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**Iowa
CONSERVATIONIST**
May 1990, Vol. 49, No. 5

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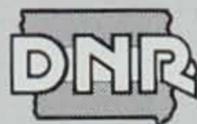
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COVERS: Front -- Cottontail rabbit. Photo by Roger A. Hill. Back -- Whip-poor-will nest. Photo by Ken Formanek.



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The Bottom Line

The Cloth vs. Disposable Diaper Debate

When the first disposable diapers were produced in the early 1950s, few people took notice. The early brands were expensive and did not perform as well as cloth. It wasn't until the mid-1960s, as serious time restraints began hitting home and manufacturers started producing higher-quality disposables, that consumers chose convenience over cost, causing an economic boon for the disposable diaper industry.

Today, with 18 billion disposable diapers sold each year, and with the majority ending up in landfills, more and more consumers are beginning to challenge the value of the time saved over the cost to the environment. And, while state legislatures tackle the often-heated disposable diaper debate, various brands of biodegradable and chemical-free disposables and new-wave cloth diapers are hitting the market as diaper companies hope to cash in on parents switching from the traditional disposable diaper.

But is the disposable diaper a threat to our environment? Is cloth better for the environment -- as well as for baby and parents -- than the disposable? Will biodegradable/chemical-free disposables solve the "landfill problem"? And, finally, *is* there a disposable

diaper/landfill problem?

When Pampers were introduced in 1961, single-use, or disposable, diapers accounted for less than one percent of all diapers sold in this country. Today, disposable diapers account for approximately 90 percent of the diaper market. Although not the most desirable disposal option, most diapers end up in landfills. Nearly 82 percent of all diapers purchased find their way to landfills; approximately 10 percent are cotton diapers; and eight percent are incinerated.

Diapers are by no means the only landfill problem -- they represent, in fact, less than two percent of the total amount of waste in landfills. However, only two other single consumer products -- newspapers and beverage and food containers -- contributes as much



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Photos by Ron Johnson

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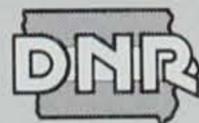
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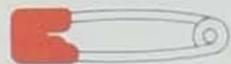
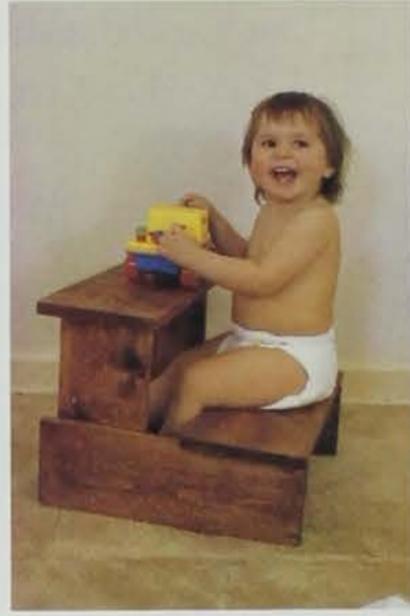
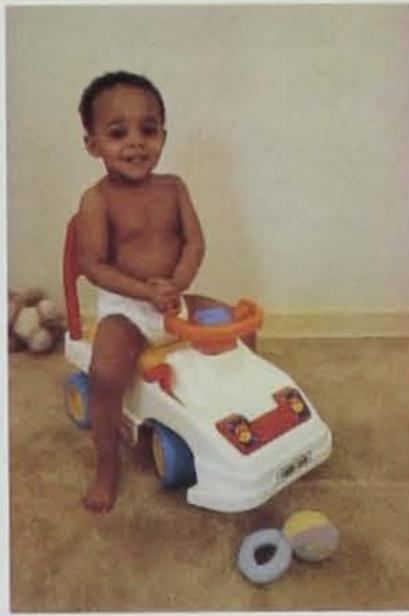
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When Pampers were introduced in 1961, single-use, or disposable, diapers accounted for less than one percent of all diapers sold in this country. Today, disposable diapers account for approximately 90 percent of the diaper market. Although not the most desirable disposal option, most diapers end up in landfills. Nearly 82 percent of all diapers purchased find their way to landfills; approximately 10 percent are cotton diapers; and eight percent are incinerated.

Diapers are by no means the only landfill problem -- they represent, in fact, less than two percent of the total amount of waste in landfills. However, only two other single consumer products -- newspapers and beverage and food containers -- contributes as much



Article by Tammra K. Pavlicek
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Diapers are available in a wide variety of styles, colors and designs. From left: two super-absorbent disposables, traditional cloth and a Bumkins-brand cloth diaper. Is one better for the environment than the others?

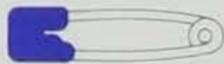
to our solid waste stream. That fact is what disposable diaper adversaries highlight when trying to convince consumers to discontinue using the ever-popular, traditional disposable.

But are these disposable diapers a major landfill problem? Should we be concentrating so much effort on solving a problem that is not as serious a problem as other waste in landfills?

Paper and paperboard make up the largest percentage of landfill waste -- approximately 40 percent of the solid waste stream is paper products. Every person in the United States discards nearly 3.6 pounds of garbage each day. "Paper products, such as cereal boxes, newspapers and junk mail, make up nearly 1.5 pounds of

that waste. This is a significantly larger volume of waste than disposable diapers," says Teresa Hay, administrator of the Department of Natural Resources' Waste Management Authority Division. "And, this waste can be reduced by recycling the paper instead of throwing it away."

But regardless of what these figures tell us, diaper critics continue to argue that disposables are a serious threat to landfill space and must be dealt with now -- from outright banning to imposing a tax on the use of disposables. And, parents' consciences have become the target of ad campaigns from all diaper manufacturers, each one struggling to grasp or keep ahold of a profitable share of the diaper market.



Disposable diapers represent less than two percent of the solid waste stream. Disposable adversaries say this is a significant amount -- and suggest the use of cloth or biodegradables as solutions to the diaper/landfill problem. However, paper and paperboard -- which can be recycled -- make up 40 percent of the solid waste stream. Perhaps more time should be put into creating viable markets for recycled paper instead of concentrating efforts on finding alternatives to disposable diapers.

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The Disposable Diaper

The disposable diaper is the gold in the diaper industry mine. It is a \$3.5 billion business. But with its popularity comes its controversy -- the wood pulp and super-absorbent gel -- that hints at possible health risks.

The wood pulp, which is bleached with chlorine to make it ultra-white, has become a concern of disposable diaper users. Dioxins are released into the air and water when chlorine is used to bleach the wood pulp, and traces of dioxin have been found in a wide range of paper products such as coffee filters, milk cartons and disposable diapers. Dioxins can be eaten, inhaled and absorbed through the skin. How dangerous are dioxins? Based on animal tests, the Environmental Protection Agency classifies dioxin as a "probable human carcinogen." However, the threat of exposure by use of disposable diapers is unknown, pending further research.

This dioxin threat can be eliminated, however. "The use of recycled paper or a lower-grade pulp would work as well or better than the ultra-bright, white fiber currently being used," says Robert Meddaugh, recycling coordinator for the DNR. Another possible alternative is to bleach the wood pulp with hydrogen peroxide instead of chlorine.

Disposable diapers represent another problem -- the fecal matter ends up in landfills instead of being filtered through sewage treatment systems. Although labels on some brands of disposables recommend emptying the excrement into the toilet, a study by Carl Lehrburger -- *Diapers in the Waste Stream: A Review of Waste Management and Public Policy Issues* -- shows that less than five percent of users actually rinse out disposable diapers.

More than 100 different intestinal viruses are known to be excreted in human feces, including polio and hepatitis. A 1975 study by Dr. Mizdra Peterson published in the *American Journal of Public Health* found that viruses could survive up to two weeks in a landfill. This represents a threat to sanitation workers as well as to groundwater supplies.

Super-absorbent gel

About six years ago, the Japanese introduced a diaper containing a super-absorbent gelling chemical material which "slurps" up large amounts of moisture. Two years later major U.S. disposable diaper manufacturers followed suit. This material -- sodium polyacrylate, a salt-based chemical -- turns into a gel that absorbs 10 times its weight when exposed to moisture.

This gel allows manufacturers to produce thinner diapers, thereby reducing the amount of plastic used to make diapers. And, because they are super-absorbent, some parents find it unnecessary to change them as often as standard disposables. While this practice decreases the number of diapers used -- and the volume going to the landfill -- some concerns arise over leaving the diaper on for extended periods of time. These super-absorbent diapers have not undergone long-term testing for possible side effects caused by this gel. They work great, but are there any health risks?

Biodegradable and Chemical-Free Diapers

Within the last few years, various manufacturers have come out with alternatives to the disposable diaper -- biodegradable and chemical-free diapers.

Manufacturers of biodegradable and chemical-free diapers such as TenderCare and Nappies, claim their diapers decompose in just two to five years, making them better for the environment than standard disposables which take 300 to 500 years to decompose. The cornstarch-based biodegradables allegedly attract microorganisms in a landfill and speed the break-down of a diaper's plastic makeup.

In 1989 Nebraska became the first state in the country to enact a biodegradable bill, which prohibits the sale of non-biodegradable disposable diapers after 1993. The final bill was amended to include a provision

Although well intentioned, the use of biodegradables does nothing to alter the volume of diapers entering the solid waste stream. And, contrary to manufacturer's claims, biodegradables may not decompose as quickly as promoters claim . . .

stating the biodegradable diapers must be available in sufficient consumer quantities and at a competitive price. Lawmakers in other states, such as Ohio, Oregon and Washington, have proposed similar laws.

But are biodegradable diapers -- which cost more than standard disposables -- the answer?

Although well intentioned, the use of biodegradables does nothing to alter the volume of diapers entering the solid waste stream. And, in fact, biodegradables could *increase* the volume of disposables because they do not contain the super-absorbent gel. Neither the quantity of diapers nor the potential for spread of infection from disposables is eliminated prior to landfilling.

And, contrary to manufacturers' claims, biodegradables may not decompose as quickly as promoters claim because rapid decomposition requires oxygen. Landfills are specifically designed to be air- and water-tight to avoid contaminating groundwater. And, without air or water, biodegradable materials break down very slowly, if at all. Even if these biodegradables do break down, the small pieces of plastic that remain do not benefit the environment.

Although biodegradable and chemical-free disposable diapers do nothing to decrease the number of diapers ending up in landfills, they do represent an alternative for parents who are uncomfortable with the idea of having the super-absorbent gelling material in their child's diaper.

Cloth vs. Disposable Diapers

Mention cloth diapers and most people think of a piece of cotton, pins and plastic pants. Certainly, these items are still available to consumers. But there are brands available today that are pre-folded, have Velcro(TM) closures, and, in at least one brand -- Bumkins -- includes a waterproof outer shell.

Bumkins combines both the convenience of a disposable and the reusability of a cloth diaper. A one-piece cotton diaper joined to a waterproof shell, they are form-fitting, have elastic at the legs and waist, and adjustable Velcro(TM) closure tabs. Machine-washable, these diapers can last through 200 launderings. However, these diapers cost significantly more than standard cloth and require 60 to 90 minutes of dryer time. And, diaper services may not accept them.

The task of washing traditional cloth diapers can be alleviated by the use of a diaper service, provided there is one in your area. In Iowa, diaper services are hard to come by. And although they offer relief from home laundering, some diaper services still provide the old-fashioned cloth diaper that requires folding, pins and plastic pants.

