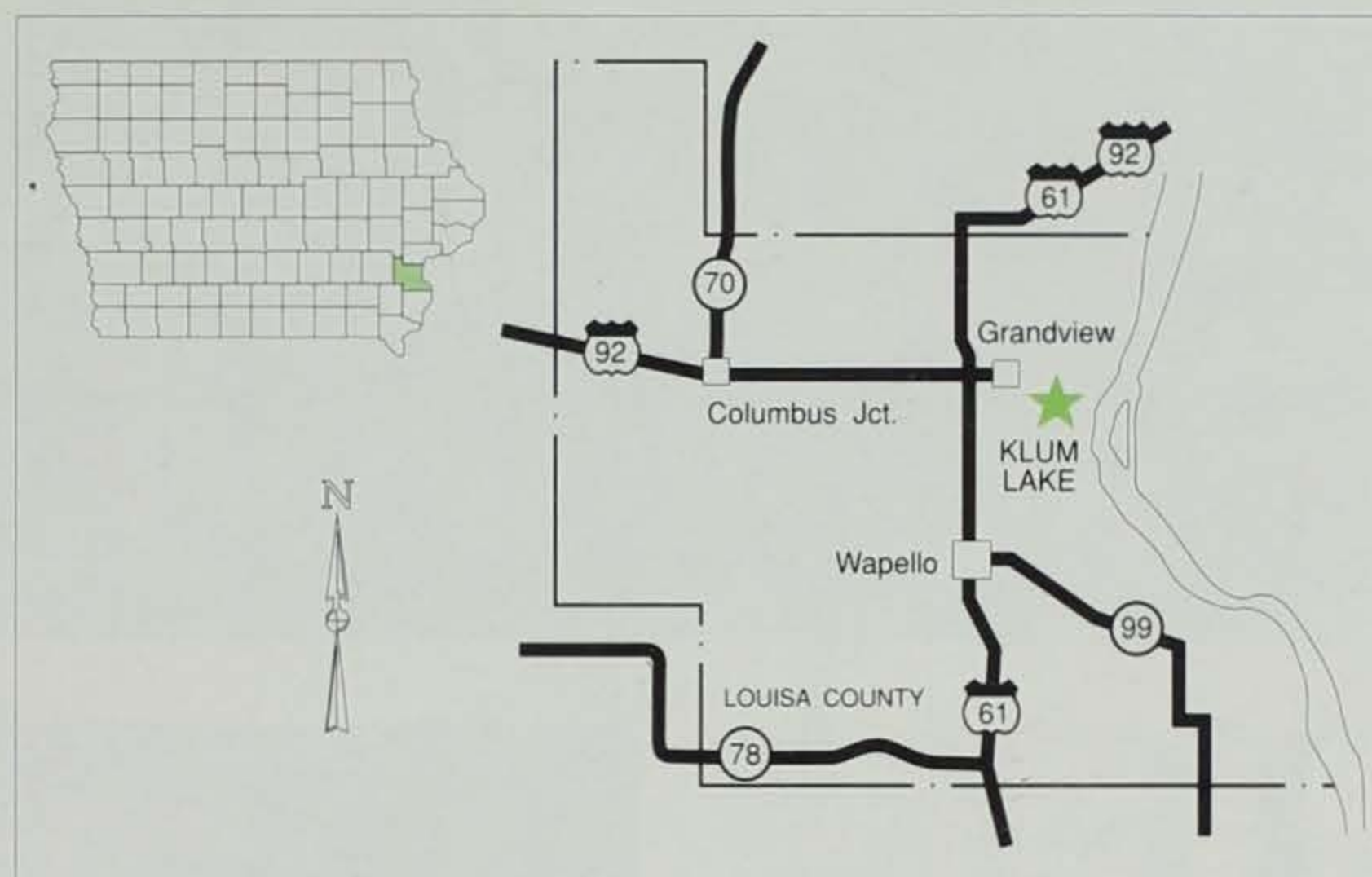
scales, a small frog or fish vertebra, and the shell of a small clam.

A second, younger vegetational period occurred from 7,300 to about 2,500 years ago and was dominated by grass and goosefoot pollen, with decreased percentages of tree pollen. These shifts in pollen abundance indicate that prairie vegetation was now present on uplands to the west of the valley as well as on large, sandy, river terraces within the Mississippi Valley to the east and south. Although reduced in numbers over the region, trees still inhabited the

steep valley slopes and rimmed the wetlands such as Klum Lake and the Mississippi River channel. These changes in the regional vegetation are reflected in other wetlands across Iowa and resulted from the post-glacial warming and drying trend that culminated approximately 6,000 years ago.

As the pollen analyses reflect a climatic shift to drier conditions, the seeds themselves indicate a shallowing of the lake. As the climate became drier, the level of the lake dropped, exposing accumulated vegetation to the air. The rate of decomposition of organic matter in the wetland increased. At the same time, more mineral sediment accumulated in the wetland from periodic overbank flooding along Muscatine Slough. The combined effect was a dominance of silts and muds and an infilling of the wetland. Less aquatic and more marsh-like plant species are found in this interval, with sedges, spikerush, and smartweed as common seeds representing this time period. Seeds of several tree species, including important Native American food resources such as the pecan, have been recovered from nearby Mississippi River sediments of the same age.

The third and youngest vegetation zone is marked by an increase in pollen species that reflect disturbance of the land surface. This change represents the clearing of forests and the onset of agriculture during Euro-American settlement, which began about 1840. This zone is similar in age to sediments cored from a marsh in an abandoned channel of the Cedar River near Nichols, in western Muscatine County. Oak pollen also increases and grass pollen percentages decrease in this interval. During this time, the water table apparently rose in response to increased precipitation, and tree species increased in abundance but did not attain the dominance they displayed in the earliest zone. Regionally, the rise of ragweed pollen to high percentages is one of the most obvious markers of the Historic period. Ragweed grows on disturbed ground and is apparent to some degree in all three zones at Klum Lake. Most likely this plant also inhabited the exposed areas around the



wetland margins during the dry periods mentioned earlier.

Seeds from the upper zone are dominated by woodland and disturbed-ground species. Wild grape was found, indicating a woodland environment. Goosefoot and grass seeds from this interval indicate disturbed ground, probably around the wetland margin. The large goosefoot seeds appear to be a species thought to have been cultivated by Native Americans as food source.

