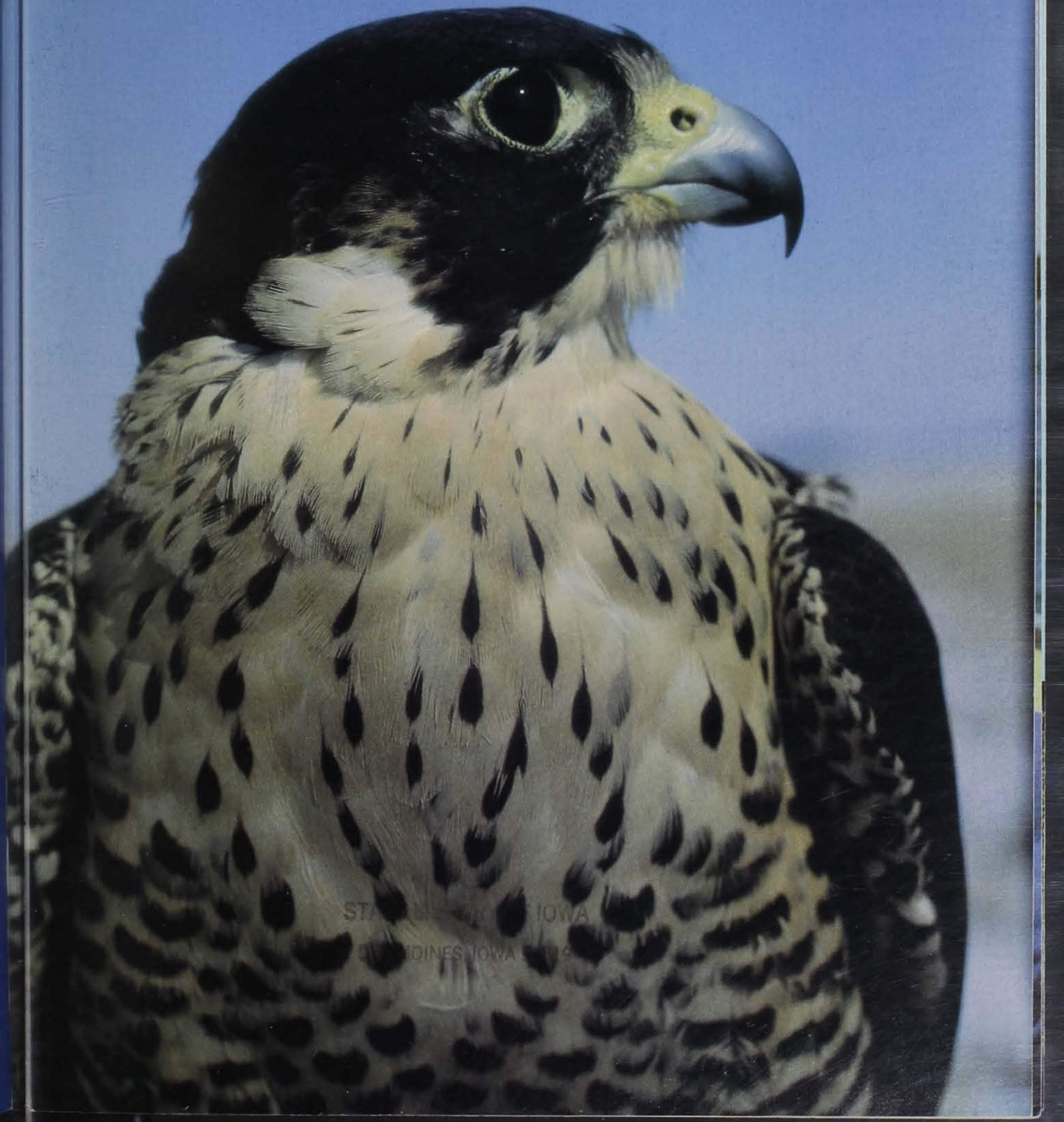
IOWA CONSERVATIONIST

February 1990

Department of Natural Resources



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February 1990, Vol. 49, No. 2

SPECIAL PHONE NUMBERS

DNR Central Office	1-515/281-5145
Emergency Spill Response	1-515/281-8694
Telecommunications Device for the Deaf	1-515/242-5967
Groundwater Hotline	1-800/532-1114
Turn in Poachers (TIP)	1-800/532-2020

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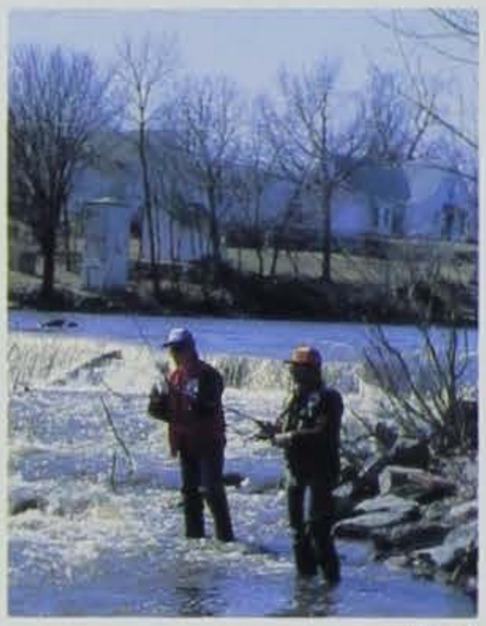

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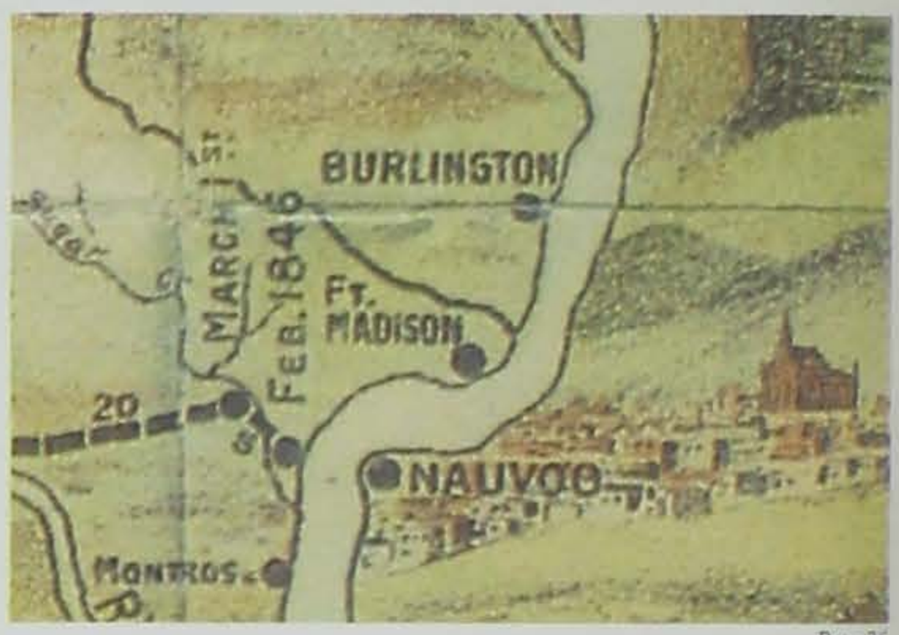

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COVER: Front -- Peregrine falcon. Photo by Lowell Washburn. Back -- Post office/general store at Bear Grove used by the Mormons on their travels across Iowa in the 1850s. Photo by Wendy J. Zohrer.