And the cost of a diaper service? The use of diaper services can actually cost more than purchasing dispos-

able diapers or laundering your own cloth diapers.

The debate between cloth and disposables has heated up in recent months, in light of growing landfill capacity problems. As cloth advocates identify problems, with disposables, the disposable supporters counter with similar problems with cotton diapers. Some examples:

While the disposable manufacturers argue that paper keeps a baby drier, cloth advocates counter the plastic backing prevents the skin from getting air.

Advocates from both sides say their product is superior in combating diaper rash. Cloth advocates say their diapers, when used with a diaper service, are pH controlled and rinsed in a bacterio-static germ-killing agent. Disposable advocates argue the super-absorbent throwaways reduce skin wetness and the mixing of urine and feces.

It is true that cloth diapers have to be changed more often than disposables -- nearly twice as often -- because they get more saturated than the super-absorbent disposables. This means more time spent changing diapers. And, babies that wear cloth diapers are less apt to sleep through the night than disposable wearers.

The threat of fecal contamination by the handler --

How Do Diapers Stack Up?

| TYPE OF DIAPER | DIAPER COST (120 WEEKS) | LAUNDERING COMMENTS | OTHER COMMENTS |
|-----------------------------------------------------------|-----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Disposables Huggies Luvs Pampers | \$9/package* 1 package/week (Total cost = \$1080) | Water for rinsing of fecal matter before disposal. | Super-absorbent ones contain gel: possible threat of dioxin; fecal contamination threat in landfill if not rinsed prior to disposal. |
| Biodegradable/Chemical-Free Disposables Nappies | \$11.95/package* 1 package/week (Total cost = \$1434) | Water for rinsing of fecal matter before disposal. | No gel; no threat of dioxin; fecal contamination threat in landfill if not rinsed prior to disposal; do not reduce volume going to landfill; may have to change more frequently. |
| TenderCare | \$59/package* 1 package every 4 weeks (Total cost = \$1770) | Water for rinsing of fecal matter before disposal. | No gel; possible threat of dioxin; fecal contamination threat in landfill if not rinsed prior to disposal; do not reduce volume going to landfill; may have to change more frequently. |
| Cloth Traditional (home laundering) | \$9/dozen Average need=5 dozen (Total cost = \$45) | Water, detergent, energy usage, wear on washer/dryer. | No gel; no threat of dioxin; change more often than disposables; more time involved for washing, drying, folding and putting away; water and air pollution from laundering; storage problems; diaper services may be unavailable. |
| Traditional (diaper service) | \$10/week (Total cost = \$1200) | None, unless service requires you rinse before returning. | |
| Bumkins (home laundering) | \$73.95/dozen -- medium size -- 12-25 lbs. Average need=3 dozen (Total cost = \$221.85) | Water, detergent, high energy usage (takes 60-90 minutes to dry); wear on washer/dryer. | No gel; no threat of dioxin; more time involved for washing, drying and putting away; water and air pollution from laundering; storage problems; diaper services may not accept; may need to purchase other sizes of diapers, which would increase diaper cost. |

*Same price per package regardless of size or number of diapers. The average package lasts approximately one week.

whether parent, day care or hospital worker -- is the same as for the disposable user.

Cloth diapers have environmental costs, too. Washing them pollutes water. Transporting them to and from diaper services and heating the water to wash them uses energy and pollutes the air. Places with water shortages or poor air quality may find that mess worse than disposables.

And, what about the use of farm chemicals in producing the cotton? Farm chemicals have long been a threat to groundwater supplies.

Flushable Diapers

Ironically, it has only been a few years since Procter and Gamble discontinued a Pampers that was partially flushable. Consumers separated the absorbent paper liner, which could be flushed, from the plastic backsheet, which was discarded. The company now says that is not the way to go because there are markets for recycling the materials instead of throwing them away. And, the flushable diapers are not compatible with the water-conserving, ultra-low flush toilets that may be standard in the future.

However, according to Lehrburger, the flushable diaper is both technically feasible and desirable. In the late 1950s, a "flush-away" disposable liner was available for use with cloth diapers. Lehrburger suggests a two-piece diaper with a reusable diaper cover and a highly absorbent flushable inner padding. Less waste would go to landfills because the flushable padding would rely on the normal sewage treatment system for disposal. And the flushable diaper might offer cost benefits from cotton diapers by partially eliminating the detergent, energy and labor involved in laundering.

Recycling and Composting Disposables

Although new concepts, recycling and composting disposable diapers may evolve to become viable solutions to decreasing the number of disposables going to the landfill. But how can diapers be recycled and composted?

Procter and Gamble has started a project to recycle used diapers into other useful products. Used disposable diapers are sanitized and then processed to separate the paper from the plastic. The paper and plastic are used to make other consumer products. Recycling diapers is costly, however. Lehrburger estimates the cost of recycling plasticized diapers would be much higher than the cost of the diaper, making recycling economically unfeasible at this point in time.

Composting -- the natural decomposition of organic materials by microorganisms -- is gaining acceptance in the U.S. The pulp, paper and feces would degrade into humus, which can be used as top soil or a soil enhancement material. The diaper's inorganic plastic parts, however, would have to be sifted out. And, there currently are few facilities for composting diapers.

Solutions?

While it is becoming increasingly more difficult to ignore the recent media hype about the disposable diaper/landfill problem, we should not be too hasty about throwing away convenience and choice. Few studies take into consideration the extra amount of time

and up-front cost involved in using cloth diapers as compared to disposables. And, few day care centers and hospitals allow the usage of cloth diapers because of the staff needed to properly handle cloth diapers.

There is certainly nothing wrong with choosing to use biodegradable and chemical-free disposable diapers, provided consumers do not choose these products based simply on manufacturer's claims they help solve the landfill problem. They do not.

With confusing -- and often distorted -- claims

bombarding diaper buyers, it is becoming increasingly more difficult for anyone to know which diaper is best. Is there an ironclad answer on diapering a child? The bottom line is -- whatever works best for you and your child.

Here are some guidelines to follow when purchasing diapers:

- ◆ If you choose cloth diapers, consider using a diaper service, if one is available in your area. Consider using a new-wave brand of cloth diaper.
- ◆ If you use disposable diapers, be sure to flush the diaper contents before discarding. Also, write diaper manufacturers and encourage them to develop a flushable liner.
- ◆ If the gelling material in a super-absorbent disposable diaper concerns you, change them more frequently or consider using chemical-free disposable diapers.
- ◆ Select a day care center that allows use of both cloth and disposable diapers. If the one you are currently using does not, request a change in policy.
- ◆ Express concern to manufacturers about the use of bleached, high-grade pulp used in disposables. Perhaps recycled paper or a lower-grade pulp would work as well or better than the white fiber currently being used.



Beyond the Status Quo

Decreased funding during the 1970s and '80s forced a struggle to just maintain the existing state park and recreation area facilities at a "status quo." Now, with REAP money available, the parks system can catch up to, and even forge beyond, the status quo.

by Jim Scheffler

7 Iowa's state park system had its beginnings in 1919 with the dedication of Backbone State Park. Over the years, the park system grew. The Depression of the '30s brought a great spurt of park development through programs such as the Civilian Conservation Corps (CCC) and the Works Progress Administration (WPA). Things slowed down through the war years, but in the late '40s and '50s, another round of park acquisition and development occurred. During this period, a number of state parks and lakes were acquired



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Volga River State Recreation Area



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The walkways in Pikes Peak State Park were built in the 1930s and '40s. The construction of new walkways, funded through REAP, will begin this year.

and developed, many in southern Iowa. The '60s and '70s brought several major state recreation area projects. Land was purchased at Volga River, Brushy Creek and Pleasant Creek, for example, and some development occurred in these areas. Impoundments were completed at Volga River and Pleasant Creek, but sufficient funding was not available for construction of basic facilities such as shower buildings, rest rooms, utility systems and picnic shelters.

Historically, state parks have been funded almost exclusively by appropriations from the Legislature. Some cost sharing became available in the mid-60s from the federal government for state park acquisition and development

projects, and this was put to use as often as possible. In good economic times, legislative funding was frequently available for acquisition and major capital improvement work. In bad times, however, little if any money was provided for park expansion and improvement projects. Such a downturn started in the late '70s and continued into the '80s. The parks system had to tighten its belt, and the staff had to redouble their efforts just to maintain the existing system at a "status quo." Even federal funding was of no use if the state "share" was not available.

In 1986, after a lively legislative effort, the state park user permit went into effect. The user permit generated funding to be used

exclusively for the renovation and replacement of existing state park facilities. The philosophy was "take care of what you have." The permit brought in more than a million dollars a year between 1986 and 1989 when it was rescinded by the Legislature. Also during these years, the park system benefited from the state lottery. State parks received a slice of the "lottery pie" for the completion of major park development and redevelopment projects that had been on hold for too long.

The end of the user permit was, to the DNR, a "bad news/good news" situation. The bad news was the loss of funding. The good news was the Resource Enhancement and Protection Act passed by the

Legislature and enacted into law in 1989. REAP is a 10-year program with significant funding available for a wide variety of projects and programs at state and local levels. A standing \$20 million annual appropriation from the Legislature has been established. Any additional funding for REAP may come from state lottery receipts.

REAP is providing a major source of money for the development and renovation of state park and recreation area facilities.

Funds from the REAP open spaces account will allow the DNR to implement master plans at major areas such as Brushy Creek, Volga River and the Mines of Spain. This year at Brushy Creek, acquisition of additional land with REAP funding is underway. New facilities will be constructed with REAP funds in the future along with the 690-acre Brushy Creek

Lake, now in its final design stage. Planning and design efforts are also underway for major facility development at the Mines of Spain State Recreation Area at Dubuque.

Other parks overdue for major facility redevelopment will be refurbished over the next several years. This year, new overlooks, walkways, rest rooms and shower facilities will be constructed in northeast Iowa's beautiful Pikes Peak State Park. The unique Maquoketa Caves State Park will receive a major facelift with the development of a brand new, modern campground as well as new park office and visitor center facilities. Critical work will be accomplished at Pine Lake State

Park where the long-delayed dam and spillway will proceed.

Several of the largest state parks and recreation areas will also see substantial new development. Visitor centers will be constructed at busy Lake Manawa State Park at Council Bluffs and at the popular Pleasant Creek State Recreation Area near Cedar Rapids. Big Creek State Park, located north of Des Moines, will have its beach and boat concession facilities renovated.