Today, Klum Lake does not always contain standing water, but it is usually quite wet. Dredging on the north end of the wetland has produced a narrow stretch of open water around the Muscatine Slough water-control structure which maintains seasonal water levels in the wetland. During the drought of 1988 and 1989, the water table dropped below the wetland surface, making it possible to walk out to the middle of the area and collect the cylindrical cores of sediment used in this study. By the spring of 1990 however, standing water was again present across most of the wetland as the drought ended. Today the vegetation on the marsh is dominated by river bullrush, a member of the sedge family which grows in aquatic or wetland environments. Willow and other water-tolerant trees rim the wetland, while hickory, oak, and elm grow on the drier, steep valley wall to the west.

The changes that affected Klum Lake and other riverine wetlands along

the Mississippi Valley during the time period examined here demonstrate that vegetational communities do not remain static. Shifts in composition of vegetation are clearly influenced by regional climate, local landscape changes (such as river-channel abandonment and wetland infilling), as well as human activities. Information obtained from study of the vegetation and sedimentation history of riverine wetlands allows us to see how these habitats are altered through time in response to changes in climate and local environmental conditions. This in turn provides us with a better picture of the natural stages through which these environments evolve, from recently abandoned open-water lakes through silted-in marshes. Such information is essential for providing us with an historical framework for managing modern riverine wetlands in various stages of evolution. These records are also invaluable for interpreting relationships between environmental influences and cultural change, as well as for providing information to archaeologists about food resources available to the prehistoric peoples who utilized these riverine environments.

Reprinted from Iowa Geology 1990, Number 15.

Brenda K. Nations is a geologist with the department's geological survey bureau in Iowa City.

Ask Bernie the B

Hello again from the east coast of Iowa. Things have been busy as usual with the seasons flying by like snowflakes driven by that October storm that ran across Iowa and the Midwest last year. I've received more questions and tried to pick out some of the more interesting ones to answer. I even had a few technical questions about aging fish and doing population estimates. Maybe I should start sending some test questions along with my answers and those of you who can correctly answer all of the questions will be granted a B.B.B., "Bachelor of Bass Biology," but then again I don't think I want to sit up at night grading all those papers. Have a happy and safe summer.

Article by Bernie Schonhoff
Photos by Ron Johnson



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the Biologist

Aside from the weight of eggs in a female bass, which grows larger, the male or the female?

In general, the larger fish will be female. But, the difference in growth between male and female bass is not as pronounced as it is in other species, such as walleye, which have measurable differences in growth rates between males and females after reaching sexual maturity.

Is it true that you can really tell the age of a fish from its scales?

It sure enough is true. Actually, any bony part of a fish can be used, but scales are convenient because you don't have to kill the fish to determine its age. As a fish grows, it lays down ridge-like calcium deposits, known as circuli, on its scales. Because freshwater fish are cold-blooded, and therefore, stop growing in winter, the ridges also stop. When the fish starts growing in the spring, there is a slight interruption in the pattern of circuli. This interruption allows the biologist to age the fish much like a forester does when counting rings on a tree stump.

In your experience, list by order of preference the types of habitat — weeds, vertical structure, blowdowns and rocks — used by river bass?

Tough question. As any experienced angler knows, bass love structure. Those same anglers know that conditions are constantly changing, especially as the seasons change. So

let's key in on one season — the late spring/early summer period. Telemetry studies of bass in backwaters suggest the following order of preference: blowdowns, vertical structure, weeds and rocks. But, keep in mind there usually isn't a lot of rock available in most backwaters. And, a final word about blowdowns — bigger fish appear to prefer bigger trees.

I understand that there were some regulation changes on the Mississippi River in 1991. Can you tell us a little about them?

Size limits on both black bass (largemouth and smallmouth) and walleye changed and the possession limit on walleye was reduced.

The size limit on bass has been increased from 12 to 14 inches. The computer model used to simulate the effect of the regulation predicted a 10 percent increase in yield (the total weight of fish caught by anglers) over the 12-inch size limit with a 32 percent increase in the mean weight of fish caught.

Walleye did not have a length limit prior to 1991 on the Mississippi. With the 15-inch length limit and six creel limit, the computer predictions were a six percent increase in yield and a mean weight increase of 44 percent.

How were these regulations decided upon?

Computer models are used to predict how much a population will respond

to a change in regulations. First, however, you must have accurate information on the growth rate, recruitment (number of fish entering the population due to spawning), total mortality, fishing mortality and hooking losses to enter into the computer model.

This information is then fed into the computer and different regulation options are considered to give a range of possibilities. Once the computer has done its work, the biologist considers the many factors to come up with the best situation from the information gathered from the populations. This is done by comparing changes in number caught and size of fish caught predicted by the computer model.



▲ **Bass love structure.** Studies of Mississippi backwater bass suggest this order of preference -- blowdowns, vertical structure, weeds and rocks. However, conditions change.

Ask Bernie the Biologist



How do biologists come up with a population estimate for the number of fish in a lake, surely, they don't count them all?

No, we don't count them all. There are, however, several different methods of obtaining a population estimate. A population estimate is just that, an estimate that is arrived at by using statistics and formulas, and is only as accurate as the data collected. The easiest method to explain calculating a population estimate is the mark and single recapture method. The formula for this method is:

Population Estimate =

$$\frac{(\text{\# of fish marked}) \times (\text{\# of fish examined for mark during the recapture})}{\text{\# of fish recaptured with a mark}}$$

To try this yourself, take a box representing a lake with 100 black marbles representing the fish in the lake. Reach in and take out 10 marbles. Replace these 10 marbles with 10 white marbles, which will represent 10 fish that have been marked. Put a lid on the box. Now shake your lake, I mean box, to mix up the marbles. Now without looking, reach into the box and take out 20 marbles, one at a time. Keep track of how many of the marbles are white. When I did this, I got two white marbles. This removal of marbles a second time represents the

◀ **Biologists cannot count all the fish in a lake. But there are several methods they can use to make accurate estimates.**

recapture period. We now have everything we need to fill in our formula. We have the number of fish we marked (10). We have the number of fish we examined for mark (20) and we have the number of fish that had a mark upon examination (2). Putting these numbers into their appropriate place in the formula we have:

Population Estimate =

$$\frac{10 \times 20}{2} = \frac{200}{2} = 100$$

The total comes out to be the exact number of fish/marbles we put in our lake/box. When you try this yourself, you will come up with different numbers and you will see that a population estimate is in fact an estimate and not a perfect procedure. It's not very often that the numbers come out so exact, but then again I don't get to shake too many lakes either.