Printed on recycled paper.

The Environment In The 1990s
Second In A Series

Food and Product Packaging

Too Much of a Good Thing?

(Author's Note: This article deals with over-packaging of grocery products as most packaging which ends up in the trash comes from the supermarket. However, readers should also keep in mind the overpackaging of other products as well, such as toys, clothing, hardware items.)

The second World War has been credited with the dawn of disposables. With GIs throughout the world, the American military was faced with a seemingly insurmountable set of food storage and distribution problems. The packaging industry rose to the occasion with portion control, vastly improved canning technology, disposable beverage containers and other innovations.

When the war ended, design and marketing experts set their sights on civilian uses for these wartime inventions. The result was a food-packaging industry that has evolved at a dizzying pace — along with the fast-food restaurant and the self-service supermarket, both of which owe their existence to packaging innovations. The idea was to sell "convenience" to prosperous post-war consumers. And sell it did.

Each person in the U.S. throws away 440 pounds of packaging each year, and the amount of plastic packaging is expected to double in this decade, thanks in part to the increased use of microwavable foods. Currently, more than 57 billion pounds of plastic are produced annually, 13 billion of which are for food packaging alone. Only one percent is now being recycled.

Most of the packaging that ends up in our trash cans comes from the supermarket. According to the U.S. Department of Agriculture, Americans spent $32.3 billion on food packaging in 1988, up from $28 billion in 1986. In 1988, eight percent of the amount U.S. shoppers spent on food products alone paid for packaging.

Article by Tammra K. Pavlicek
Photos by Ron Johnson

How Much Is Too Much?

A way to determine if a product is overpackaged is to count the number of separate layers that surround the item. There are few products that actually need more than one or two layers of packaging, but many have far more than that. Often, the less essential a product is, the more it tends to be overpackaged.

Examples of overpackaging: Campbell Soup Company's "Super Combo." This soup-and-sandwhich meal is comprised of five layers of packaging — outer container; soup and sandwhich tray; soup bowl, soup bowl lid; and sandwhich wrap.

Gum. This item consists of an outer wrapper with two interior wrappers around each stick of gum.

-- TKP

Single-servings, while convenient, are also expensive -- sometimes twice the price on a per-ounce basis.

The Microwave Age

The first successful "TV dinner" — Swanson's turkey, mashed potatoes and peas — appeared in 1953. The dinner was packaged using a three-sectional metal tray, aluminum foil cover and an outer paperboard box and was heated in a conventional oven. This metal tray, which cannot be used in the microwave (the microwave rays cannot penetrate metal), has since become obsolete: Swanson donated the last tray to the Smithsonian Institution in 1986. In its place is a plastic tray that can be used in both the microwave and conventional oven.

The packaging industry may also make another packaging material obsolete — the tin can. Widespread use of the microwave oven -- three-quarters of American households have one -- forced food industries to come up with packaging that works in the microwave. Enter paper and plastic packaging. Consumers, also, want packaging materials that are lighter in weight, yet preserve food on the shelf as long as the tin can. Manufacturers have responded with various kinds of "shelf-stable packaging" — many of which can be used in the microwave.

While consumers are stressing the convenience factor to manufacturers, the environmental factor should also be considered. How much packaging is too much? Any packaging that is unnecessary for preserving the product or for making the product tamper-resistant. Very few products need more than one or two layers of packaging. Keep in mind you are paying for the packaging of that product which goes from freezer to oven to table to trash in record time. And, the package itself may actually cost more than the product inside.

Single-Servings

The single-serving foods and drinks available to consumers in a myriad of varieties owe their popularity to restaurants, cafeterias and hospitals. From individual frozen pizzas to single-serving cans of soup, these items are hot sellers in supermarkets. Convenient? You bet. But, keep in mind that the

Millions of plastic beverage bottles are recycled each year for use in carpeting, clothing and construction materials.

more an item is divided up, the more packaging, in total, is required to wrap up the same amount of a substance. And, the cost also increases, sometimes at least doubling the per-serving price as compared to a larger container of the same product.

Fast Food Packaging

From almost the moment the first McDonald's Restaurant opened in 1955, fast food establishments have been cropping up on neighborhood corners at an alarming rate — from burgers to tacos, pizza to egg rolls. The fast food industry is a large contributor of solid waste, due in part to the excessively packaged items — multi-layered specialty burgers, individually wrapped straws and plasticware, and single-serving condiment packages. Is the fast food industry doing anything to reduce its contribution to the American waste stream?

Last November, McDonald's announced its plans to recycle plastic hamburger containers and other food packaging from 100 of its restaurants in New England. The program will eventually be expanded to McDonald's restaurants around the country.

Non-Food Packaging

Take a walk down any non-food aisle in the supermarket and you will quickly notice products that are excessively packaged — and for what reason? Preserving freshness is hardly a reasonable argument for the three and four layers that surround bars of soap, various personal care items and cleaning products. And, many store-bought cleaning agents can be replaced by cheaper, and safer, substitutes (see the Earth Day Calendar, page 26, or call the Groundwater Protection Hotline at 1-800-532-1114 for suggestions).

Few non-food items, such as medications which require various packaging techniques to make the product tamper-resistant, actually require more than one or two layers of packaging.

Manufacturers Are Helping Solve Packaging Problem

Are product manufacturers finding any ways to reduce the excess packaging ending up in landfills? Although the actual layering of most products is not being decreased, some companies are changing from plastic to paper packaging, mainly because paper packaging is cheaper than plastic. Paper degrades quicker than plastic and is easier to recycle. And, because paper is less costly, consumers should see lower prices

Many non-food items are overpackaged, often using three and four layers.

Polystyrene (a.k.a. Styrofoam)
Introduced in 1938, polystyrene is used to produce disposable dishes, cups and bowls. Polystyrene, better known by Dow's tradename Styrofoam(TM), is best known as the fast-food "clamshell" hamburger container. It has also virtually replaced the paper egg carton and meat tray.

Oriented Polystyrene
Another polystyrene to recently hit the supermarkets and fast-food outlets is the clear clamshell made of oriented polystyrene. Thanks to the boon in take-out salads and the popularity of pre-packaged produce, deli entrees and baked goods, sales of oriented polystyrene in 1987 jumped 33 percent.

Polystyrene and oriented polystyrene fast-food packaging. Last November, McDonald's began recycling plastic hamburger containers and other food packaging.

PET
Except for polystyrene, polyethylene terephthalate—PET—is probably the most familiar plastic. PET has captured 100 percent of the two-liter beverage bottle market since its debut in 1978 and is doing well in other bottling markets. Because of its ability to withstand heat, PET is widely used for food boil-in-bag pouches, as well as "dual ovenable" trays for frozen foods that can be heated in microwave or conventional ovens. PET is also used to package items from salad dressings to peanut butter, from mustards to mouthwashes.

What Price Convenience?

Producers of various food and non-food items continue to offer consumers new and innovative products designed for convenience. But what price — environmentally as well as economically — are these time-savers worth? Is it necessary to have two, three or, sometimes even six, layers of packaging around a product? And, at what point does convenience become too costly? Consider:

Product	Cost/cost per serving	Waste	Comments
Apple	10-20 cents/10-20 cents	None	Stem, core and unwanted peelings can be used in a compost pile.
Applesauce (jar/50 ounces)	$1.45/12 cents per 4-ounce serving	Glass jar, metal lid, label	Jar and lid can be reused/recycled. Paper label can be recycled.
Applesauce (4, 4-ounce single-serving containers)	$1.10/27 cents per 4-ounce serving	Containers, tear-off lids, labeling	Difficult to recycle.