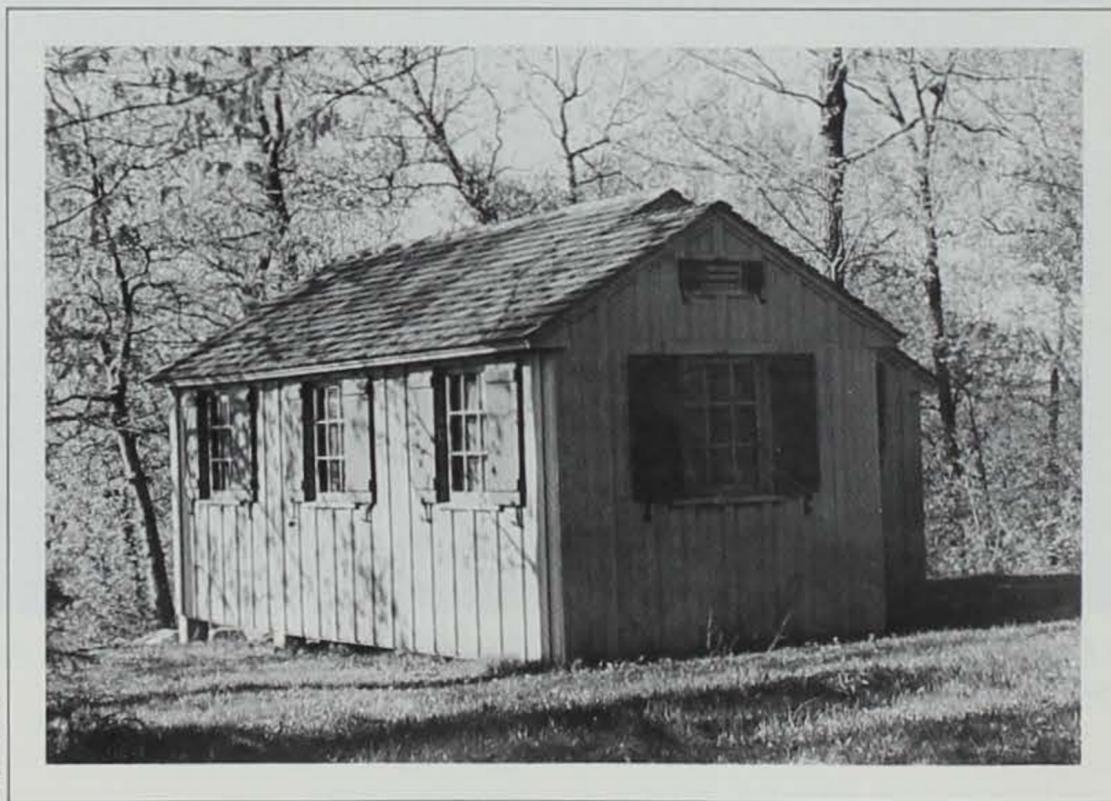
system to carry on work started with the park user permit. A long list of badly needed state park facility renovation and replacement projects is now being addressed through REAP. New shower buildings and rest rooms, renovated electrical and sanitary systems, as well as renovation of historic CCC buildings are now "in the mill" thanks to REAP. A major state park trail renovation effort is underway.

Crews are busy constructing new trail steps, walkways and erosion-control structures to help reverse the effects of generations of trail use and abuse. More than \$1.5 million has been targeted for such improvements during 1990. In future years, it is anticipated that an annual figure of \$1.7 million will be available to carry on the effort. The list of needed park refurbishing

work is a long one.

State park and recreation area visitors are now seeing and enjoying results of the REAP program. REAP is an effort that all Iowans may be proud of and one in which they can participate in through county Resource Enhancement Committees, regional REAP assemblies, as well as the statewide REAP congress. Thanks to REAP, Iowa state parks will be even more enjoyable places to visit now and in the future.

Jim Scheffler is an assistant bureau chief for the DNR's park management bureau in Des Moines.



DNR PHOTO

The cabins at Backbone State Park were constructed by the CCC in the 1930s and will be renovated this year using money available through REAP.

REAP open spaces funding will also enable the DNR to purchase badly needed lands adjacent to, or within, state parks. For years, the state's parks system simply had no money available for land acquisition. More than \$1 million in REAP open space monies will be made available this year for state park improvements.

REAP's land management trust account will enable the state park

WARDEN'S DIARY

The Big Weekend by Chuck Humeston

This is the month. It's here! Memorial Day weekend! The start of the summer recreation season. Fun and sun!

It's the weekend we can shake out the kinks of winter and head for the outdoors to recreate, rest and relax. That is, unless you're a conservation officer or park ranger.

Ah, the peaceful sounds of the outdoors . . . the soothing sounds of a motorcycle at full throttle; the restful tune of an inboard-outboard V-8; the tranquil car stereo blaring through the woods playing accompaniment to the ubiquitous frisbee game.

What? You can't hear the wind through the leaves? You didn't notice the early morning music of wildlife around the campsite? Is that what you are seeking?

Before I was appointed a conservation officer, I spent five years as a ranger in a 1,000-acre recreation area. During that stint, I don't know if I ever figured out what people were looking for from the outdoors.

Memorial Day was always the first assault upon the park. Every year there were the inevitable incidents.

By noon, all picnic tables and shelters were taken, and parking lots were near capacity (that's right, parks have capacities, like anyplace else, for the protection of the resource). Someone would always ask, "Would it be okay if we just pulled our car off into the picnic grounds and picnic by our car?" I would answer, no, and suggest parking in a lot elsewhere and then walking to the picnic area. Invariably the person would visibly shake at the thought of being more than 10 feet away from an automobile. Walk in the outdoors?

We took a survey asking what people wanted in a campground.



ILLUSTRATION BY NEWTON BURCH

The responses were electricity, showers, lighting and a paging system at each site so campers could be paged when visitors arrived. Sounds like a Holiday Inn.

And, of course, during the Memorial Day weekend the ranger always manages to "ruin someone's weekend." I've been chewed out for a variety of reasons -- it was my fault it rained, a visitor committed a violation, no parking was available, it was cold, the fish weren't biting, a car would not start -- just pick a reason. I never realized I had control over so many of life's matters!

When I went to work as a conservation officer I believed, "No more . . . heh, heh . . . I've left all that behind." Then one holiday weekend I was asked to help out at the Iowa Great Lakes. I no sooner arrived when a car passed another on a yellow line. After pulling him over, I discovered he had been drinking -- off to jail for processing and paperwork. With that over, I had a radio call for help to attend to -- a fight at a campground. Oh

Memorial Day was always the first assault upon the park . . . By noon, all picnic tables and shelters were taken, and parking lots were near capacity . . .

no, I didn't leave it all behind! After that, it was time to go out on the lake for navigation patrol -- always interesting on a holiday weekend.

Like I said, I don't know if I ever figured out what people were looking for in outdoor recreation, but to each their own, I guess.

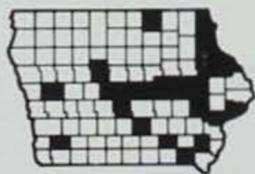
Take a moment to assess your attitude toward the outdoors. Remember the other people around you, and respect their rights and the resources around you. Make it a safe and enjoyable summer for you . . . and for others.



True or False?

Article and photos by
George Knaphus,
Lois Tiffany and Don Huffman

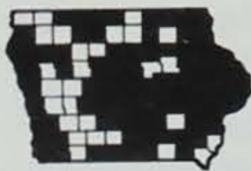
Morchella crassipes



Morchella deliciosa (above)



Morchella esculenta



■ species present



A six-year research project studying the distribution of morels and false morels in Iowa has produced some interesting results. This project was unusual because it depended upon the interest and cooperation of hundreds of people in Iowa willing to submit specimens (remember, morels are delicious) so they could be studied, photographed and placed in a herbarium.

The number of collections submitted each year varied greatly. The years 1984 and 1986 were more productive and 1988, which was very dry, produced very few. Most readers may be interested in distributions of the various species within Iowa and especially which ones were found in their county.

Documented morel species include the yellow or tan morel (*Morchella esculenta*), the white or grey morel, (*Morchella deliciosa*), giant or bigfoot morel (*Morchella crassipes*), black morel (*Morchella angusticeps*) and the half-free morel (*Morchella semilibera*). The yellow and grey morels seem to be distributed throughout Iowa. The distribution pattern of the giant morel is more difficult to interpret without additional information. The half-free and the black morel are distinctly different from the previously mentioned and also quite different from each other. The black morel variety seems to have a limited distribution in Iowa based on present information. The half-free morel has been found only in the southern two-thirds of the state.

The false morels documented in Iowa include *Gyromitra brunnea*, *Gyromitra caroliniana*, *Verpa conica* and *Verpa bohemica*. *Gyromitra brunnea* may occur throughout Iowa, but more specimens are needed, particularly from northern and northwestern Iowa, to establish a more valid distribution pattern. In contrast, *Gyromitra caroliniana* seems to be found mostly in the southern portion of the state. *Verpa conica* has a southern distribution based on present information. *Verpa bohemica* seems to occur only in northeastern Iowa.

Most people find morel species very tasty, although some people do find a difference in flavor. No toxic compounds have been reported in any species of morels. However,

some people are sensitized to the proteins in some morels and cannot eat them. Eating too many in a short period of time may trigger sensitization.

It is important to remember that some false morels are poisonous. In Europe, some species of *Gyromitra* have caused illness and death. These fungi can contain gyromitrin which breaks down to form mono-methylhydrazine, a carcinogenic compound. They can often be eaten in moderate amounts with no apparent immediate ill effects, but when a certain threshold level is reached, serious illness results. *Gyromitra brunnea* is suspected of containing some gyromitrin and it is best to avoid eating *Gyromitra brunnea* and *Gyromitra caroliniana*.

True mushrooms also have potential for producing harmful effects when eaten. Thus, mushroom hunters need to be certain that every specimen is correctly identified and safe to eat. In addition, the wise mushroom hunter eats only small portions of mushroom species that are being eaten for the first time.

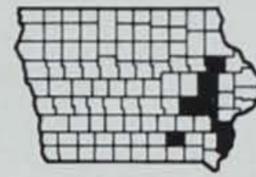
The morel/false morel project, originally scheduled for three years, has become addictive and will probably continue at least another year or two. We would miss the people, the letters, the specimens and the pictures. There are still some counties with no recorded specimens. In addition, there are some puzzling questions raised by the curious patterns of distribution for some of the species.

Specimens can be submitted to Dr. Lois Tiffany, Plant Pathology Extension Service of Iowa State University, Ames, IA 50011, or Dr. Don Huffman, Biology Department, Central College, Pella, IA 50219. Send one of each kind of morel and false morel collected. Specimens can also be submitted to local county extension offices for shipment.

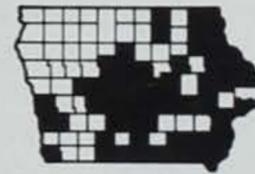
George Knaphus and Lois Tiffany are professors in the botany department at Iowa State University. Don Huffman is a professor in the biology department at Central College in Pella.



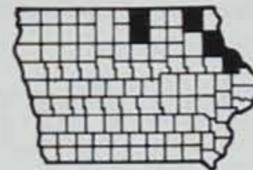
Morchella angusticeps



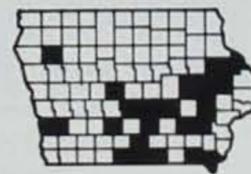
Morchella semilibera



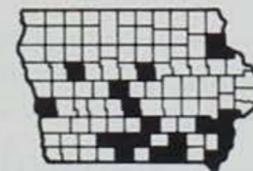
Gyromitra bohemica



Verpa conica



Gyromitra caroliniana



Gyromitra brunnea



TREES IN OUR TOWNS

A Growing Need

by John Walkowiak

Mention the word forest and most of us imagine a large area covered with trees. We think about traditional tree-covered areas in Iowa along the Mississippi or Missouri rivers, or maybe a national forest in the Pacific Northwest. But every city and town in Iowa is a forest, too! On an average, up to 30 percent of an Iowa community's surface area is covered by trees. These urban or community forests include the trees along our streets and in our parks. Community forests seem only to receive attention after some type of natural disaster, such as Dutch elm disease, or, more recently, the severe ice storm. Due to tight local government budgets, and possibly apathy, Iowa's community forests

are declining. Some Iowa communities are at a critical point, where continued tree removal without replacement could make portions of their city or town treeless in 10 to 20 years. But this trend can be changed by active support and participation of a community's residents.