Bernie Schonhoff is a fisheries management biologist at Fairport.

GREEN ISLAND

The Making of a Marsh

Have you ever contemplated a project so large that its size tends to overwhelm you? So you decide it may just be an impossible dream? It happens in our daily lives and it happens in conservation. So was the case of the Green Island Wildlife Area in eastern Jackson County. The DNR wildlife bureau knew the 4,000-acre delta at the junction of the Mississippi and Maquoketa rivers was a "natural" for waterfowl management. It was located on the northern edge of Iowa's Big Bend region on the Mississippi River. Migrant birds had developed a tradition of resting and feeding at Green Island before traveling south to the lower river pools near Burlington and Keokuk.

The federal government purchased two-thirds of the wildlife area in the 1930s, when the lock-and-dam system was installed. After studying the area's potential, the DNR requested and received authority to manage Green Island in 1954. Insurmountable problems seemed to face the area, but a handful of far-sighted individuals would not discard the area's potential.

The six-mile boundary levee

around the wetland, crucial to water level management, was overgrown with trees and in poor condition.

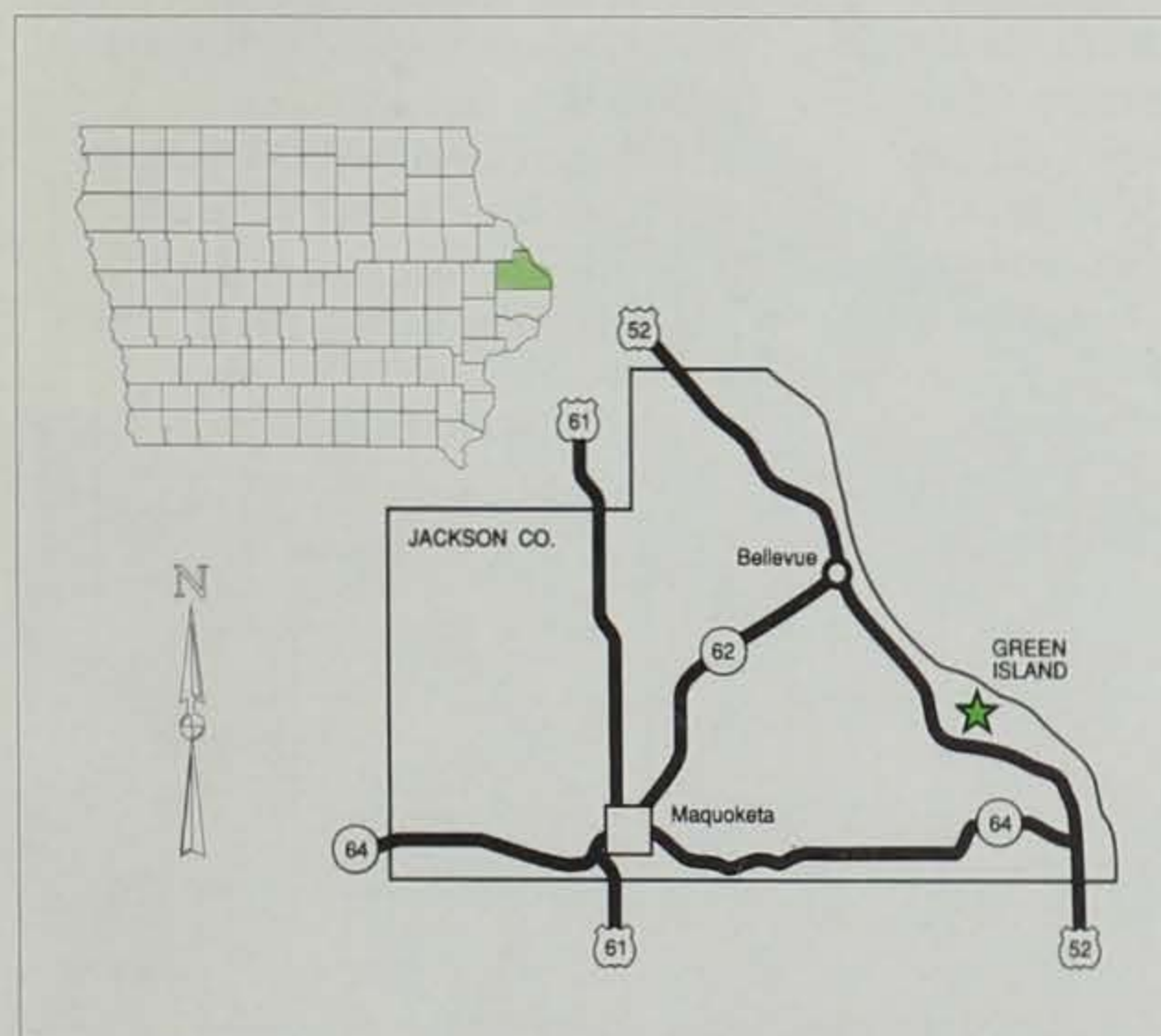
Timely adjustment of the water control structure was also difficult, because wildlife personnel were located 70 miles away. The Green Island Drainage District relied on finely tuned water control of this structure and management from such a

distance was impossible. Seven-hundred acres of prime wetland were associated with the area, but marsh acres were totally dependent on Mississippi River levels and rainfall

amounts. DNR personnel recognized that an additional 1,400 acres of wetland could be created with another dike and a three-foot water level increase, but it was also apparent that a cooperative agreement would be needed with the local drainage district and additional land would have to be acquired. The question kept resurfacing -- Could all of these hurdles be overcome? Due to the magnitude of the task and other funding commitments, plans were temporarily shelved and the wildlife bureau went on to develop and manage other wetlands on large federal reservoirs at Red Rock and Rathbun. Canada goose restoration projects were started at these reservoirs, the Ingham High complex in northwest Iowa, and at Rice Lake in north-central Iowa. The wildlife bureau also invested substantial sums of time, energy and money at Forneys Lake and Riverton marsh in southwest Iowa. All the developments were possible because land management hurdles could be overcome.