-- TKP

Dual Ovenable Tray
While eager to lure microwave owners, food manufacturers also want to hang on to the conventional oven owners. Enter the "dual-ovenable tray," which is typically constructed from either paperboard or polyester and can be used in either kind of oven.

Susceptor Packaging
For all its advantages, microwaves have one major failing: they cannot brown or crisp food. Enter — "suscepter packaging." Microwave ovens cook food from the inside out. For food to brown, it must come into contact with hot air or a very hot surface, like a frying pan. Suscepter packaging is the microwave's frying pan. A very thin layer of metal is deposited on plastic or paper. The hot surface browns the food. Pizzas and waffles are marketed in this kind of packaging.

Aseptic Packaging
Made of aluminum foil laminated with plastic, aseptic packaging has only been available a few years. Yet already, more than a billion little, rectangular cartons for juices and other drinks (known as "brik paks") are sold yearly. Puddings and applesauce are already being marketed in aseptically packaged cups, in disposable, single servings for consumers.

-- *TKP*

onthese products, especially for microwavable frozen entrees.

Companies are also finding ways to recycle various containers, thereby reducing the volume of trash. More than 54 percent of all aluminum soft-drink and beer cans in the U.S. were recycled in 1988. Making a new aluminum beverage can from a post-consumer can costs about five percent of what it costs to make a can from new materials. Also, about 25 percent of all new glass bottles and jars are made from post-consumer glass containers.

Approximately 130 million pounds of polyethylene terephthalate (PET) from two-liter soft-drink bottles is being recycled each year into non-packaging items such as carpeting and construction materials and as stuffing for ski jackets.

While recycling is certainly a viable option to reducing solid waste, many plastic containers do not lend themselves for easy recycling. Because most recycling technologies require plastics be separated according to type, or resin -- polystyrene, PET and so on -- multi-plastic packages, which can be made from as many as 10 layers of plastic, almost invariably end up in the trash. These containers range from juice boxes to squeezable bottles.

Reduce, Reuse, Recycle, Reject
What can consumers do? First of all, everyone needs to be aware of the overpackaging problem, and, keeping this in mind, purchase items accordingly.

◆ For starters we can *reduce* our own volume of packaging trash by purchasing products that are not excessively wrapped. Compare brands — does a similar product use less packaging?

◆ Purchase products that come in containers that can be *reused*. Glass jars, which are quickly being replaced by plastic ones, can be reused for many household tasks and can also be recycled. Refillable containers can be reused scores of times. Because sterilizing and refilling require much less energy than reprocessing a package, refillable bottles are less wasteful than even those that can be recycled.

◆ Keep an eye out for products packaged in made of *recycled* material. Recycle as much food packaging as possible. From foil trays to the common beverage can, aluminum is the most valuable of all recyclable materials. And the tin can, used for fruits, vegetables, juices and pet food, can also be recycled.

◆ *Reject* overpackaged products — no matter what the packaging is made of. Doing without products sold in single servings can cut down on cost as well as waste. Consider purchasing fresh fruit and vegetables instead of frozen or canned. Fresh foods are spared the extreme cold of frozen foods and intense heat used to process canned foods, both of which damage the cell structure.

Convenience foods and products have become necessary mainstays of American life as everyone strives to squeeze as much time as possible out of a 24-hour day. Not only are they here to stay, but as technology allows for new developments, additional innovative products are sure to flood the market. With new products debuting on our grocer's shelves at an alarming rate, it is becoming increasingly necessary for consumers to consider just how much these convenience foods and products are worth — both economically and environmentally — before purchasing that product. And, remember, you are paying -- and often paying big -- for that packaging that will be thrown away in a matter of moments. How much is it worth to you?

In May: The diaper debate.

by R. H. (Dick) McWilliams

DON BONNEAU

Ice-Out Angling

Opportunities abound for the angler willing to get a jump on things and brave a few chilly days. From catfish to crappies, walleye to trout, early spring fishing in Iowa offers some exciting action.

As the last of winter's snow and ice melt away, harboring the beginning of spring, the thoughts of many anglers (myself included) turn to the up-coming fishing season. This is the time of year many anglers spend going through tackle, putting new line on reels, checking boats and trailers and the seemingly hundred other "details" necessary before going fishing. However, by the time the details are finished, some of the year's best fishing opportunities have come and *gone*! Early spring, the month or so after ice-out, provides some excellent and exciting fishing opportunities many anglers ignore or, perhaps are unaware exist. Fishing opportunities for a variety of species abound throughout Iowa during early spring. Although there is really no secret for successful early spring fishing, the *where*s, *what*s and *how*s might be more critical than during other times of the year.

Early spring fishing is perhaps most closely associated with walleye and sauger, and for good reason. Some of the season's best walleye and sauger fishing is during early spring. In the Mississippi River and larger interior rivers, such as the Des Moines and Cedar, fishing is usually concentrated below the dams and spillways, out of the main currents, in and along "slack" or "standing" waters. In contrast, walleye found in natural and artificial lakes concentrate along and across points and shallow-water dropoffs.

Lures and baits for walleye and sauger vary as much from angler to angler as from area to area. Important techniques used by successful anglers, however, almost always include a favorite lure fished slowly with natural bait attached. In rivers, 1/8-ounce to 1/4-ounce light-colored leadheads in fluorescent shades are often preferred. In lakes, a 1/4-ounce, blue-white combination leadhead is an old standby. In many cases, tipping the leadhead with a small minnow can make the difference between success and failure. Crank baits of various kinds are also popular along with jigging sonars or sonic lures, particularly in the larger

rivers and below artificial impoundments. Another favorite standby, particularly when drift fishing or trolling, is a "Lindy" rig. The basic rig includes a slip sinker attached several feet ahead of a bare hook or floating jighead tipped with a small minnow. With these rigs, if fish hit short try attaching a stinger or trailer hook.

The success of early spring walleye and sauger fishing in the rivers is often dependent upon the degree of flooding. If severe flooding occurs, fishing usually declines sharply then picks up as water levels recede to more normal levels.

One note of caution in fishing below dams and spillways. Water going over these structures circulates backward to the dam face (called a back tow) and can quickly pull an unsuspecting boater into what is often called the "drowning pool." This area is aptly named. Survival of people pulled into these areas, even with good life preservers and gear, is very poor. These "drowning pools" can exist wherever water goes over dams, even lowhead dams. So, if fishing these areas, allow plenty of distance for safety. On the Mississippi River, safety regulations prohibit fishing within 150 feet downstream and 600 feet upstream of the gates.

Another red-hot fishery in many lakes and reservoirs is crappie. Although crappie are not commonly associated with central and southern Iowa artificial lakes, crappie fishing in some of the natural lakes, such as Spirit Lake, can be excellent. In the natural lakes, some of the best areas are generally along the shorelines in relatively shallow water (five to seven feet). In artificial lakes and reservoirs, crappie are often located in deeper water (6 to 10 feet in smaller lakes and 10 to 15 feet in the larger reservoirs) along old creek beds, dropoffs or breaks in the lake's contour. Depth- or fish-finders are good for locating concentrations of fish.