Shade is the most obvious benefit that trees bring to a community. Shade actually has economic value in terms of energy conservation and increased property values. With the right tree in the right location, air conditioning costs can be reduced by 50 percent. Values of homes with trees generally run 10 to 15 percent more than the same house with no trees.

Research studies document the other benefits of trees in a community ranging from wildlife habitat for song birds and small mammals to decreasing air pollution and reducing noise. Perhaps the least understood, but greatest non-monetary gifts trees bring to a community are aesthetics and pride. Trees tend to soften the effects of our steel and concrete society. Pride in how a community appears is evident in every Iowa city and town by the many tree-covered streets and parks.

When settlers first arrived in Iowa, they were attracted to the forested rivers and streams for the fresh water source, wood products and shade that reminded them of their homes in the East and in Europe. As communities and agriculture expanded, millions of acres of forests were cleared. Soon community residents discovered how unbearable life could be without trees, and major tree planting efforts were started in the 1920s and 1930s. Because of the vision and dedication of early Iowans, our communities are blessed with an abundance of shade trees.

Even though Iowa's commu-

nity forests have grown in value and benefits, their life has often been marked with tragedy. During the 1960s, our community forests were devastated when one of its most hardy, beautiful and widely planted trees, the American elm, was wiped out by Dutch elm disease. According to Des Moines' city forester, Bob Cooper, Dutch elm disease claimed 75,000 American elms in Des Moines alone. Other Iowa communities, such as Belmond and Charles City, have had their tree resources severely damaged by tornadoes. Yet the toughest battle our community forests face is the slow-occurring urban growth and development which results in little tree planting, poor pruning efforts and tree removal.

A typical Iowa community possesses a number of different tree species, but unfortunately the majority are two main species — green ash and silver maple. The danger of having too much of a community's forest in one or two species is obvious — Dutch elm disease demonstrated this with the once-plentiful American elm.

Tree numbers are decreasing in Iowa's community forests as more trees are removed than planted. It is commonly believed by Iowa's urban foresters, that four to five trees are removed for every one planted in this state. Iowa's community forests are old — ranging from 60 to 80 years. As these trees decline in vigor, they become susceptible to damaging insects, disease and other problems.

The bright side of the situation is a growing public and governmental interest in the values of Iowa's community forests. The Forests and Forestry Division of the DNR has used Arbor Week and the National Arbor Day Foundation's *Tree City USA*, to focus attention on the need for community interest in

street and park trees. This year 23 Iowa communities will be designated as *Tree City USAs*. In addition, the DNR is working with small- and medium-sized communities on limited technical forestry assistance and promotional work. City foresters in larger communities, perform the necessary day-to-day tree planting and maintenance work and have joined forces to form Iowa urban foresters, to expand the promotion of community forestry statewide. Iowa State University Extension foresters have produced excellent publications on community forestry. Finally, local and statewide groups, such as Maquoketa's Friends of Trees and Cedar Rapids-based, Trees Forever, have established excellent tree planting projects through volunteer labor and private donations.

The success of community forestry in Iowa lies in the vision and hard work of its citizens. Key individuals or groups must step forward and be willing to become involved in managing their community's forest. Direct activities such as tree planting in parks and around schools is a start, but indirect efforts such as tree promotion have long-term benefits.

With gradual, but effective action, Iowa's community forests will continue to provide multiple benefits to each of us and our children.

If you are interested in community forestry in your city or town, contact your local city forester, parks or public works department, or the Forests and Forestry Division, Iowa Department of Natural Resources, Wallace State Office Building, Des Moines, Iowa 50319-0034.

John Walkowiak is a forestry projects coordinator for the department in Des Moines.

What's the Point?

Iowa loses nearly 240 million tons of topsoil each year and with it goes a variety of chemicals applied to the land. Between siltation and runoff, protecting Iowa's surface water from these nonpoint source pollutants is an uphill struggle.



DEAN MILLER, SOIL CONSERVATION SERVICE

by Lowell Washburn

According to the U.S. Environmental Protection Agency, nonpoint source pollution is defined as the contamination of surface or groundwater supplies with pollutants that are conveyed by uncontrolled water movement such as snowmelt, rainfall or natural flooding. Nonpoint source pollution is not traceable to a specific, identifiable source, such as a municipal or industrial wastewater discharge. Instead, pollutants may originate from large land areas, and may enter at a number of locations.

While nonpoint source pollution is a serious problem, it is also not one that folks like you and I tend to spend a lot of time thinking about.

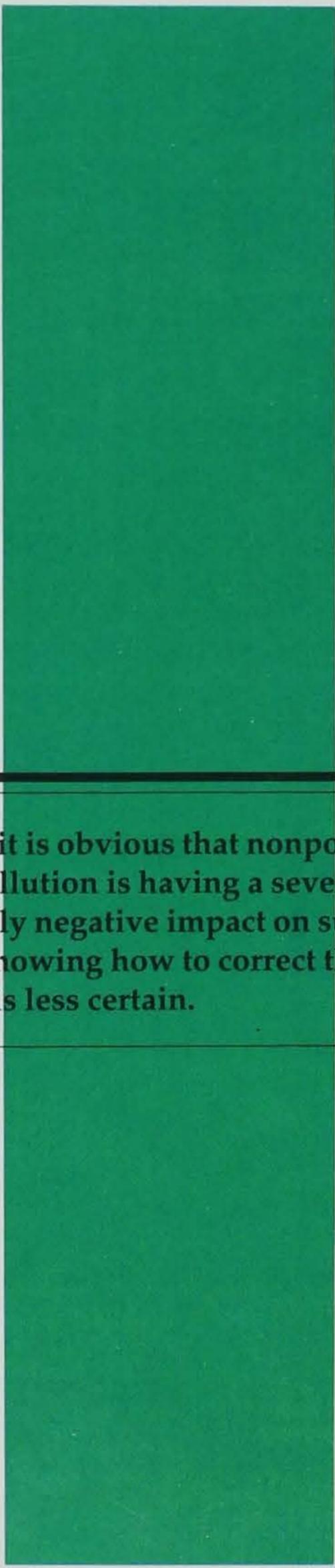
Today things were different, for nonpoint pollution had touched a part of the Iowa landscape that means a great deal to me. The location was north-central Iowa's Beaver Dam Creek. A small stream by any standards, the Beaver Dam can be cleared by a good broad jump in many places. But what it may lack in size is more than made up for in quality. For each spring and summer its cobble stream reaches attract fighting smallmouth bass by the score. And in the view of local outdoor types, these bronzebacks represent the creek's greatest treasure.

But on this particular morning all was not well on the serene Beaver Dam, and the bloated lifeless forms of smallmouth bass, along with other stream species, lay strewn along the bank.

Personnel of the DNR's Environmental Protection Division determined that the fish kill was the result of high ammonia levels, caused by either a fertilizer spill



LYNN BETTS, SOIL CONSERVATION SERVICE



While it is obvious that nonpoint source pollution is having a severe and profoundly negative impact on surface waters, knowing how to correct that problem is less certain.

or runoff from recently fertilized farm fields. They tried to find where the concentration originated, but since the drainage was fed by many tiles from several farms, it proved to be the equivalent of looking for a needle in a haystack. The location was never determined.

In Iowa, the menacing effects of this scourge is currently degrading aquatic resources and silently destroying recreational and other values of streams, lakes and marshlands from border to border.

Nonpoint source pollution originates from a variety of human activities. Erosion from construction sites, urban runoff and surface mining all contribute to water quality problems. However, agriculture is far and away the major polluter of Iowa's surface waters. Considering the amount of the state's land mass devoted to farming, this should come as no surprise.

According to Ubbo Agena, environmental engineer for the DNR's water quality planning section, studies have revealed that sediment is the largest single agent of agricultural nonpoint source pollution. Nearly all sediment comes from croplands. Each year tons of topsoil clog stream channels, covering critical fish spawning areas, destroying eggs and smothering small fish. In addition to outright destruction of habitat, increased turbidity also reduces the ability of sight-feeding fish to locate food while at the same time aids rough fish, such as carp, to out-compete the more desirable species.

But while sediments may have a devastating impact on stream environments, they spell double trouble for lakes, reservoirs and marshes. Flooding may have a scouring effect on stream beds, but once silt is trapped in a lake or shallow marsh, it is there for good.

According to Agena, sediment-laden waters greatly reduce the aesthetic values of recreational areas and have a direct effect on activities such as fishing, swimming, boating and water skiing. Sediment also increases the treatment costs of municipal water supplies and serves as a carrier for other pollutants such as pesticides.

The total magnitude of sediment impacts on Iowa waters is nothing short of mind boggling. Annual sediment yields from Iowa land draining to the Mississippi River may exceed 2,000 tons per square mile, and nearly half of this land averages in excess of 1,000 tons per square mile.

Even more staggering are the sediment loads entering, and ultimately filling, our flood control reservoirs. Saylorville averages 4,500 tons per day, and Red Rock Reservoir receives an average of 16,500 tons each day. During an eight-year period from 1969 to 1977, Red Rock lost an estimated 26,570 acre feet, or 29.5 percent, of its conservation pool to sediment. In a 17-year period, Coralville Reservoir lost 52.4 percent of its pool.

Sedimentation has a severe impact on lesser lakes and marshes across the state. During a nine-year period (1971-1980) displaced topsoil entering Prairie

Rose Lake reduced boating and fishing areas by 10 percent, and reduced total lake volume by 19 percent. Most lakes and marshes lack detailed information on sediment buildups.

A second major threat to Iowa's surface water is pollution by nutrients, generated by such things as feedlot runoff or by fertilizer components such as nitrates. These pollutants enter surface water as runoff or through drainage tile outlets.

During periods of intense runoff, nutrients can cause rather spectacular fish kills that generate widespread public concern. More commonly the effects are much more subtle. In lakes, increased nutrient levels often result in tremendous blooms of algae. These growths seem to appear overnight and can quickly transform a favorite lake into a medium closely resembling pea soup. Not only does this condition look and smell bad, it also reduces light penetration which weakens or destroys desirable aquatic plant life, which are valuable food and cover for a wide range of fish and wildlife. Blue-green algae cause swimmer's itch, and algae die-offs may create severe taste and odor problems for municipal water supplies. Decomposing algae reduce levels of dissolved oxygen, which may cause significant fish kills. Some research indicates long-term ingestion of water containing high nitrate levels may be linked with cancer, birth defects and hypertension. Currently, more than 20 percent of the state's surface public water supplies have nitrate problems, and the level in many streams is increasing.

Pollution from pesticides also has a great impact on the quality of surface waters. Pesticide use in Iowa ranks second in the nation. Herbicides are used on 95 percent of corn and on 97 percent of soybeans produced. The ramifications of pesticide pollution are diverse. High levels cause fish kills or may bring about behavioral and reproductive changes in aquatic organisms. Some pesticides may concentrate in plant and animal tissues which ultimately enter the human food chain. Monitoring of the Iowa River in the 1970s and '80s has found a number of pesticides present including Atrazine, Bladex, DDT, DDE, Dual, Dyfonate, Lasso and Sencor. Even today, Dieldrin is being detected in spite of the fact it has not been used in Iowa since 1977.