Then, in 1966, the Corps of Engineers notified the DNR that the Green Island levee needed immediate repair work. River floods in 1965 caused serious damage. The federal government offered to rebuild the levee if the drainage district and the DNR would clear the timber from the dike. A year later, the requested levee maintenance was completed and a major obstacle had been overcome.

In 1973, a feasibility study on further development at Green Island was completed. Included in the plan was a recommendation that an additional 500 acres be acquired for the project. However, a meeting with adjacent landowners in 1975 indicated they were not interested in selling. Then, in 1976, following the first land acquisition, a decision was made to move personnel and equipment to Green Island. The initial land use study, completed in 1973, was expanded into a complete development plan in 1978 and the project was approved. An agreement to establish higher fall water levels for the proposed wetland was made between the DNR and the drainage district in 1980.



Article and photos by
Robert G. Sheets



An agreement between the DNR and several landowners had been reached in 1978. This allowed the agency to establish a 1,000-acre wildlife refuge on selected state land and adjacent private lands. Several additional land purchases were made during the early 1980s, trimming the original list of 17 parcels down to a handful by 1990.

Engineering and design work for the development project was completed in 1988, but funding constraints stood in the way. The long-awaited project was shelved once again.

Then, in 1989, a very significant happening took place in the Iowa Legislature. A small group of far-sighted legislators introduced a bill aimed at preservation and development of Iowa's natural resources.

Entitled the Resource Enhancement and Protection bill (REAP), the legislation was designed to provide \$30 million annually for Iowa's sagging state park development agendas, fish and wildlife development projects, state forestry projects, and other county, city and private resource enhancement projects.

Upon enactment of the REAP act, the DNR Fish and Wildlife Division reached to the shelf and immediately presented the Green Island Development Project as their

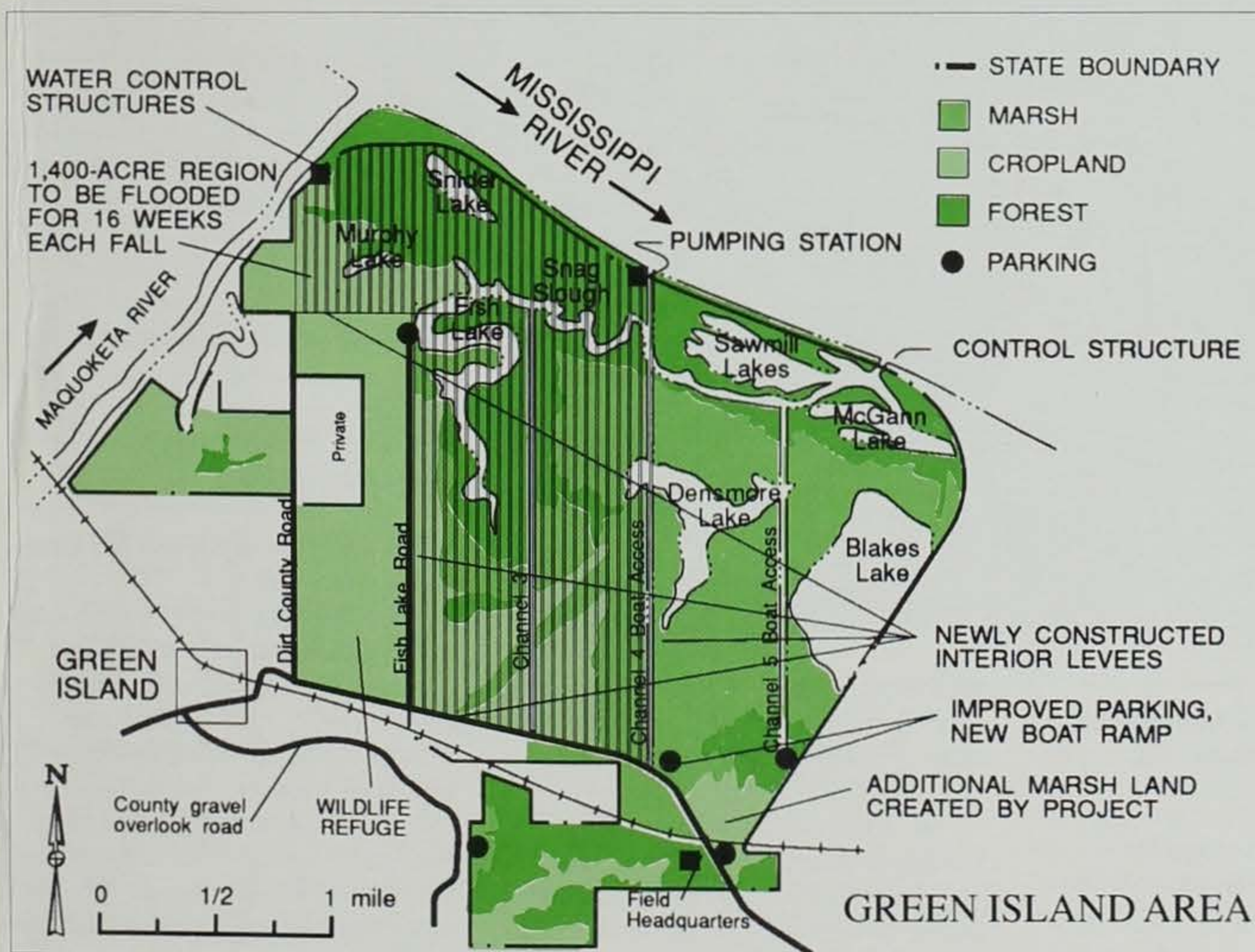
number one priority. Construction work began in August 1989. Good progress and favorable weather conditions pushed dike and channel development to completion by the fall of 1990 and water pump installation was completed by early fall in 1991.



► **It has taken 35 years to complete the development of Green Island, but the final product will give many Iowans a richer experience of the state's great outdoors.**

Despite the seemingly insurmountable problems facing the Green Island project, the area's potential could not be ignored. Many benefits resulted from the additional 1,400 acres of wetland created by the project.