Another favorite "trick" is to drift fish, or use a trolling motor to work these areas until fish are located. Crappie tend to be suspended, so raise and lower the lures as areas are fished. Slip bobbers are one method of maintaining constant depth and keeping the bait from running along the bottom. Lures and baits follow traditional lines, and in most areas small jigs with minnows probably outfish any other bait or lure. Slip bobbers are good in maintaining just the right depth. Crappie fishing, particularly in the larger reservoirs, is affected by turbidity associated with run-off and flooding. The rule of thumb is the more run-off and flooding, the slower the

RON JOHNSON

VAUGHN PARAGAMIAN

Along with catfish, crappies and walleye, the cool spring months provide excellent fishing for northern pike on the Mississippi (above). In early spring, anxious walleye anglers (left) find good fishing along the Shell Rock River.

fishing. Clear water means excellent crappie fishing in flood control reservoirs, however.

Of surprise to many anglers may be the excellent catfishing available during early spring. Although catfishing is generally thought of as a mid-summer sport, early spring can produce excellent catches of large fish. Most of the small artificial lakes produce good catfish angling, but typically the large flood control reservoirs produce some of the best. Fish the shallow water at the upper ends of embankments for best action. These areas warm quicker than the main basins, and consequently, are attractive to catfish.

In rivers and larger streams, catfish are most often found in slow currents and eddies. For example, in the Mississippi River, the side channel, running sloughs and along the main channel borders are good areas for catfish. In the interior streams, the best fishing is usually in the deeper holes near brush piles.

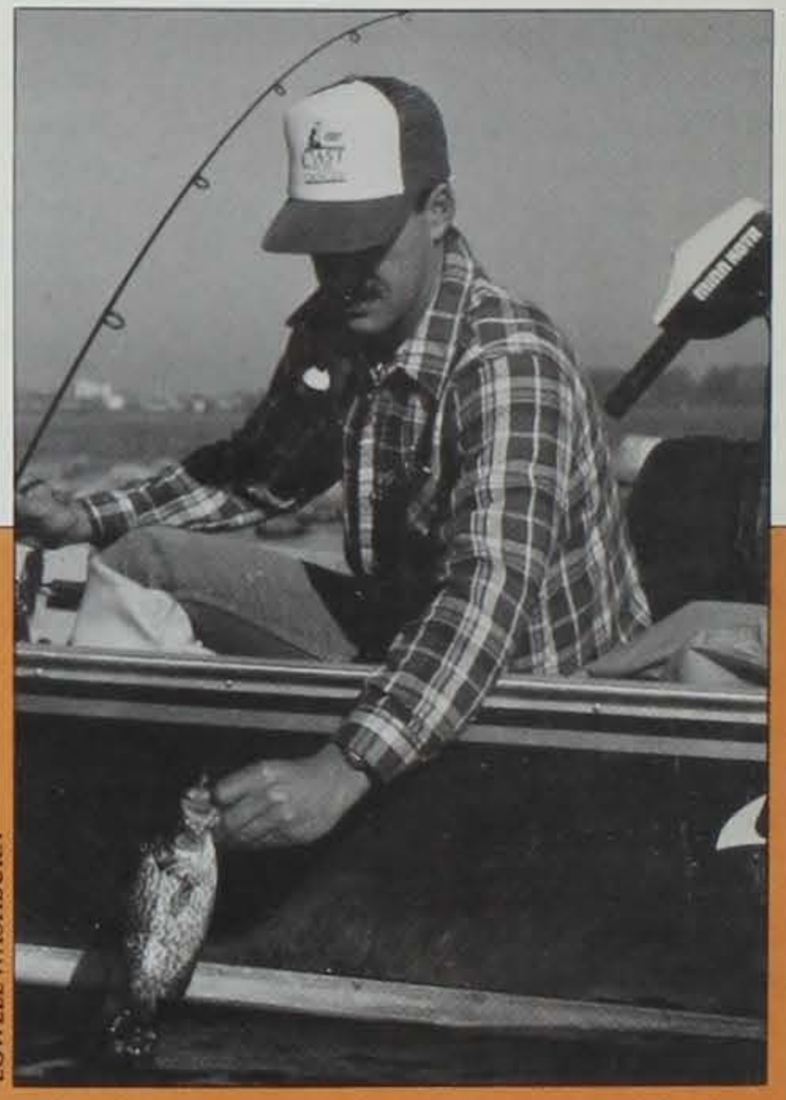
The type of catfish bait is seemingly more critical during early spring than during other times of the year. Cut baits, primarily shad "gizzards" and sides, are the preferred delicacy of spring "cats." One trick of the spring catfish angler is the use of wind-induced currents to carry the attractive odor of this bait. Crosswinds create wave action and lake currents which "carry" the scent along an entire shoreline and can provide that little "extra" needed to catch a mess of nice fish.

For anglers who like to move away from the crowds and walk through more timbered areas of Iowa, trout fishing during early spring is hard to beat. Iowa has 49 spring-fed trout streams located in a nine-county area in northeast Iowa. Stocking usually begins in early April and most streams receive at least one early stocking.

For trout, the rule of thumb for baits and lures for trout on spinning tackle is the smaller the better. Preferred lures are 1/16-ounce or 1/32-ounce jigs -- black with a little red, black with silver, white with silver tinsel -- and small willow leaf spinner rigs with weighted bodies. Hook sizes vary but #10 to #14 are generally the best. Small worms, corn or salmon eggs are also good baits for trout. Put one or two pieces of corn or salmon eggs on a bare hook (no weight), and allow the current to carry the bait downstream as naturally as possible. Current stocking information is available from the three state trout facilities: Manchester Hatchery, (319)927-5736; Big Springs Hatchery, (319)245-1699; or Decorah Hatchery, (319)382-3315.

In addition to these opportunities, early spring is also an excellent time to enjoy smallmouth bass fishing in West Okoboji Lake or northern pike on the Mississippi River. Opportunities are there for the taking. Grab your jacket, get the "details" done a bit *earlier* and go. The early angler will get to enjoy some of Iowa's finest angling.

R. H. (Dick) McWilliams is a fisheries research biologist for the department at Spirit Lake.



LOWELL WASHBURN

Where to Go

The following areas will provide the best early spring fishing:

Walleye*

Rivers: Mississippi (also for sauger); Shell Rock, Des Moines, Wapsipinicon, Upper Cedar and Little Sioux.

Lakes and Impoundments: Clear Lake, Storm Lake, Lake Macbride, Pleasant Creek Lake, Twelve Mile Lake (saugeye), Lake Icaria, Lake Rathbun and below Saylorville and Coralville reservoirs.

Crappie

The Mississippi River, Big Creek Lake, Storm Lake, Lake Icaria, Lake Miami, Spirit Lake, Lake Darling, Lake Geode, Hawthorn Lake, Pleasant Creek Lake, Lake Odessa, Lake Anita, Coralville and Saylorville reservoirs and Lake Rathbun.

Channel Catfish

Rivers: Mississippi, Des Moines, Little Sioux, Raccoon, Cedar, Nishnabotna, Iowa and Skunk.

Lakes and Impoundments: Green Valley Lake, Lake Icaria, Lake Anita, Lake Rathbun, Coralville and Saylorville reservoirs, East Okoboji Lake, Big Creek Lake, Lake MacBride, Lake Miami and Storm Lake.

Trout

Little Mill Creek, Spring Branch Creek, Bankston Creek, Bear Creek, Waterloo Creek and Richmond Springs.

*Walleye fishing in the Iowa Great Lakes has a closed season; check the current fishing regulations for the opening date.