Agena noted that pesticide concentrations tend to peak during early summer and decrease as the season progresses. On the average, measured pesticide levels are below levels thought to present a serious problem to fish and wildlife. But, during periods of runoff, certain chemicals, particularly Atrazine, show up in quantities that exceed drinking water standards.

What people fear most about pesticide pollution could probably be described as a fear of the unknown. Can anyone say with certainty what actually constitutes a "safe" level of chemical contamination in either surface water or groundwater?

It should not be forgotten that substances such as

DDT, Aldrin and Chlordane were once considered safe. "Today we realize that assessment was incorrect," says Agena. "What assurance do we have that products in widespread use today won't turn out the same?"

While it is obvious that nonpoint source pollution is having a severe and profoundly negative impact on surface waters, knowing how to correct that problem is less certain. Currently, there is no comprehensive program designed to closely regulate the activities associated with nonpoint agricultural pollution.

Iowa leads the nation in soil loss -- nearly 240 million tons or the equivalent of one-sixteenth of an inch of topsoil annually. "What is needed is widespread adoption of better land management practices across the state," says Agena. He added there are some signs of optimism.

The 1985 Farm Bill was designed with provisions to combat soil loss, which as a fringe benefit could help prevent some nonpoint source pollution problems. Major provisions of the bill deny federal payments to landowners who disturb highly erodible grasslands or woodlands, drain wetland or crop highly erodible lands without a conservation plan. These are referred to as Sodbuster, Swampbuster and Conservation Compliance provisions, respectively. The Conservation Compliance provision affects thousands of Iowa farmers -- requiring owners of highly erodible land to have a soil conservation plan and begin implementing it by 1990. The plan must be fully implemented by 1995.

Probably the most-recognized current federal farm program, also a provision of the 1985 Farm Bill, is the Conservation Reserve Program (CRP). The program helps protect water quality by idling highly erodible cropland and establishing trees, grasses and other permanent cover. More than two million acres of Iowa's most erosive lands have been enrolled in this program.

With an estimated eight million acres of highly erodible land in Iowa, these provisions can have a significant impact on the state's nonpoint source problem and protect the integrity of Iowa's wetlands and waterways.

However, government programs can also be something of a two-edged sword. Should future administrations choose to promote all-out, no-holds-barred production, as was witnessed during the 1970s, then the fight to maintain quality aquatic resources can be expected to take quantum leaps backwards.

Recently, the Iowa Department of Natural Resources has received funding from the U.S. EPA to carry out a variety of nonpoint pollution control projects. These include expanded public information and education efforts, and a variety of projects demonstrating methods by which nonpoint pollution can be controlled.

But regardless of what the future may hold, one thing remains certain -- protecting the integrity of Iowa's surface waters will be an uphill struggle. Today we stand at the bottom of that hill, and have a long, long way to climb.

CONSERVATION UPDATE

Water/Energy Savings Linked

by Kristine Maggard,
energy bureau intern

Despite recent rains, drought wounds in Iowa will be slow to heal. Some Iowa communities must still haul water, although the past spring has showered some of us with above-average rainfall. Preserving Iowa's waning water supply is no longer a matter of choice, but of necessity.



Water heaters are large energy users. Several no-cost/low-cost ways are available to conserve water energy losses. One way is to insulate the water heater.

"Iowans can't rest too easily," said Harry Hillaker, state climatologist. "It's a very real possibility that we could have water problems for a long time to come.

"Even with normal rainfall, well levels are certain to drop during the summer months," he added.

So how can one person make a difference? By starting in their own home with simple, cost-effective, water-saving techniques that will not compromise convenience or comfort.

Each household in Iowa could cut its annual consumption of water by 13,000 gallons, or 18

percent, through a few inexpensive measures.

The two least expensive improvements are high performance showerheads and faucet aerators. By installing aerators in both the bathroom and kitchen faucets, about 70 percent less water would be used in the bathroom and about 60 percent less water in the kitchen. Faucet aerators cost \$6 to \$7 each.

For \$20 or less, a high-performance showerhead can be installed which uses 1/3 to 1/2 as much water as a five-gallon-per-minute conventional showerhead. Another incentive for installing an efficient showerhead is it uses less of the hot water supply -- no more cold showers.

The dedicated water conservationist, however, should pay special attention to the toilet. As the biggest indoor water waster, a conventional toilet uses five to seven gallons per flush and can empty up to 100 gallons a day from just one of its invisible leaks.

Two no-cost efforts will help combat those problems. To save an excess amount of water from being flushed down the drain, put a weighted-down plastic soap bottle in the tank to displace some of the water. Be careful not to put the bottle where it will jam the flushing mechanism. Next, check for leaks by putting a drop of food coloring in the toilet tank. Without flushing, wait about 15 minutes. Color in the

bowl indicates a leak that needs to be sealed.

The best solution is to install a low-flow toilet. Although it costs about \$200, it will cut overall water use by more than 27 percent. And, when used in conjunction with the showerhead and faucet aerators, total use can drop by 45 percent. Moreover, the toilet can be made cost-efficient by installing the showerhead and faucet aerators first and applying the money saved on water and energy bills to the low-flow toilet.

Water conservation goes hand-in-hand with energy/water heating costs. The showerhead and faucet aerators alone can cut the average yearly natural-gas water heater bill by \$66 and an electric water heater bill by \$175. The payback period for the three fixtures can be under three months.

Water heaters also merit conservation measures. In most homes, water heaters are second only to the furnace in energy usage. In addition, an inefficient water heater in an energy efficient home can destroy energy performance. Several no-cost/low-cost ways are available to conserve water energy losses.

The most basic is setting the water heater temperature lower. Water heated to 110 to 120 degrees Fahrenheit will do the same job, although dishwashers require 140 degrees to

function properly. Most dishwashers have a booster heater that regulates the temperature.

Another no-cost way is to drain a bucket of water out of the heater at least once a year. This will flush out accumulated sediment at the bottom that can prevent the water from being efficiently heated. For \$5 to \$10 the water heater can be insulated. The first 10 feet of hot and cold water pipes out of the heater can be insulated with foam that costs about 49 cents per yard. Because most electric heaters are not insulated on the bottom, they should be set on one-inch of extruded polystyrene foam insulation.

By implementing these few measures in your home, energy and water bills can be reduced, while creating low-cost water supplies that are able to meet future demands.

Corrections . . .

Phone numbers which appeared on pages 20 and 25 of the April issue are incorrect. The correct number for the state forest nursery, appearing on page 20 under "Plant a Tree," is (515)233-1161. In regards to the *Household Hazardous Waste Wheel* on page 25, the correct number is (800)532-1114. Our apologies for any inconvenience these errors caused our readers.



From left: Larry Wilson, DNR director; O. J. Oliver, farmer of the year; Doug Smalley, DNR commissioner; and Al Farris, Fish and Wildlife Division administrator.

1989 Wildlife Farmer of the Year

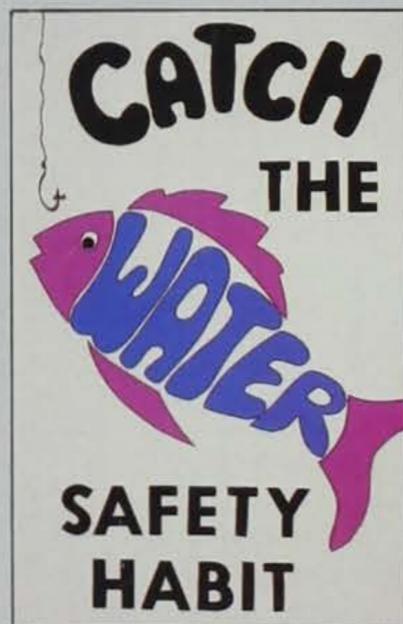
O.J. (Pete) Oliver of Coon Rapids, Iowa, has been selected as the Iowa Wildlife Farmer of the Year for 1989.

Oliver has implemented a number of wildlife conservation prairies on the Garst Farm in Guthrie County.

Oliver manages 36 farm ponds, in cooperation with the DNR, which are open to the public for fishing. He has constructed more than 80 woodduck boxes, 20 goose nest structures, 30 kestrel boxes and 50 bluebird boxes.

"Mr. Oliver recognizes the importance of habitat to wildlife populations," said Don Cummings, supervisor of the DNR's wildlife management section. "His efforts have resulted in increased production of pheasants, quail, waterfowl and songbirds. He has improved or preserved more than 30 acres of wetlands and 1,000 acres of grassland, and 30 acres of forest have been managed for wildlife." Oliver plants 20 food plots totaling 80 acres each year. In addition, 15,000

trees and shrubs have been planted for shelterbelts and wildlife cover strip.



This Year's Water Safety Poster

Brenda Christiansen, a sixth-grade student from Charter Oak-Ute School, won first place in this year's water safety poster contest. Christiansen will receive \$100 and a certificate and will meet Governor Branstad when he signs Iowa's safe boating proclamation this month. The poster contest is held each year to promote an awareness of water safety among young Iowans.

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, write or call the Iowa Department of Natural Resources, Wallace State Office Building, Des Moines, Iowa 50319-0034, (515)281-5384.

Natural Resource Commission:

--June 7, Creston

--July 12, Estherville

Environmental Protection Commission:

--May 21-22, Des Moines

--June 18-19

--July 16-17, Des Moines

State Preserves Advisory Board:

--June 12, Dolliver State Park, Lehigh

1989 Top 25 Turkeys

In 1988 the Iowa Department of Natural Resources adopted the scoring system of the National Wild Turkey Federation. The top 25 turkeys scored in 1989 using this system are listed below.

Individuals whose turkeys were listed in the former all-time top 10 listing (by weight only) are eligible to have their turkeys rescored for the 1990 listing. For information, contact the Iowa Department of Natural Resources, Wallace State Office Building, Des Moines, Iowa 50319-0034.