Aerial view of the Green Island area taken in November 1989, during development.



The Green Island Agenda

The goal of the development project is to provide an additional 1,400 acres of wetland by impounding three feet of water in the west marsh segment each fall. Several added benefits will result from the creation of this wetland.

- The existing Fish Lake access road has been raised three feet to maintain access during high water and to contain increased fall water levels on land designated for moist soil management. The Fish Lake parking lot has been doubled in size and will be able to accommodate up to 50 vehicles. A new concrete boat ramp has been installed at Fish Lake for improved access.

- A four-bay concrete stoplog structure has been installed just north of the Fish Lake parking lot. It will control runoff from the 1,500-acre Mooney Hollow watershed that passes along the west side of the state-managed land. Stoplogs will be inserted into the structure during the fall to divert silt runoff through three large culverts into the Maquoketa River. These culverts are equipped with stem gates so area

managers can allow high water on the Maquoketa River to flow into the marsh complex when the water is clean, or divert silt away from the area following heavy rains.

- Roughly 5,000 feet of new levee has been built between the Fish Lake parking lot and the Maquoketa River levee to contain water within the upper impoundment.

- Nine thousand feet of flank diking has been constructed parallel to the county road on the south side of



the development. A large "boatable" water-control structure will be installed in Snag Slough to provide access between the two impoundments during the spring and summer months. This structure will be closed during the fall to create wetland conditions west of the Channel 4 dike. Three other small water control structures are located along this same levee to regulate levels.

- The Channel 4 and Blake's Lake parking lots have been tripled in size, with concrete boat ramps added to each. Visitors will be able to choose between two ramps that lead to either pool at the Channel 4 lot. Blake's Lake visitors have a double-wide concrete ramp for access to

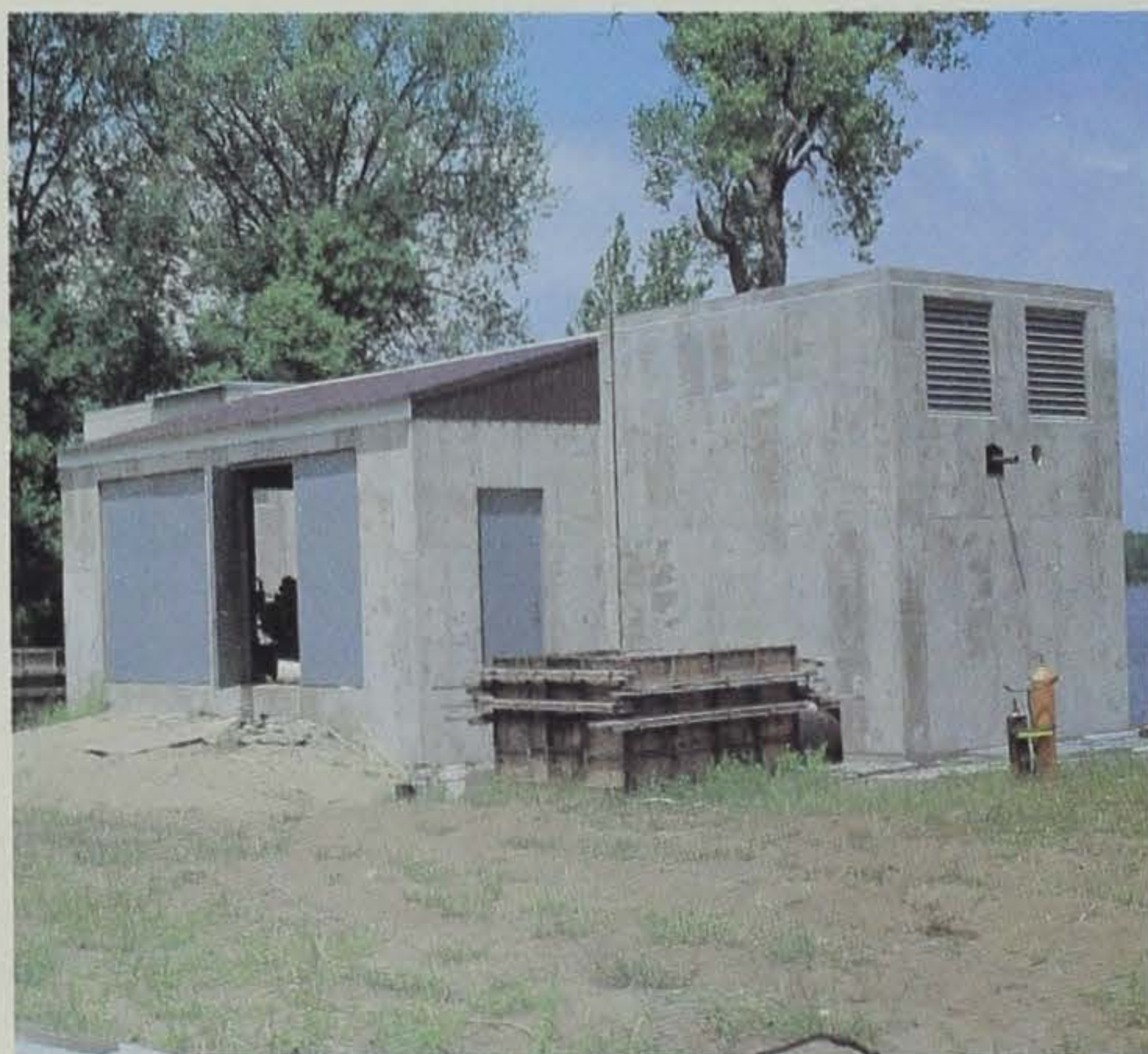
the marsh.

- A new water-control structure has been added at the east edge of the Blake's Lake parking. It will gather water entering through nearby Smith Creek. This structure is capable of impounding 25 additional acres of wetland near the county road.

- Final development for the area involved construction of a pumping station along the Mississippi River to provide an assured water source for the Green Island impoundment when river stages are low. Although gravity flow from the Maquoketa and Mississippi rivers is expected to help furnish added fall levels, pumping will be used when necessary. This development phase was completed in 1991.