Note: For current information and tips on local fishing, contact the fisheries stations listed on the back of the 1990 Iowa Fishing Regulations brochure.

REAP and Iowa's Forest Resources

by John Walkowiak

The forests of Iowa are the living history of our diverse landscape. Many of Iowa's ancient bur oaks have witnessed the prairie fires of the past centuries, others have survived the Dust Bowl era, and a few have been spared by the bulldozer making way for more marginal cropland, pasture or urban expansion. In today's modern world, Iowa's trees are losing the battle against steel, concrete and quick profits. Although, many Iowans have dedicated themselves to the resources, the actual amount of commercial forestlands has declined to 1.5 million acres from and original 6.7 million acres.

Now is the time for Iowans to plant more trees and manage our existing forest resources for the multiple benefits they give each of us every day. Iowa's forests, on both private and public lands, help to prevent massive soil erosion, provide critical wildlife habitat, supply needed wood products, and improve the quality of our air and water. REAP, the Resource Enhancement And Protection Act, can have a major impact on increasing the amount of forestland and improving the care of existing forestlands for Iowa's short- and long-term future.

Iowa's Forest Resources

Iowa has lost more than 1.1 million acres of forest in the last 30 years. Currently, only four percent of Iowa is forested -- a total of 1.5 million acres. Our forests consist primarily of deciduous or hardwood trees such as oak, hickory and cottonwood. These trees grow either on upland slopes or floodplain areas, either too steep or too wet to farm. Two-thirds of Iowa's forests are owned by farmers, with the state owning less than 136,500 acres in forests, parks, wildlife areas and preserves.

Iowa's private forestlands face the continuing problem of livestock grazing. Grazing activities by cattle, hogs and sheep compact fragile timber soils making them more prone to erosion and thereby restricting natural forest regeneration. Even with the help of the Department of Natural Resources' district foresters, located throughout the state, forestland owners have often misunderstood the benefits of proper forestry efforts and have lacked financial incentives to begin long-term projects.

When Governor Terry Branstad signed the Resource Enhancement And Protection Act (REAP) on May 27, 1989, REAP became one of the premier state conservation laws relating to forestry in Iowa. REAP will provide funds to acquire and upgrade Iowa's state forests and will also provide financial incentives for tree planting and forest management of Iowa's private lands. In addition, other REAP funds are being distributed to local county conservation boards for natural resource education and management. Finally, competetive grant programs for specific natural resource projects will also be funded through cities and county conservation boards by REAP.

REAP and Iowa's State Forests

REAP funds have already allowed the state to complete acquisition of more than 1,200 acres of unique land to be added to the state forest system. Five parcels totalling 356 acres have been acquired for the Loess Hills State Forest in Harrison and Monona counties. The Yellow River State Forest in Allamakee County, will gain 870 acres thanks to REAP funds. In the near future, REAP funding will allow the state to continue to acquire additional land for the state forest system as it becomes available for purchase.

Additional REAP funds have been targeted for specific projects on Iowa's existing state forests, such as building maintenance, trail renovation and boundary identification. One project, of specific interest to Iowans, will be the construction of an office and a visitor center for the Loess Hills State Forest, in the next two years, on land donated by the town of Pisgah.

JERRY LEONARD

Not only will REAP provide funding to acquire and upgrade Iowa's state forests, but will provide a number of financial incentives to private landowners for tree planting and timber management.

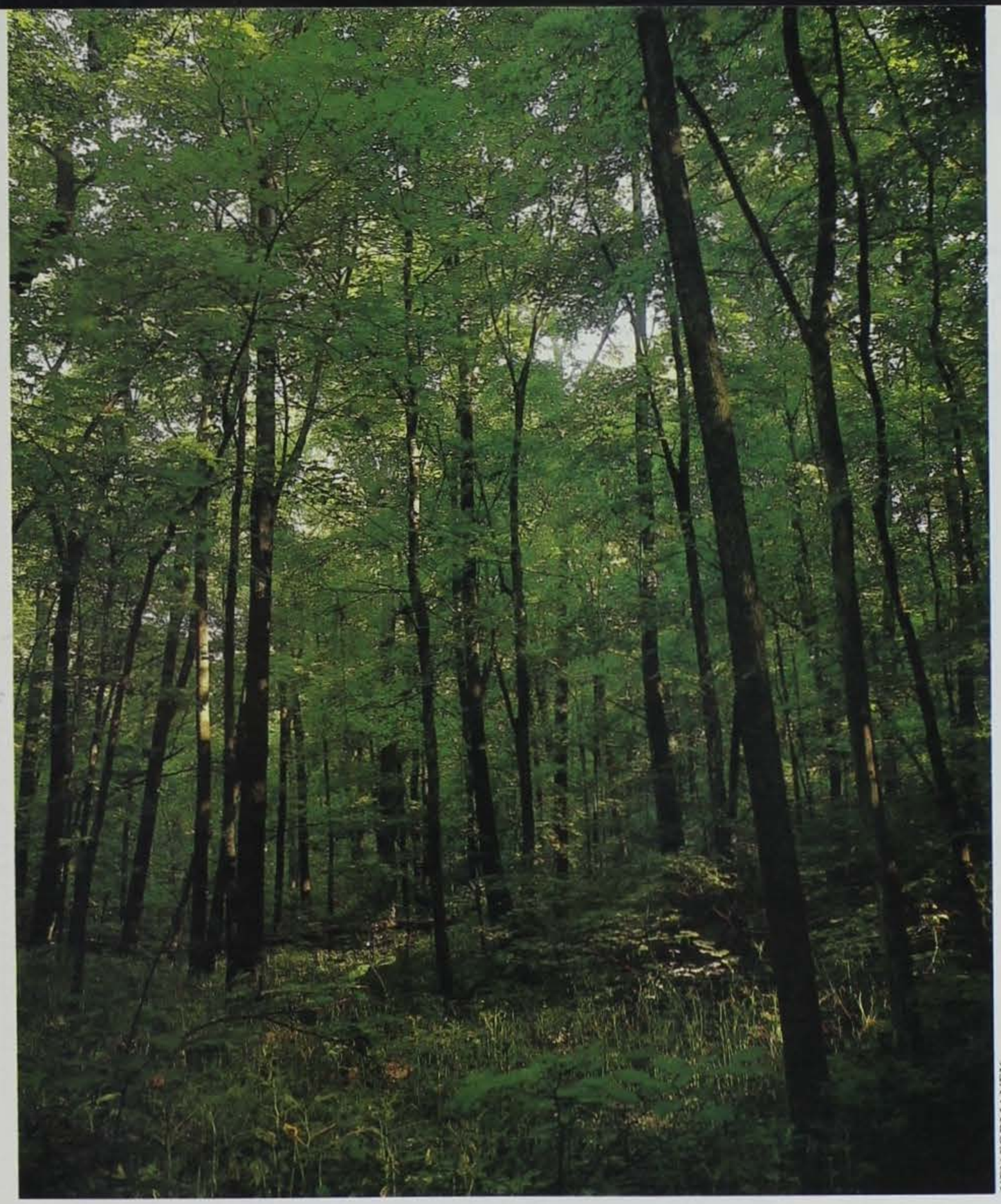
REAP and Private Forests in Iowa

REAP established statewide incentive cost-share funding for water protection practices involving reforestation, woodland enhancement and protection, windbreak establishment and renovation and planned grazing systems for private lands in Iowa. In a joint effort, the Department of Natural Resources and the Department of Agriculture and Land Stewardship are handling REAP funds for tree planting and woodland management on a first-come-first-served basis. Interested landowners should apply for specific practices with their local Soil and Water Conservation District office, who will then forward it to the appropriate technical advisors.