| TOTAL SCORE | WEIGHT | BEARD LENGTH | LEFT SPUR | RIGHT SPUR | NAME/ADDRESS | COUNTY TAKEN |
|-------------|-----------------|--------------|-----------|------------|------------------------------------|--------------|
| 83.88 | 28 lbs. 6 ozs. | 10 2/8 | 1 6/8 | 1 6/8 | Bryan T. Hayes, Mystic | Appanoose |
| 82.25 | 25 lbs. 4 ozs. | 11 | 1 6/8 | 1 6/8 | Bruce Parks, Burlington | Henry |
| 81.75 | 25 lbs. 4 ozs. | 12 | 1 5/8 | 1 5/8 | Merlin Houselog, Dubuque | Dubuque |
| 80.25 | 30 lbs. | 9 4/8 | 1 5/8 | 1 4/8 | Alvin Wyckoff, Ankeny | Lucas |
| 80.12 | 24 lbs. 2 ozs. | 10 4/8 | 1 6/8 | 1 6/8 | Brad Scheckel, Bellevue | Jackson |
| 79.88 | 25 lbs. 6 ozs. | 11 | 1 5/8 | 1 5/8 | James Hargis, New Sharon | Van Buren |
| 79.75 | 32 lbs. 4 ozs. | 10 | 1 3/8 | 1 3/8 | Frank Wesely, Mount Pleasant | Henry |
| 79.75 | 29 lbs. 8 ozs. | 11 3/8 | 1 3/8 | 1 3/8 | Larry Couron, Council Bluffs | Monona |
| 79.56 | 29 lbs. 1 ozs. | 11 4/8 | 1 3/8 | 1 3/8 | Kevin Nauman, Panora | Guthrie |
| 79 | 28 lbs. | 10 4/8 | 1 4/8 | 1 4/8 | Francis Hewlett, Grand River | Ringgold |
| 78.44 | 29 lbs. 3 ozs. | 11 4/8 | 1 3/8 | 1 2/8 | Mark Bradley Murphy, Albia | Monroe |
| 78.44 | 27 lbs. 7 ozs. | 10 4/8 | 1 4/8 | 1 4/8 | Dudley M. Spooner, Burlington | Van Buren |
| 78.31 | 28 lbs. 9 ozs. | 10 4/8 | 1 4/8 | 1 3/8 | Steven Menke, Dyersville | Clayton |
| 78.25 | 28 lbs. 8 ozs. | 10 4/8 | 1 4/8 | 1 3/8 | Warren Lee Bonnett, Bussey | Monroe |
| 78.06 | 26 lbs. 1 ozs. | 11 | 1 3/8 | 1 5/8 | Lance Beauregard, Cedar Rapids | Linn |
| 78 | 25 lbs. | 11 4/8 | 1 4/8 | 1 4/8 | Andy Beck, Grinnell | Van Buren |
| 77.88 | 25 lbs. 6 ozs. | 10 | 1 5/8 | 1 5/8 | Mike V. Hagen, Newhall | Johnson |
| 77.75 | 27 lbs. 4 ozs. | 11 4/8 | 1 3/8 | 1 3/8 | Mike Adams, Monticello | Linn |
| 77.44 | 26 lbs. 15 ozs. | 11 4/8 | 1 3/8 | 1 3/8 | David Steffens, Mt. Pleasant | Henry |
| 77.06 | 28 lbs. 5 ozs. | 11 7/8 | 1 2/8 | 1 2/8 | John Janssen, Northwood | Worth |
| 77 | 30 lbs. | 11 | 1 2/8 | 1 2/8 | Rickey C. Dailey, Knoxville | Appanoose |
| 77 | 28 lbs. | 12 | 1 2/8 | 1 2/8 | Russell L. Dodds, Des Moines | Madison |
| 77 | 26 lbs. 8 ozs. | 11 4/8 | 1 3/8 | 1 3/8 | Peter Busch, Gladbrook | Van Buren |
| 77 | 25 lbs. 4 ozs. | 10 7/8 | 1 4/8 | 1 4/8 | Edward W. Sattler, Jr., Burlington | Van Buren |
| 76.88 | 26 lbs. 2 ozs. | 11 | 1 3/8 | 1 4/8 | Wayne Cantrell, Drakesville | Davis |

All-Time Top 10 Turkeys

| TOTAL SCORE | WEIGHT | BEARD LENGTH | LEFT SPUR | RIGHT SPUR | NAME/ADDRESS | COUNTY TAKEN | YEAR |
|-------------|-----------------|--------------|-----------|------------|---------------------------------|--------------|------|
| 85.69 | 28 lbs. 3 oz. | 11 2/8 | 1 6/8 | 1 6/8 | Matt Whatley, Riverside | Davis | 1988 |
| 83.88 | 28 lbs. 6 ozs. | 10 2/8 | 1 6/8 | 1 6/8 | Bryan T. Hayes, Mystic | Appanoose | 1989 |
| 83.31 | 30 lbs. 5 ozs. | 11 4/8 | 1 4/8 | 1 4/8 | C. L. Current, Monroe | Marion | 1987 |
| 82.75 | 28 lbs. | 13 | 1 4/8 | 1 4/8 | Steven M. Dirks, Wyoming | Jones | 1988 |
| 82.25 | 25 lbs. | 11 | 1 6/8 | 1 6/8 | Bruce Parks, Burlington | Henry | 1989 |
| 81.75 | 25 lbs. | 12 | 1 5/8 | 1 5/8 | Merlin Houselog, Dubuque | Dubuque | 1989 |
| 80.94 | 26 lbs. 11 ozs. | 10 7/8 | 1 5/8 | 1 5/8 | Dennis J. Smith, Council Bluffs | Fremont | 1988 |
| 80.25 | 25 lbs. 8 ozs. | 10 4/8 | 1 6/8 | 1 5/8 | Ralph E. Roberts, Oskaloosa | Davis | 1988 |
| 80.25 | 30 lbs. | 9 4/8 | 1 5/8 | 1 4/8 | Alvin Wyckoff, Ankeny | Lucas | 1989 |
| 80.12 | 24 lbs. | 10 4/8 | 1 6/8 | 1 6/8 | Brad Scheckel, Bellevue | Jackson | 1989 |

Unrecycled Car Oil Creating Local "Valdez Spills" Says IWLA

People who change, but do not recycle, their own car oil are responsible for more spilled oil than that found in Prince William Sound after the Exxon Valdez spill in Alaska one year ago, according to the Izaak Walton League of American (IWLA).

"If communities are serious about preventing environmental disasters, they must provide and publicize places where people can take their car oil for recycling," said Jack Lorenz, IWLA executive director. "Consumers purchase and then waste many times more oil each year than the 11 million gallons of crude that coated Alaska's coastlines. Oil that is dumped down street sewers or washed off coated driveways by rain is just as deadly to wildlife here as in Alaska."

Lorenz urges citizens to call local auto shops and gas stations to check whether they accept oil for recycling.

[Beginning July 1 Iowa retailers who sell oil will be required to take back the used oil from consumers or post a sign instructing consumers where to take the oil.]

FISHING: IT'S REEL NATURAL FAMILY FUN.



FISHIN' & FRIENDS
It's Catching On

NATIONAL FISHING WEEK
JUNE 4-10, 1990

Free Fishing Days, June 8-10, 1990

Again this year, sport fishing license requirements have been waived for Iowa residents on June 8-10, 1990. This three-day period of free fishing has been set aside by the Iowa Department of Natural Resources in recognition of both National and State Fishing Week, June 4-10, 1990.

All laws regarding size and bag limits and other fishing regulations must be followed. Beginning anglers should familiarize themselves with the laws pertaining to sport fishing by obtaining a copy of the Iowa 1990 fishing regulations brochure available from all fishing license outlets such as county recorders, sporting goods stores and DNR offices.

Classroom Corner

by Robert P. Rye

The Governor's Conference on Environmental Education identified changes in lifestyles as a priority for the next 10 years. The programs, projects and individual efforts needed to assist Iowans in understanding the choices they have in lifestyles include: 1) reducing energy usage; 2) protecting land and restoring the environment so that its climate-stabilizing mechanisms are maintained; 3) increasing individual participation in governmental and economic decisions; and 4) making a personal commitment to caring for the earth.

Start today by doing one of the items on the following list. Each day, add another item until you are following as many as possible.

- ❖ Buy products that are recyclable or can be easily recycled -- avoid disposables.
- ❖ Reject over-packaged food and non-food items.
- ❖ Turn the faucet off when the water is not in use when showering, shaving, brushing teeth or hand-washing clothes.
- ❖ Carry and use reusable cups, dishes and flatware.
- ❖ Take extra plastic and rubber pots back to the nursery.
- ❖ Compost leaves and yard debris.
- ❖ Get involved in local tree planting activities.
- ❖ Roach killer: mix baking soda and powdered sugar; ant killer: use chili powder to hinder entry.
- ❖ Water lawns and gardens at night to limit evaporation.
- ❖ Buy plain white toilet paper, tissues and paper towels. Dyed paper pollutes.
- ❖ Make and use cloth grocery bags.
- ❖ Instead of toxic mothballs, use cedar chips.
- ❖ Buy a fuel-efficient car. Aim for 35 miles per gallon.
- ❖ Use recycled paper for any printing needs.
- ❖ Plant compact shrubs by foundations to help insulate.
- ❖ Air-dry laundry when possible.
- ❖ Clean lint screen in clothes dryer.
- ❖ Walk or ride a bicycle whenever possible.
- ❖ Use latex and other water-based paints instead of toxic enamel or oil-based paints.
- ❖ Clean lamps and lighting fixtures regularly.
- ❖ To clean rugs and upholstery, sprinkle on cornstarch, then vacuum.
- ❖ Repair leaks and drips as soon as they occur. A moderate drip wastes two gallons of water or more per hour.
- ❖ Take showers instead of baths to save water and energy.
- ❖ Plant marigolds to repel insects. Other "natural" pesticides are available from garden supply stores.

COUNTY CONSERVATION BOARD FEATURE

Wildlife in Your Own Backyard by Cele Burnett

When you think of wildlife, what do you see? A pack of timber wolves holding an aged and sickly moose at bay? A bald eagle swooping down on a stream swarming with migrating chinook salmon?

And what about habitat? Do you see majestic snow-capped mountain peaks piercing the clouds? A dark, cool, seemingly endless expanse of oak and hickory, interspersed with patches of woodland flowers and ferns?

Why not think smaller and closer to home? Why not think about attracting backyard wildlife? It is more than a neatly manicured lawn, shrubbery and a garden, more than house sparrows and starlings.

Urban wildlife includes all non-domestic mammals, birds, amphibians, reptiles and insects living in an urban setting. It also includes the vegetation -- trees, shrubs, bushes, grasses and flowers -- which provide the basics of life -- food, water and cover from predation and for protection for reproduction.

Urban wildlife is a synthesis of wildlife biology and landscape planning, a way of designing the backyard environment with wildlife in mind. City parks, cemeteries, transportation and utility rights of way, stream and river banks, private home backyards, lawns and gardens -- they all can serve as travel corridors and pathways for wildlife to move from place to place. They also can act as islands and refuges from the hazards of the urban desert.

People appreciate these vast expanses of green color and cool air



FRED LATNER

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Landscaping backyards to attract wildlife has several benefits, such as providing food and cover for wildlife, providing shade and acting as noise buffers for homeowners, and reducing soil erosion.

as well. Even in an agricultural state like Iowa, most of us live in cities and towns. And people simply enjoy wildlife watching with its diversity and, in the urban environment, its proximity.

Vegetation attracts the wildlife and is aesthetically pleasing, but there are many more added benefits of plants. In the act of photosynthesis, the oxygen we breathe is released by plants. The plants provide shade and act as noise buffers. They cool the air and break the flow of wind and snow. Soil erosion rates are reduced, and ugly sights are screened from view. Vegetation offers privacy, recreation and potential for food and firewood. Besides increasing property values, vegetation also simply enhances the quality of our lives.

The attracted wildlife benefit

us as well. They provide natural pest control. Images of chimney swifts swooping down on mosquitoes and toads snapping up flies come to mind. Animals aerate and improve the soil (earthworms) and serve as carrion and garbage removers (raccoons and skunks).

Interactions with nearby wildlife are aesthetically enjoyable, again adding to

the quality of life. Animals provide a lesson in ecology, the study of the interactions of wildlife and habitat which includes people and their environment, as well as an awareness and appreciation of nature.

And perhaps most important to people aware of the interference and influence of humans on the environment, many species of wildlife are indicators of environmental quality. Bluebirds, once common to rural Iowa, are now a rare treat, indicating the meadow's edge has become too polluted with chemicals for the birds to reproduce and survive.

To prevent such loss or degradation of wildlife habitat, many levels of government are incorporating the blending of wildlife biology and landscape planning into their programs. Many cities across the state have decided to turn economic constraints into ecological benefits. For example, due to decreased budget funding, city departments have cut back on mowing in certain park areas, allowing them to revert back to their natural conditions.