Waterfowl Resources and the Green Island Plan

A major objective of the development at Green Island is to improve Canada goose management opportunities in the vicinity. Efforts to raise and attract Canada geese at Green Island have been underway for the past three years. A resident flock of Canada geese was established on the area in 1986 to expand the local population. The entire public hunting area was also closed to Canada goose hunting that year to



▲ Current view from the Channel 4 overlook at Green Island (top).

▲ The pumping station along the Mississippi will deliver water to the Green Island area when river stages are low.

the wildlife area. This dike keeps water away from the county road and serves as an elevated walkway for marsh visitors.

- A 10,000-foot dike has been developed through the center of the wetland, adjacent to what is commonly called the Channel 4 access ditch. This dike serves as the main component for



◀ **The main objective of the Green Island project is to improve waterfowl resources, particularly Canada geese.**

own young three years later. As family members return, an increased tolerance for closer nesting begins to develop. Experience has shown that nest densities may reach one nest per acre in time. The 1990 initiation of a 48-square-mile hunting closure zone should speed the process. Survival of young geese is expected to improve due to the closure. Once numbers reach 20,000 to 30,000 birds, the closure will be eliminated.

The improved water levels will be a distinct benefit to ducks at Green Island and a large increase in peak numbers and duck day-use is expected. The increased marsh acreage will provide improved feeding and resting conditions for all waterfowl species, as well as additional hunting opportunities for hunting enthusiasts.

In addition, the added water acreage is expected to increase furbearer populations on the area, thereby providing more "rat houses" for resident geese to nest on during the spring. All other types of wetland-dwelling wildlife species can be expected to increase their numbers as a result of the improved habitat conditions.

The Green Island project is aimed at making the area one of the finest wetland-waterfowl complexes in Iowa. The long-awaited improvements are nearing completion thanks to close cooperation between the DNR, Iowa Legislature, and the dedicated private supporters of the project. The fruits of these efforts should come to bear very soon, and all Iowans can share in the enjoyment of this fine wetland resource. Although it has taken 35 years to bring the Green Island project full circle, the final product will give many of our citizens a richer experience in Iowa's great outdoors.

Robert G. Sheets is a wildlife management biologist for the department in Maquoketa.

provide protection for both resident and migrating geese. Each year, during this period, 400 acres were planted to winter wheat and corn to attract and hold waterfowl in the area. All of these management practices occurred within the confines of the 1,000-acre refuge.

Expansion of wheat and corn stubble acreage occurred in the fall of 1990 following completion of the levee excavation. Green Island attracts an estimated 6,000 geese during peak fall migration days and an estimated 10,000 geese during the peak spring migration. Water level and land management efforts will continue to build numbers,

but because geese are very traditional, time is needed to raise their numbers.

Green Island management is aimed at attracting migratory geese from the Eastern Prairie Population (EPP), Mississippi Valley Population (MVP) and giant Canada population. In addition, plans are to raise increasing numbers of local giant Canada geese. To accomplish these objectives, additional nesting structures will be developed for the geese.

Two-year old female geese will be released on the area at the peak of each nesting season. The goslings produced should return each year and raise their

Tucked away throughout the state are some tracts of land that fall under management of the DNR's Forests and Forestry Division. All are worth knowing about and visiting.

A 314-acre tract of native timber and forest plantations, known as *Holst State Forest*, is located in the Des Moines River breaks northwest of Boone.

If you can find the town of Fraser on the map, the Holst tract is just south across the river. Access to

the areas' parking lot and trails is from the east by a short stretch of county road from the county highway.

The tract was given to the state by B. P. Holst in 1939 and is used from time to time by Iowa State University forestry students and faculty to conduct experiments and to practice forestry methods. Extensive use of the tract is made by the Ames schools system for ecology and nature study.

The major recreational use of the area is hunting and hiking.

Article by Jim Bulman
Photo by Ron Johnson

Another forest given to the state by B. P. Holst is *Pilot Mound State Forest*, a 33-1/2-acre tract located just one-half mile southeast of the town of Pilot Mound.

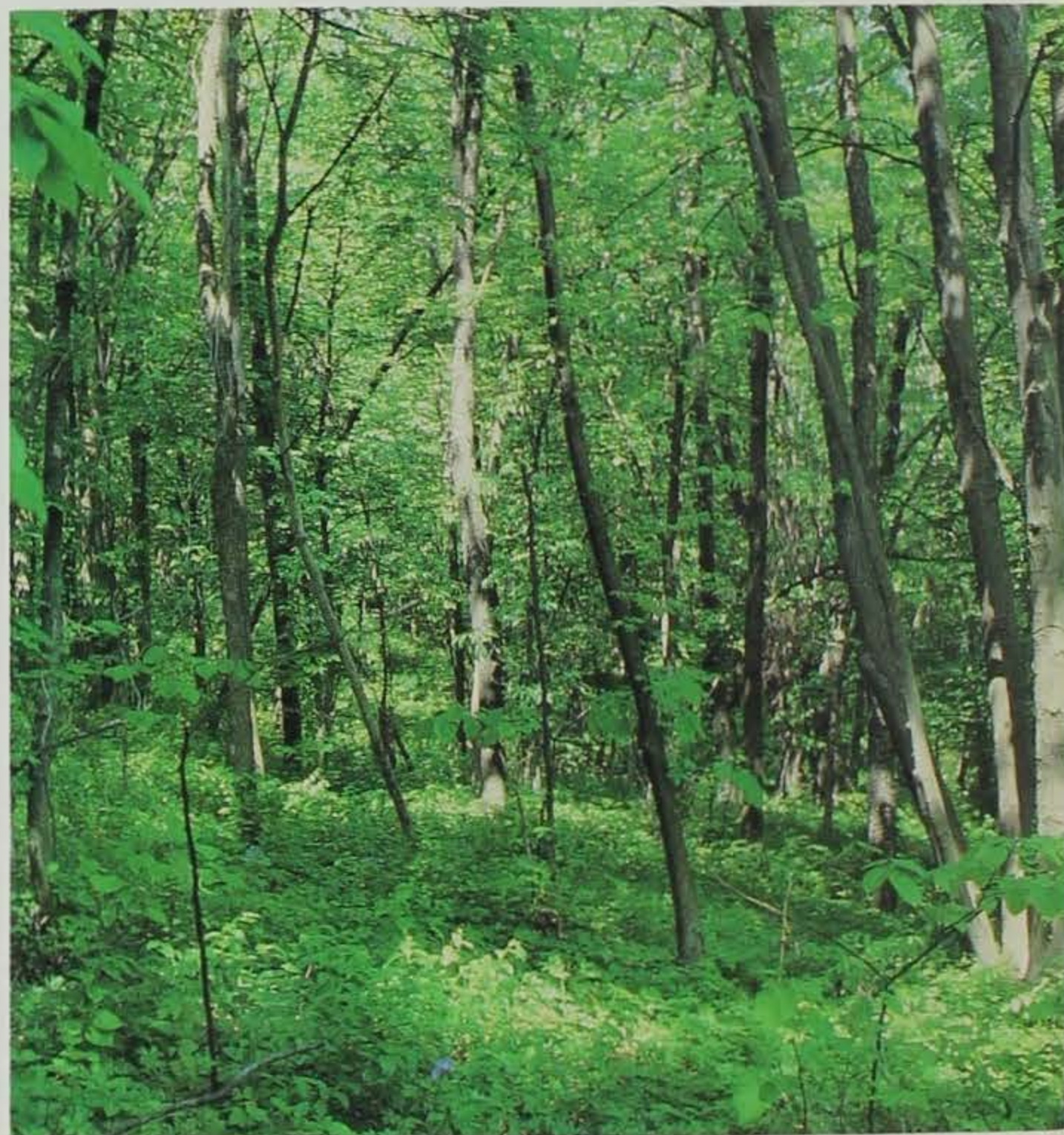
The site is prominently elevated above the surrounding terrain and visible for some distance. Because of its elevation and proximity to the town, hunting is prohibited on this area. Because of the elevation, it is used by the town as the site of its water supply tank. The area is forested with conifer and hardwood plantations, as it receives mostly local use for picnics and outings.