As for forestry practices, requests for REAP cost-share assistance will be handled by the local district forester within 30 days. Windbreak and grazing management requests for REAP funds will be handled by the USDA Soil Conservation Service, with $450,000 available for fiscal year 1990 and an anticipated $1.2 million available for fiscal year 1991. Long-term REAP funding will allow the DNR to aggressively promote tree planting, to encourage proper forest management, and to offer financial incentives to encourage Iowa's landowners to participate.

Specifically, cost-share funding involving forestry efforts will require a written forest management plan approved by a district forester. In addition, the participating landowner will be required to sign a 20-year maintenance agreement to follow the approved management plan. The specific REAP programs involving forests and forestry are:

Tree planting — will give a cost-share payment of 75 percent of the actual costs (up to a total of $365 per acre) for site preparation, plant materials, planting and weed control. Additional cost-sharing for fencing is allowed up to $8 per rod or $45 per acre. The minimum eligible area is three acres.



KEN FORMANEK

More than 1,200 acres of unique forestland have been added to the state forest system through REAP.

Timber stand improvement — will give a cost-share payment of 75 percent of the actual costs (up to a total of $75 per acre) for forest thinning, pruning of crop trees, or releasing young seedlings. Fencing costs of $8 per rod or $45 per acre will again be available. The minimum eligible area is five acres.

Site preparation for natural regeneration — will give a cost-share payment of 75 percent of the actual costs to enhance natural regeneration of logged or grazed forestlands through vegetation management or mechanical means. The maximum payment will range from $75 per acre using no heavy equipment to $120 per acre using heavy equipment. Again, fencing of these areas can be cost-shared up to $8 per rod or $45 per acre. The minimum eligible area is three acres.

Rescue Treatments — will give a cost-share payment of 75 percent of the actual cost for establishing alternate cover for weed control ($60 per acre maximum), rodent control in tree plantings ($15 per acre maximum), replanting activities ($365 per acre maximum) and deer browse control ($24 per acre maximum). The minimum eligible area is three acres.

As the world grapples with the potential dangers of the greenhouse effect due to tropical deforestation and air pollution, Iowans can strike a direct blow for a healthier environment by planting trees and managing their existing forest resources. It is a major goal of the DNR to actively promote tree planting and forest management using the REAP program.

For more information about the REAP forestry cost-share programs or any other questions relating to forestry, please contact your local district forester, your local Soil and Water Conservation District office or contact the DNR's Forests and Forestry Division at (515) 242-5966.

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

Granting Alternatives to Landfills

by Stuart Schmitz

In its second year, Iowa's grants for waste disposal projects have proven successful. Projects funded under the program are providing Iowans with examples that demonstrate alternatives to landfills.

Generating garbage is something we all do. In fact the average person produces approximately four pounds of solid waste per day as a result of their daily routine. Over the years, this has had a cumulative effect and as a result, we are presented with a solid waste crisis in most parts of our nation. Until now, the majority of waste has been placed in landfills for disposal. But a new age is dawning in Iowa -- alternatives to landfilling.

Since the spring of 1988, the Department of Natural Resources' Waste Management Authority Division has administered a grant program that funds waste management alternatives to landfilling. The grant program has given financial assistance to a variety of programs, including recycling, composting and waste-to-energy projects. The projects, funded under the grant program, have been some of the first efforts in the state to move away from disposal in landfills.

In April and October of each year, the Waste Management Authority Division issues a request for proposals to public and private groups, businesses, or individuals with an interest in, or a responsibility for, solid waste management in Iowa. The response to these requests has been excellent — an indication of a sincere interest in solving waste management problems.

As the grant program moves into its second year of existence, a few of the projects have been completed and have provided with examples of what can be accomplished in alternative waste management programs.

In the fall of 1988, the Lee County Solid Waste Management Commission started the state's first recycling program involving curbside pickup of recyclables from residential areas. This program involves the cities of Fort Madison, Montrose and surrounding subdivisions. In this voluntary program, residents in these communities are given the opportunity to have materials that can be recycled or reused picked up at the curbside. Funds from the grant program were used to pay for a portion of the equipment and a building used in the project.

The following materials are collected: corrugated cardboard, newsprint, glass, aluminum, other metal cans, plastic, textiles, motor oils and batteries. The collected material is then taken to a processing center located at the Lee County landfill where it is prepared to be sold as a marketable material.

DNR PHOTO

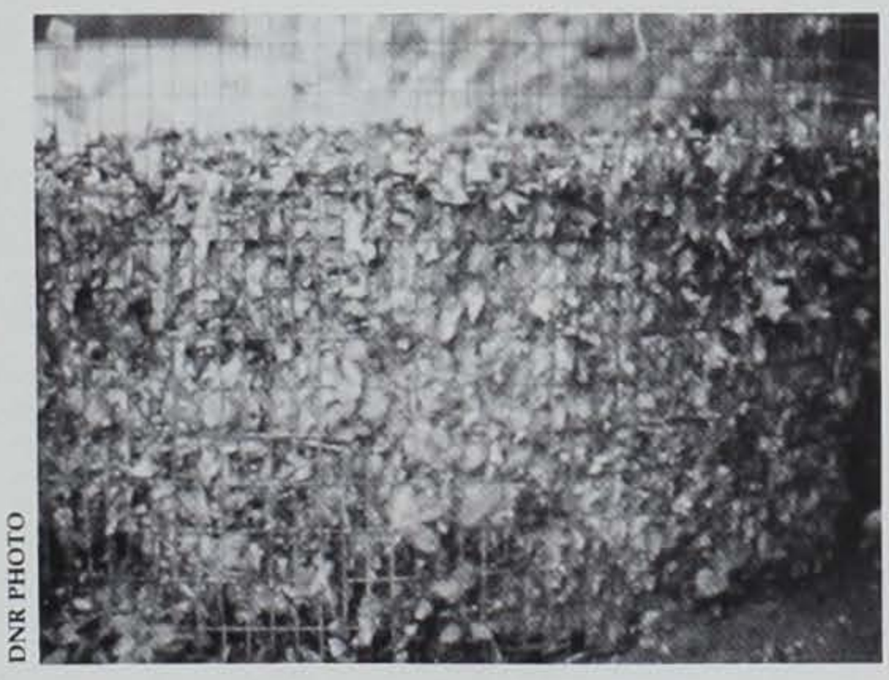
Vehicles, like the one above, aid in curbside pickup of recyclables in residential areas of Lee County.

Combining this residential program with a program for the commercial sector, Lee County has diverted up to seven percent of the waste stream from the landfill. At this level of recycling, approximately 1,350 tons of waste can be diverted from the landfill each year in Lee County. This is equivalent to the amount of waste generated annually by 2,100 Iowans.

A recycling project coordinated by Fareway Stores, involving sheltered workshops in 12 counties throughout the state, has diverted large numbers of plastic containers from landfills. In this project, collection boxes were placed at various locations including grocery stores in the communities where the sheltered workshops are located. Funds from the grant program paid for a portion of the collection boxes and balers located at the sheltered workshops.

Plastic containers normally thrown away, including milk jugs, household product containers and two-liter soft drink bottles, are placed in the collection boxes by the public. The collected plastic is then transported to the sheltered workshop where it is baled and shipped to a plastic recycling company. During eleven months of operation, the project has diverted more than one million pounds of plastic from the landfill.