City parks contain an incon-



ROGER HILL

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Many species of wildlife are indicators of environmental quality. Bluebirds, once common to rural Iowa, are now a rare treat, indicating the meadow's edge has become too polluted with chemicals for the birds to reproduce and survive.

spicuous array of little things of beauty and amazement, such as spider webs, dew drops in the early morning sun, mushrooms, and snow dripping off the trees in winter. Decreasing mowing and increasing living space for wildlife are nice gestures on our part, because they are sharing an area with us which was once their exclusive territory.

Most county conservation boards have programs to improve wildlife habitat in their parks and recreation areas, leaving certain areas unmowed, planting native prairie grasses, hedges and shrubs, building small ponds or marshes, and erecting nest boxes for birds and mammals.

County conservation boards want to make the areas more attractive to wildlife and, therefore, of more benefit to people. The projects serve as examples to the public of things they can do to would improve wildlife habitat.

It is tempting to rely on government to provide us with these pockets of public urban wildlife habitat. But landowners can learn by example and plan our backyards to benefit wildlife. Individually it may not seem important, but collectively it can be invaluable to wildlife.

In a backyard measuring about one-eighth of an acre in the center of Ames, we supply the basics of food, water and cover for a number of wildlife species. Redbud, mulberry, lilac and cherry trees, in

addition to a border of dense hedges and one very large locust tree, have provided shelter and cover during winter for white and red-breasted nuthatches, common redpolls, pine siskins, brown creepers, three species of woodpeckers and many goldfinches.

A birdbath, a suet feeder and two bird feeders offering a variety of thistle, sunflower and mixed seeds have attracted numerous bird species, as well as chipmunks, fox squirrels and cottontails. Plantings of snowberry, coralberry, potentilla and ninebark have provided the diversity of food and cover necessary to attract a variety of wildlife, including harbingers of spring such as the hermit thrush, house wren and yellow-rumped warblers.

We look forward to the sights and sounds of spiders, crickets, millipedes, bees, butterflies and moths. And we welcome raccoons, skunks and mice, while rock piles and an old log tucked under the dense hedges are designed to attract and shelter salamanders, toads and snakes.

A diversity of vegetative species, offering a diversity of food, cover and habitats, attracting a diversity of wildlife animals, all in the center of the city.

Think smaller and closer to home. Think about urban wildlife.

Cele Burnett is a naturalist with the Story County Conservation Board.

CALENDAR

JUNE 8-10

Lewis and Clark Festival. Lewis and Clark State Park is the location for early 1800s trades, foods, crafts, history and games. Also, demonstrations of the keel-boat, "Discovery." For more information, contact Ron Williams, Lewis and Clark State Park, Onawa, Iowa 51040, (712)423-2829.

JUNE 10-16

State Park Week. Special events, including interpretive activities, fishing contests, movies and drawings for prizes at individual state parks. Also, pay for six nights of camping and receive the seventh night free. Register at any state park to win 30 days of free camping (20 names will be drawn). For more information, contact the individual state parks.

JUNE 16

Great Annual Springbrook Bike Ride. A 40-mile bike ride beginning and ending at Springbrook State Park, Guthrie County. For more information, contact David Hebrank, Springbrook State Park, Rte. 1, Box 142, Guthrie Center, Iowa 50115, (515)747-3591.

JULY 14-15

Cedar River Festival. Canoe float, July 14; Arts and music festival on July 15. For more information, contact the Cedar River Festival, P.O. Box 114, Cedar Falls, Iowa 50613, (319)277-1885.

JULY 20-22

Frontier Days. Fort Defiance State Park is the location for black powder shooting, knife and tomahawk throwing and early 1800s trades. For more information, contact Jim Hansen, Fort Defiance State Park, Estherville, Iowa 51334, (712)362-2078.

An Iowa Spring

GRAND Slam

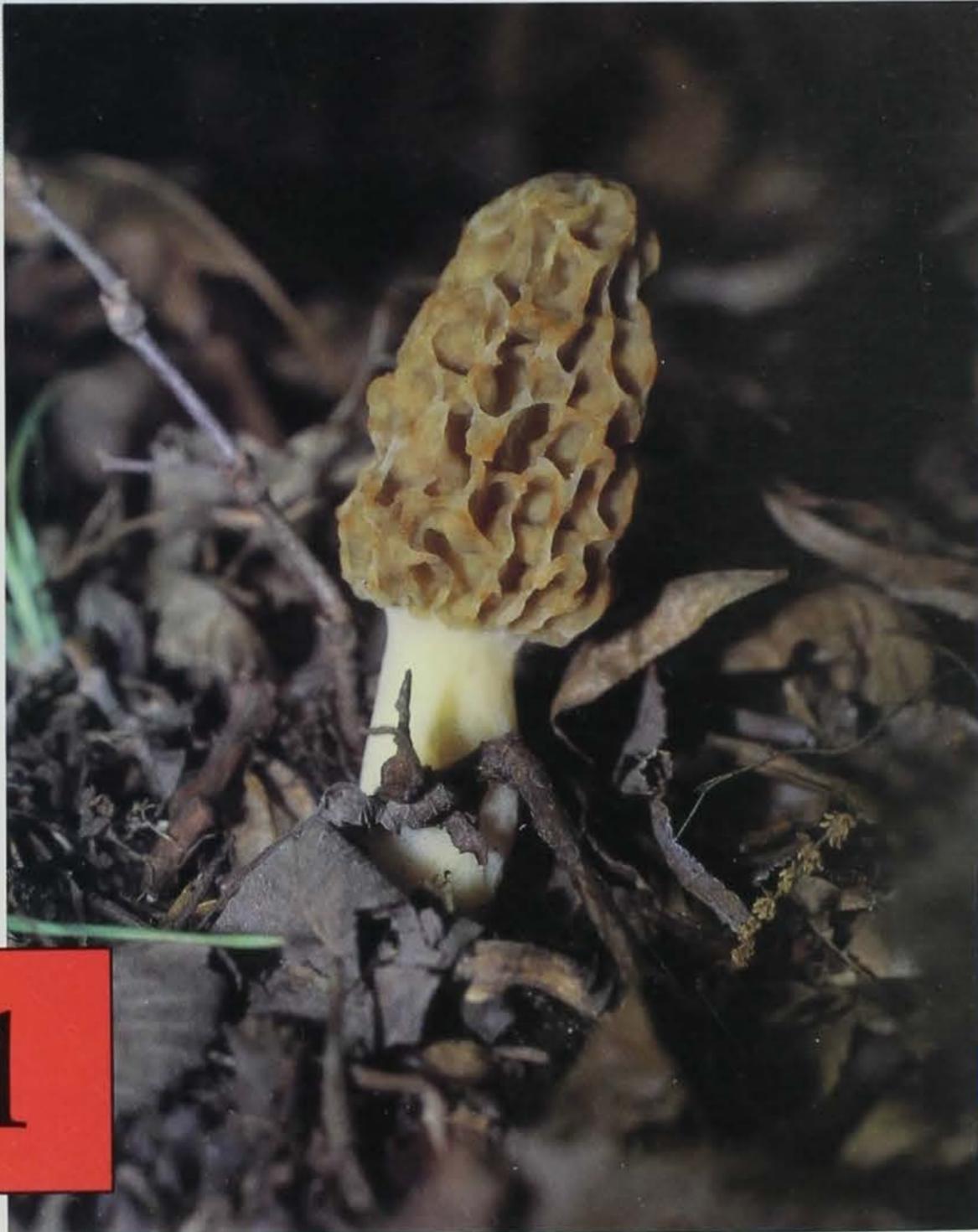
by Chris J. Larson

To a growing number of Iowa hunters, myself included, spring means the end of three long months since we put our guns away for winter. It's a time to get ready for turkey hunting. My first spring turkey hunt started with much frustration, but ended with one of my most productive outdoor trips. It produced an "Iowa Spring Grand Slam."

Bill, my hunting partner, and I arrived at our campsite along the Upper Iowa River in northeast Iowa the night before the fourth spring turkey season. After setting camp, we plotted the next day's hunt around a warm fire.

Morning came after a fitful

GEORGE KNAPHUS



night's sleep -- fitful because sleep is difficult preceding any opening day. After a quick cup of coffee, we drove to our predetermined hunting spots. We were familiar with the area from past grouse hunting and trout fishing trips, and expected to easily find turkeys. Bill hunted a ridge where he had killed a turkey a couple of years before. I drove to a valley where we had seen a number of turkeys while grouse hunting the previous fall.

This particular valley was a public area and no other cars in the parking lot meant there would be no interference that day.

That first morning I heard and stalked three different gobblers, but was unable to call any in. By 10 a.m. I was defeated by uncooperative turkeys and decided to return to my truck for coffee. Walking along a trout stream, which trickled through the valley toward my truck, I couldn't help noticing the slurping sound of trout sucking bugs off the surface. Beaver pools dotted this stretch of stream and provided good water for the fish.

Bill wasn't going to be back until mid-afternoon, so I grabbed my ultra-light spinning rod and decided to spend some time fishing for trout. After walking about a half-mile upstream, I started fishing at a pool where the trout had earlier been feeding on the surface. Casting a favorite black rooster tail spinner into a long, narrow pool produced immediate results. The lure settled to the bottom, and with a quick twitch I got the blade spinning, reeling it back slowly. The spinner blade

could barely be seen fluttering under the water's surface when a trout swam up from the dark bottom and smacked my imitation bug. Unfortunately, I set the hook too late and the fish was gone. After several more casts with no hits, I couldn't help thinking, "this will probably be just as frustrating as my hunt this morning." I approached the second pool with as little movement as possible and cast the spinner to the head of the pool. The lure splashed lightly on the glassy water, but before I could react, a trout darted up and engulfed the lure, setting the hook. The fish was amazingly powerful and when it exploded out of the

water I could see why. A dandy brown made five acrobatic attempts to throw the hook before I finally landed and released a beautiful two-pounder. Not realizing it at the time, I had accomplished the first leg of an "Iowa Spring Grand Slam." I spent the next couple of hours catching and releasing seven more trout, and creeling a couple of smaller ones for dinner that evening.

Bill was waiting at camp when I returned. He had not gotten his bird, either. After a late lunch we were ready for a rest, but because we had only a few days remaining of our vacation, we chose to fish instead.

RON JOHNSON



2

Mid-afternoon was too hot and sunny for trout fishing, so we decided to pursue smallmouth bass. This species is one of north-east Iowa's jewels and number two on our "Grand Slam" list. We had purposely picked our campsite on the Upper Iowa River because of the great view and its good bass habitat.

From past experience we knew fishing for bass in the spring would be best in deep slow-moving water. It so happened such an area was directly across the river from our campsite. High, cold water prevented wading across. Fortunately, Bill had enough foresight to bring his canoe. We went upstream about 100 yards and canoed across to avoid spooking the fish in our pool.