Barkley State Forest, located in Pilot Mound Township, Boone County, is a 40-acre tract covered with native hardwood timber.

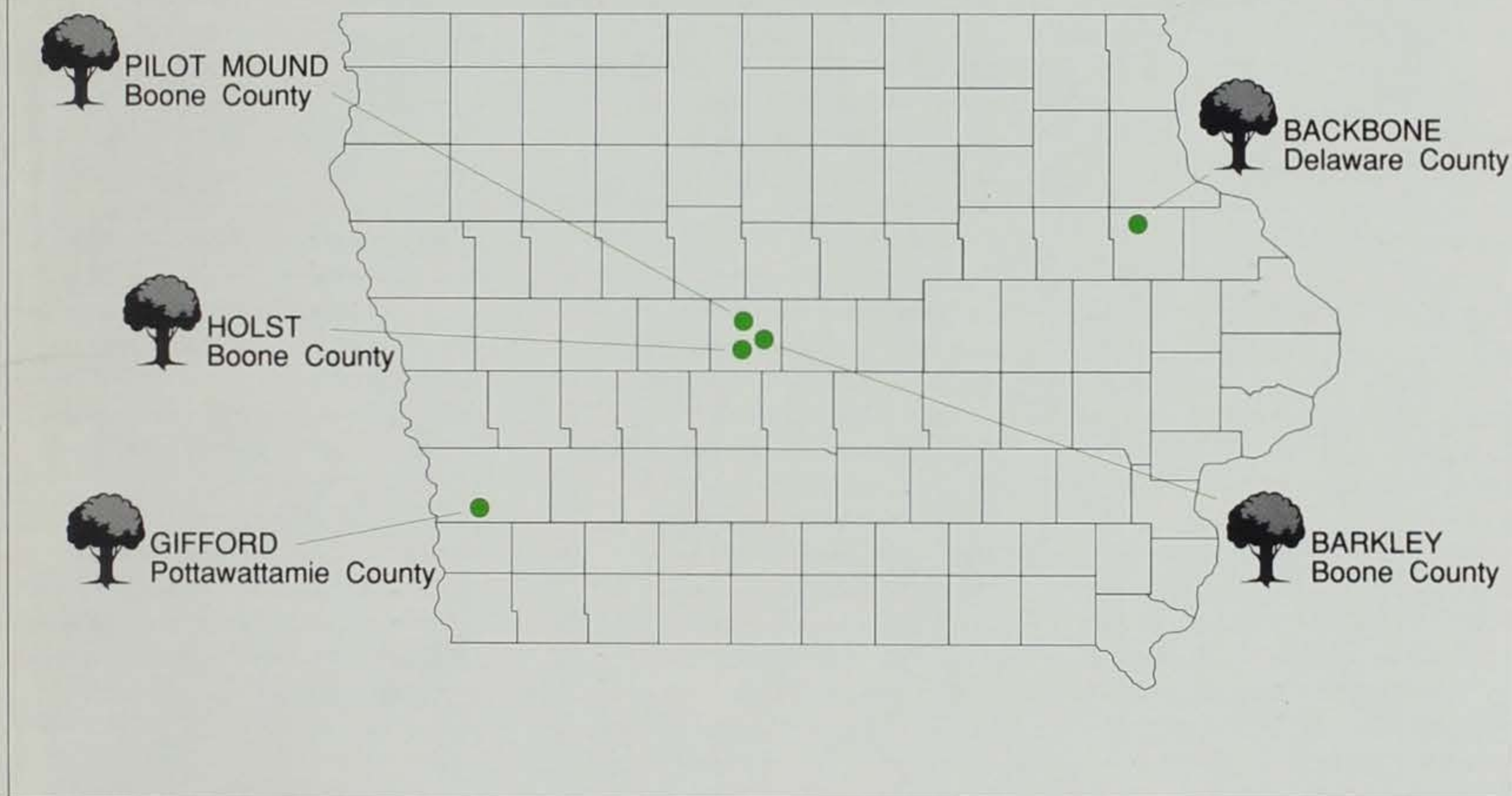
Recreational use is confined to local hunters. Access is through private property as no public access exists.

other STATE FORESTS IOWA'S

► Located at the northeast corner of Backbone State Park is a 144-acre forest unit of *Yellow River State Forest*. The Backbone State Forest area includes an extensive trail system, offering excellent cross-country skiing and hiking opportunities.