Another project funded by the grant program was a series of seminars in West Des Moines and Urbandale to inform residents in these cities of the merits of mulching and composting yard waste. Effective January 1, 1991, the practice of landfilling yard waste will be prohibited by state law. As this date approaches, more communities may be interested in setting up a program of this type.



DNR PHOTO

Yard waste constitutes 15 to 20 percent of the total waste stream in Iowa. Composting of yard waste for use in landscaping and as a soil amendment is a relatively low-cost alternative that could have a significant effect on the amount of material disposed in a landfill.

Through a coordinated effort of Fareway Stores and sheltered workshops in 12 counties, more than one million pounds of plastic were diverted from landfills last year.

DNR PHOTO

Many more projects have been funded and will be completed within the next year. In all, nineteen projects have been funded under the grant program. These projects include a waste processing facility in Iowa Falls that manually and mechanically separates recyclables and produces a fuel pellet made from waste paper, a yard waste and sewage sludge composting operation in Davenport, a yard waste collection and composting operation in Sioux City, and a series of emission tests for the combustion of fuel pellets made from waste paper.

The projects funded under the grant program are providing Iowa with examples that successfully demonstrate landfill alternatives. With the combined efforts of the grant program and other initiatives from the public and private sector, the citizens of Iowa are exchanging our throw-away lifestyles with a lifestyle dedicated to sound environmental practices and conservation of our natural resources.

For further information regarding waste disposal project grants, contact the Department of Natural Resources, Waste Managment Authority Division, Wallace State Office Building, Des Moines, Iowa 50319-0034.

Stuart Schmitz is an environmental specialist for the department's Waste Management Authority Division in Des Moines.

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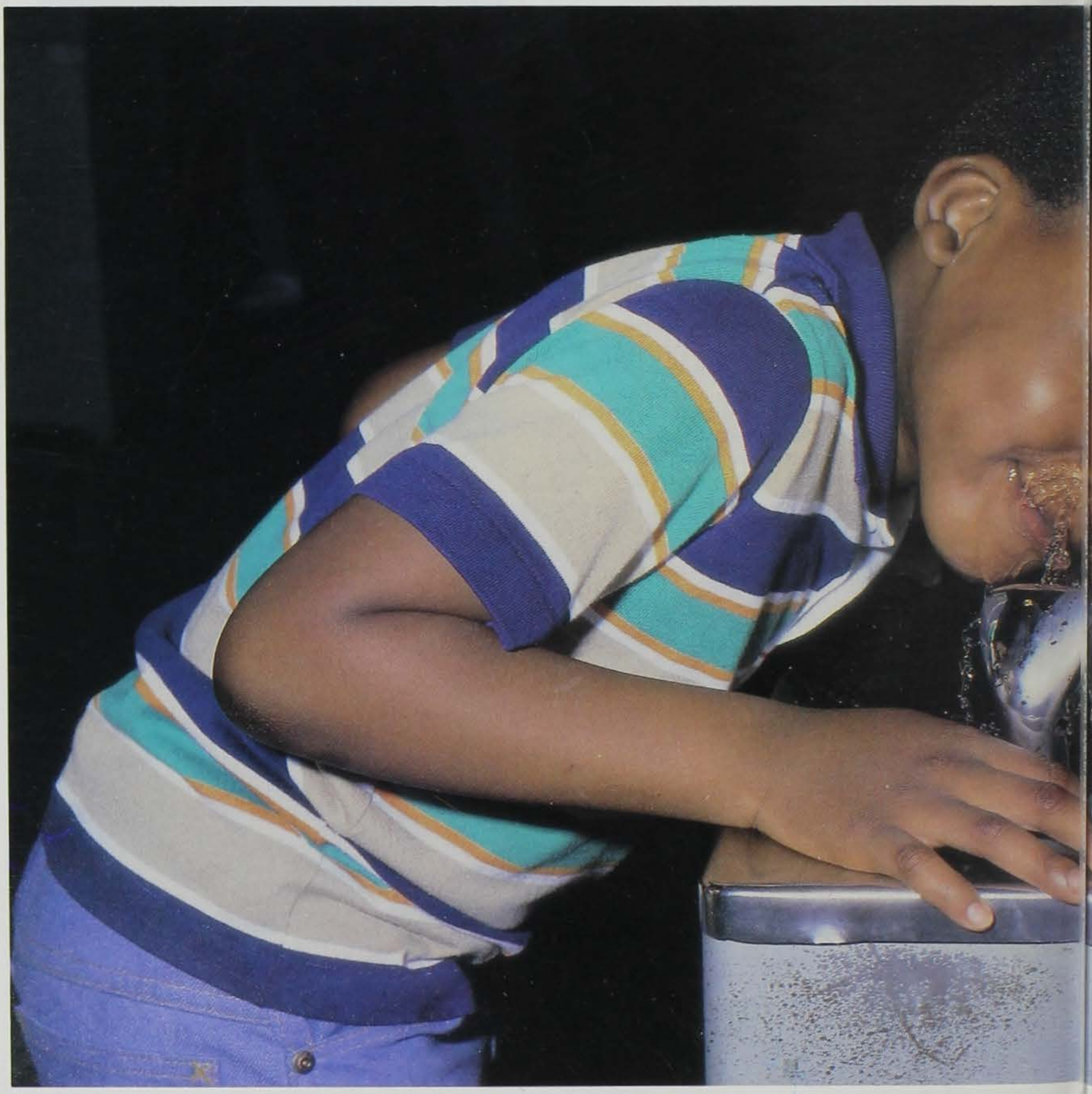


ter Safe to Drink?

RON JOHNSON

Push the button on a drinking fountain and take a drink. Walk over to the sink, turn on the faucet and a clear stream of water rushes into your glass. These are routines each of us has repeated countless times. We have taken water for granted. It has always been there and we seem assured it will always be safe to drink. Those assurances, though, cannot really be taken for granted anymore. Words such as *dought, water table* and *groundwater supply* have worked their way into our lives, reminding us that water is not an infinite resource. Likewise, terms such as *nitrate contamination, leachate* and *non-point source pollution* are 1990 reminders that we can no longer take the quality of our water for granted.

But how safe *is* our water to drink? Overall, you should have no qualms as you step up to the sink or a fountain. However, the threat of increased contaminant levels in our water supplies points to long-range concerns and potential costly remedies if water quality continues to slide. The presence of nitrates, pesticides and other pollutants has triggered a bright orange caution flag, warning us that our neglect of environmental factors in the past has ushered a serious problem to our doorstep. Fortunately, though, this "early warning system" has sparked a wide-ranging response from government agencies, the agribusiness community and the public to halt the degradation of our water supply.

The focus and the intensity of water quality concerns have shown marked changes in the last two decades. In a 1969 appraisal of Iowa's water quality, problems such as hardness, iron content and salinity in our water were cited. Nitrates were mentioned, but the report linked high concentrations of it to isolated cases in which wells were improperly built or located. Nitrates received about the same amount of attention as did excess fluoride concentrations and mineralized (saline) water. There was no mention of pesticides infiltrating our water supplies. Within a decade, the emphasis had swung. Agricultural runoff received an increased share of attention in the state's Water Plan, 1978. Still, the emphasis was trained on *point source* pollution; from faulty wells, sinkholes and industrial discharge.