Fast-action smallmouth lures do not produce well in cold water, so we tied on one-eighth ounce lead-head jigs with soft body twister tails threaded onto the hook. We cast our jigs into eddies or other slow-moving areas of water and retrieved the bait slowly along the bottom. Bill was first to hook a smallmouth. Even though the water was cool, he still had a hard time reeling the fish in against the current. He finally landed and released a nice 14-inch bass. After 10 casts, three good bumps and watching Bill catch and release two more, I was finally able to hook what felt like a big fish. Loosening the drag, I watched as the fish made several hard runs straining my ultra-light rod and taking line with every thrust. I was sure the bass would be big because of its dogged fight, but when it finally

surfaced close by, I was surprised to see it was only an 11-incher. Guess that is why some call smallmouth bass the "king of freshwater fish." We caught and released nearly 20 smallmouth that evening -- five more than 12 inches. We could hardly wait to do it again the next day, but turkey hunting was to come first.

The next morning was cloudy and cold. I returned to the spot where a gobbler had flown off his roost the day before and stayed there most of the morning. Dismal weather seemed to have affected the big birds because I did not see or hear a gobbler. Once again, frustrated and bored, I wandered

around several ridges hoping to spot an unsuspecting turkey. Approaching one ridge top, I spotted a gobbler standing by an island of trees in a hayfield. Naturally he saw me first and ran off. Disappointed, I decided that was enough turkey hunting for the day and headed back to my truck. Midway back, resting on the side of a hill, I spotted number three of my "Grand Slam." A morel lay slightly hidden in the dead leaves. Bending over to pick the mushroom, I spotted another and another. Before long, I had filled all my pockets and hunting bag with the small treasures.

Bill and I met back at the camp

KEN FORMANEK



3

around noon. We spent the rest of the day catching fish and picking mushrooms. That evening we sat around the camp fire and feasted on trout and morels sautéed on our camp stove.

The sun was just starting to lighten the sky as I arrived at my hunting spot the next morning -- the last day of the trip. The weather was beautiful -- a clear sky and no wind. When the door of my truck noisily banged shut, the entire valley erupted with gobbles. My hunt started in the island of trees where the gobbler had been the day before. The sun was just peering through the trees when I sensed movement in the hayfield. My heart pounded wildly as I slowly turned my head and saw my bird. I eased the 12-gauge to my shoulder, aimed and squeezed the trigger. Stumbling out of the heavy cover, I ran across the hayfield to my first "Iowa Spring Grand Slam."

I've been back to northeast Iowa the last two springs attempting to get another "Grand Slam." Each time I get everything except the turkey, but the other three are so much fun it doesn't seem to matter. Keep this in mind next time you get skunked when turkey hunting. Take your fishing rod, keep an eye out for mushrooms, and you're sure to have a more enjoyable trip!

Chris J. Larson is a fisheries research technician for the department at Cold Springs State Park in Lewis.

GRAND Slam

A "Spring Grand Slam" can be obtained in any part of Iowa by adjusting for the area's species.

Northwest

*Turkey
Morels
Walleye
Smallmouth bass or Catfish*

Northeast

*Turkey
Morels
Trout
Smallmouth bass or Walleye*

Southwest and Southeast

*Turkey
Morels
Walleye
Catfish or Crappies*

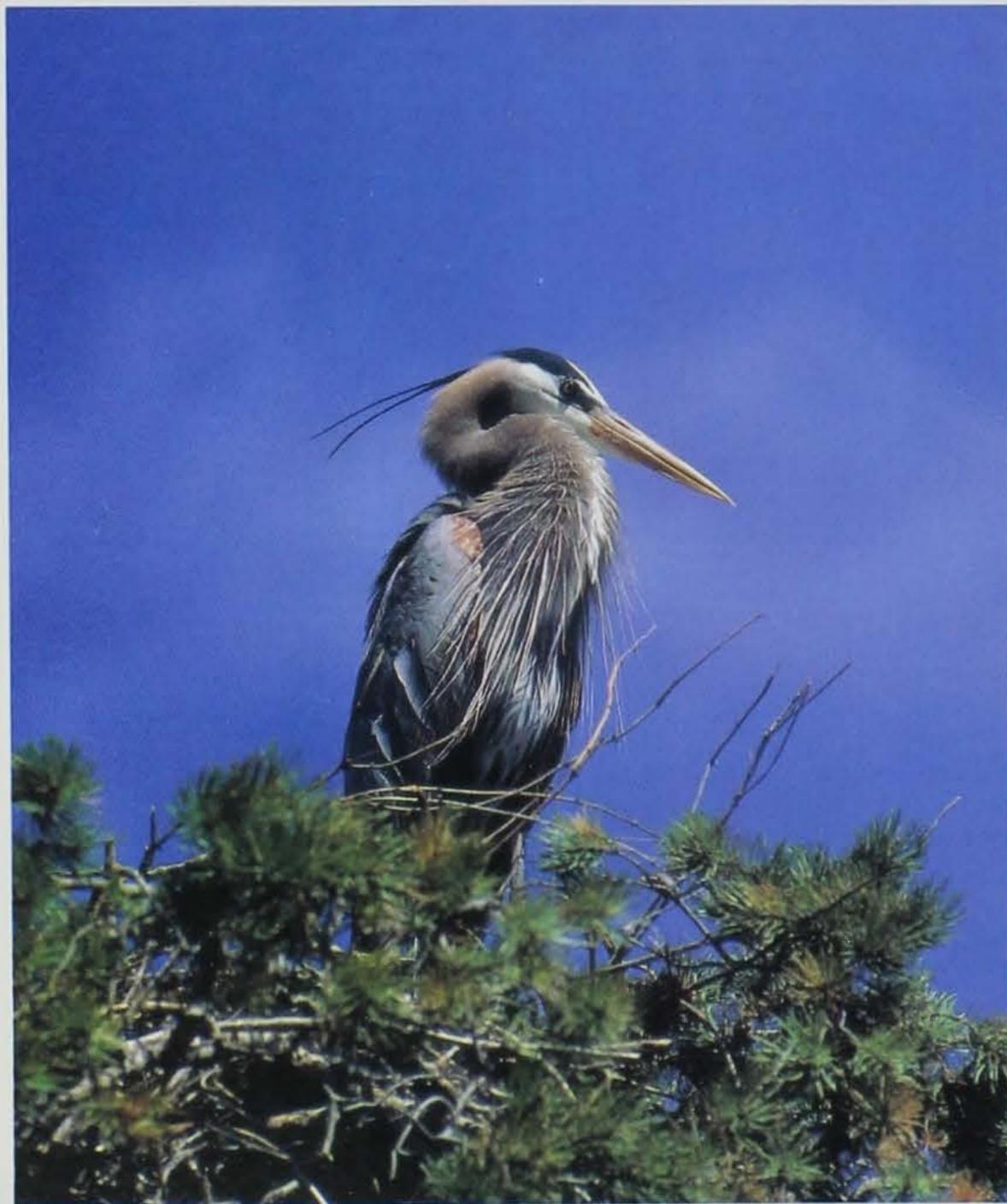
ROGER HILL



4

It's Census Time

Through the Breeding Bird Atlas, new nesting areas of rare nesters such as the great blue heron have been discovered.



ROGER A. HILL

by Jim Hansen

What species of birds nest in Iowa, and what are their breeding ranges? What parts of the state and what habitats are important to rare or endangered species of birds? How is the distribution of Iowa birds changing with time?

Answers to these and other questions should come much more easily when Iowa's Breeding Bird Atlas (BBA) project is completed. The Iowa Department of Natural Resources' nongame program and the Iowa Ornithologists' Union are co-sponsors of the project, the first-ever systematic effort to determine and map the breeding distribution of all the species of birds nesting within the state. Until this project was begun, the breeding range of many species was not known. Some rare species may have nested in the state and have not yet been discovered.

Standardized methods are used for the BBA work so that a similar project can be undertaken years later to see what changes have taken place and also so Iowa's results can be compared with other state's. At least six other states have completed a BBA project, and at least 18 other states have projects underway. In Iowa we are entering the sixth and final year of field work for the project. Bird populations naturally change over time; therefore, it is important to complete the project within a relatively short period of time. Five years was originally selected as a compromise between the need to do extensive, time-consuming bird surveys and the need to complete the project in a short time span, but the project was extended for a sixth year to get better coverage.

At the beginning of the BBA project, 861 survey blocks were selected across the state, with each block three miles by three miles square. Most of the blocks were so-called "standard" or "random" blocks and were placed in the southeast corner of every other township. To ensure that many of the best areas of habitat for birds were surveyed, about 350 "priority" blocks, many of them including wildlife areas or parks, were

selected as part of the 861 total. Each of Iowa's 99 counties has at least six blocks, with the larger counties having up to 15.

Because the project was such a massive undertaking, it was necessary to have volunteers do much of the field work. Representatives of the two sponsoring groups formed a Breeding Bird Atlas steering committee, and volunteers were assigned as county coordinators. Most of the surveys have been done by members of the Iowa Ornithologists' Union or employees of the Iowa Department of Natural Resources, but important contributions have been made by county conservation board employees and people not affiliated with any agency or organization.

Two types of information are collected for each block, the species of birds nesting within the block, and the evidence of nesting. The evidence of nesting was divided into four main categories based on the degree of certainty: *observed*, *possible*, *probable* and *confirmed*. A singing male indigo bunting during the breeding season, for example, would be recorded as *possible*, while a robin feeding young in a nest would be *confirmed* as a nesting species.

Observers are encouraged to visit their assigned blocks throughout the nesting season -- from March, when great-horned owls would be nesting, through August, when it is the best time to confirm nesting by the American goldfinch. Some work at dawn or dusk is suggested, when owls and some other species are most active. June is perhaps the best month for most species, because migrating birds have passed through the state, and many birds will be nesting or feeding young. Observers are also encouraged to sample all of the habitats in their block, including rural and urban areas, forests, wetlands, grasslands, cropfields and even to check under bridges, where cliff swallows or eastern phoebes might be found. They are also reminded to ask permission before entering private land to look for birds. A block, in most cases, is

considered complete if observers put in 25 hours or find 75 species, and they are encouraged to confirm at least 25 percent of their species.

Getting breeding birds surveyed in 861 blocks (more than 7,700 square miles) has been a massive undertaking, but thanks to the dozens of hard-working volunteers across Iowa, the job is being done. In the last two years especially, we have had excellent cooperation and progress, and with a similar effort in 1990, we should get nearly all of the blocks completed.

All 1989 field season data received has been entered in the computer, and we are in the process of reviewing so we can focus on the appropriate blocks in 1990. Through the 1988 field season, the five most commonly reported species were: red-winged black-bird (93 percent of the blocks), American robin (92 percent), house sparrow (89 percent), barn swallow (87 percent) and mourning dove (87 percent). Some of the new discoveries from the project have included finding new nesting sites of rare species such as the northern harrier (formerly called marsh hawk).

One of the exciting aspects of the BBA project has been the involvement of a variety of birders of different backgrounds. Some bird watching clubs have organized "block-busting" parties in which both expert and novice bird watchers have gone out to "gang up" on a block or two and get them completed. Many people, including myself, have gotten satisfaction from pursuing a favorite hobby and contributing important research at the same time. Possibly, the BBA has introduced some Iowans to

bird watching for the first time, and if more Iowans care about birds, they may also care about saving a place for them to live. It is not a bad "fringe benefit" of the project, on top of the primary purpose of documenting what birds nest where in Iowa. Thanks very much to all who have contributed to the project.

Jim Hansen is a nongame biologist for the department's wildlife bureau at Clear Lake.



BOB JENSEN

The northern harrier, an endangered species in Iowa, has recently been discovered to nest in Iowa.

*On the back cover --
whip-poor-will nest.*

17
N2
9
18