Iowa's "Other" State Forest Areas



Gifford State Forest 40-acre tract on the outskirts of Council Bluffs, was given to the State of Iowa in 1942 by the heirs of Dr. Harold Gifford, Sr., in his memory. The original purpose of the donation was to establish a wildlife sanctuary, particularly a bird sanctuary. However, changes on the surrounding land and in the vegetation on the tract itself have reduced its value to migrant birds.

The tract is located about a one-half mile south of Highway 92 and about two miles west of Lake Manawa State Park, within the Council Bluffs city limits. Little recreational use is practical because of dense vegetation and lack of a trail system.

Few realize that a 144-acre state forest exists on the northeast corner of Backbone State Park. The *Backbone State Forest* is a unit of Yellow River State Forest.

The area was originally established to protect the watershed of the lake in

Backbone State Park. At the time, 120 acres were in conifer plantations.

Some plantation thinning has been done in recent years, and a parking lot just east of the entrance to the park was built to facilitate unloading of snowmobiles and as a place for other users to leave their vehicles. Although Backbone State Forest is not open to snowmobiling, Backbone State Park is. And, because there are no good locations for unloading in the park, snowmobilers use a short section of forest trail to gain access to park trails.

Backbone State Forest is open to hunting and has an extensive trail system which lends itself to excellent cross-country skiing and hiking opportunities. Though a small area, it is easy to get temporarily lost because of the maze of trails and dense stands of conifers.

Jim Bulman is the chief of the department's forest management bureau of the Forests and Forestry Division in Des Moines.

WARDEN'S DIARY

by Chuck Humeston

The Holiday's Over

He turned on the radio just for noise really. "It's going to be a hot one today!" the announcer blared. "Eighty-nine degrees, and that humidity's going to be up there. Looks like a great day to be out on this Fourth of July week . . ." The conservation officer shut him off in midsentence.

He shook his head. *So far this weekend I've issued the usual tickets for no life preservers or boats passing too close to each other, and, as usual, no one can understand why I am, "out to ruin their weekend." Oh well, at least no one's been hurt. Just a few more hours.*

Out at the lake, the boat slid off the trailer into the lake. He had been the twelfth car in line, waiting to use the ramp. He put the skis and cooler into the boat. The next car waiting honked as the driver yelled, "Hurry up!" Mr. Weekender glared at the driver as he pulled out of the ramp into the parking lot. His wife was waiting at the dock holding the bow line as their daughter tried once again to figure out the straps on her life preserver. Quite a task for a six-year-old. His teenage son was already behind the wheel of the 18-foot inboard-outdrive. "Wow Dude, I mean Dad, let's go." Mr. Weekender jumped into the boat. "I'll drive first, you ski!" he said. Passing the 300-foot buoy, he fired the throttle and looked for a calm spot in the crowded bay.

Just off a reef marker, the Angler again cast over the structure below his small 16-foot boat. It was getting busy, but this spot was rather calm. Skiers don't care to get too close to the reef. This is the life! The Angler had just retired a month ago. How much he had enjoyed the "Gone Fishing" sign they gave him at the retirement dinner. A few walleye, an occasional smallmouth . . . it was a good way to spend the day.

Hours later, the evening was beautiful, as the sun started its descent. The conservation officer handed the

ticket book to the boat driver. "Please sign these two lines, sir," he explained. The driver scrawled in extra big letters and shoved the book back at the officer. "Does that make your quota?" he yelled. "No sir, I can write as many as I want," the officer answered. *I've had about enough. Be cool. Better to give him the ticket and be quiet. If he ever had a boat fire he would know then the reason for a fire extinguisher. Just a couple of more hours.*

Mr. Weekender tossed the last empty beer can into the cooler. His daughter was getting cranky, his son was half-asleep across the bow seat. "Let's go home," he told his wife. He turned the boat into the sunset. He shook his head. His vision was blurry. It was only a few beers. The constant pounding of other boats' wakes and the motion of the boat had taken its toll. He was in an almost hypnotic state . . . more exhausted than he realized. "I don't want to go back to work tomorrow," he said to himself. He pushed the throttle forward, planing the boat over the surface to beat the rush at the ramp.

The Angler reeled in his line. He would go home, pick up his wife, and come back for a choice spot to see the fireworks. He had his limit. He could hear a roar getting closer. He looked over his shoulder.

Mr. Weekender rubbed his eyes. The setting sun was directly ahead. "Dad, watch out!" Mr. Weekender looked up only to see the eyes of the Angler in the boat looking directly at him as he shouted.

The 18-foot inboard-outdrive struck the small fishing boat and was catapulted over the top into the air. Because he was trying desperately to turn, the boat turned sideways while in the air. His son and daughter were tossed into the water. His wife was thrown into the steering console. As the boat violently flipped sideways,

Mr. Weekender was thrown from his seat into the windscreen. The boat returned to the water upright. It had only taken a few seconds.

The radio cracked, "Respond 10-33 to a boat 10-50, personal injury near the reef east of the ramp." After responding to the call, the officer turned on the blue light and siren. In the distance he could see the gathering of boats and could see fire units on shore. As he arrived, he saw the small fishing boat almost flattened in the center. Poles and tackles were strewn about the floor. A fishing cap floated on the water.

A small girl had been pulled out of the lake by a passing boat. She was crying. He pulled alongside the inboard-outdrive which had a large tear in the fiberglass bow, but was floating upright. He looked inside. "No!" The officer jumped into the boat to help the woman inside. There was no helping the man in the bow anymore. "I saw somebody thrown out!" a witness in another boat yelled.

Darkness. Across the lake many were watching the fireworks. A few boats were still lazily cruising the lake here and there. The officer looked at the cluster of small blue lights flashing like beacons near the reef. He looked at the line of cars vanishing into the darkness on the nearby highway. The holiday was over. He tossed the drag line and hooks into his boat and stepped inside. For a few seconds he looked at the group of blue lights awaiting him. He lowered his head. He could still hear the cries. He shook his head at the tragedy of a senseless moment. The holiday was over. "For some it's over forever," the officer said softly to himself, and he pushed himself away from the dock.

Note: *The above is a fictionalized account of possible events leading to a boating accident. It is in no way intended to represent any particular incident, person or persons, living or dead.*