Today the focus lies squarely on nitrate levels, traces of pesticides and other synthetic chemicals, and the presence of bacteria in our water supplies. And, while there are still real concerns about sinkholes, abandoned wells and other point-source pollutants, the attention has shifted to the difficult-to-define "non-point source" problems for our water supplies. Today, water quality experts say the solution rests with preventing any further degradation of the surfacewater and groundwater we utilize each day. That is the goal spelled out in Iowa's landmark Groundwater Protection Act of 1987. Over the last few years, a variety of contamination sources have been identified. Maximum allowable contaminant standards have been set. More importantly, steps are being taken to reduce the

by Joe Wilkinson

impact of these pollutants of the streams and aquifers serving Iowa's drinking water needs.

Most contaminants are carried into our surface waters and our groundwater through runoff, or by leaching slowly through the soil. This indirect buildup of pollutants cannot be traced back to a specific location, or "point source." However, studies show that agricultural chemical application across Iowa corresponds directly with the buildup of nitrates, pesticides and other pollutants in our water. That buildup parallels the increased use of these chemicals over the last 20 to 30 years.

Through the years, the accumulation of "leftover" crop production boosters has set off a warning for water quality officials. Nitrates have been linked to toxic reactions in babies. The long-term effect on others is not known. Coliform bacteria is an indicator of viruses and other disease-causing bacteria that can lead to hepatitis and other illnesses. The long-term impact of pesticides is suspect, as well. We do know that high levels are toxic to fish. Pesticides also concentrate on the tissue of plants and animals, eventually entering our food chain. That is why the increased levels of these pollutants have come under scrutiny. Unlike many environmental problems, cleanup of vast groundwater supplies is impossible. Because about 80 percent of us drink water from groundwater aquifers, Iowa's goal is to prevent further degradation now.

Contaminant levels have triggered a call for help, and the solutions being pursued show that Iowans are serious about the goal of halting the degradation of the water we drink.

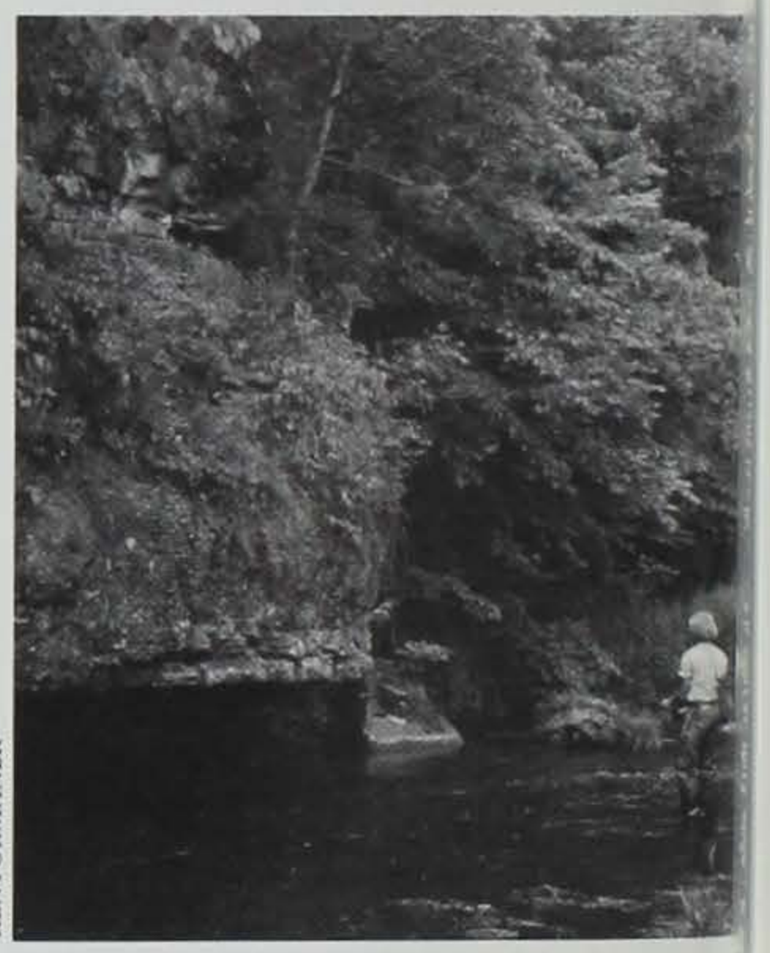
Federal legislation requires the Iowa Department of Natural Resources to follow certain drinking water standards for public water supply systems. These standards set maximum contaminant levels and determine the treatment necessary to protect the public health.

This means about 2,000 water systems are subject to routine monitoring. Tests must show, for instance, that nitrate levels do not rise above 45 milligrams per liter (mg/l). Coliform bacteria must not show up in more than 10 percent of the samples taken from a system. Other maximum contaminant levels are set for an increasing number of microbiological, physical, inorganic and organic compounds. When a system exceeds these standards, the operator must take steps to reduce the offending contaminant levels. The supply must be re-tested and adjusted until it is considered safe again. This might mean blending water from a different source to dilute contaminants, flushing a small system, or chemically treating water to ensure it is safe to drink.

In Iowa, all public water supplies are meeting Safe Drinking Water Act standards, or are on schedule for meeting requirements. However, safe water supplies do not always mean chemical-free supplies. A 1988 study showed that 122 of 853 public water supplies statewide tested positive for one or more pesticides. Of those public systems, 548 tested positive for one or more synthetic organic compounds. The report said 279 systems tested negative for the contaminants. Despite widespread presence of contaminants, only nine systems exceeded contaminant levels requiring corrective action. Although the problem of excessive pollutants appeared in barely one percent of the systems, the presence of these possible threats was widespread in at least trace amounts.

With a foundation of information built, steps are being taken to locate answers. The responses are as varied as the sources of pollution, but they are linked by two common threads — education and cooperation. Education is vital, because the more you know about the water you drink, the better off you are. Cooperation is a key component, because those who propose the solutions are not necessarily the ones who need to put them to use, and one person's actions can affect us all. All the theories, directives, pilot programs and good intentions in the world are left high and dry unless they are put to work. However, cooperation is showing up around Iowa, through field demonstrations, new research techniques and general day-in-day-out practices on farms and in business.

Some examples:



KEN FORMANEK

***Big Spring Basin. Farmers in this 100-square-mile area of northeast Iowa have worked for nearly a decade with the Department of Natural Resources, the Department of Agriculture and Land Stewardship, Iowa State University's Extension Service and other agencies. The program promotes "best management practices" for each farm reducing chemical input, maintaining or increasing crop yields and net income. More than half the operators in the basin have reduced their nitrogen fertilizer use. Application of the pesticide atrazine has been reduced by 16,000 pounds.

***Butler County Integrated Crop Management Project. Fifty producers have boosted their net income by $500,000 through lower production costs. These lower costs come, in part, through less pesticide and fertilizer application.


ROBERT RUNGE

TAMMRA K. PAVLICEK

***Toxic Waste Cleanup Days. These one-day, community collections are growing. They clear hazardous chemicals off basement shelves and garage corners to be properly handled and disposed.


RON JOHNSON

***Statewide Rural Well Water Survey. Nearly 700 private wells have been tested for contaminants. Additionally, well owners are offered information about well siting, design and proximity to chemicals and waste handling areas. The results of this 99-county study are being finalized.

***I.S.U. Soil Nitrogen Testing. Researchers have come up with a technique to determine exactly how much nitrogen fertilizer is in the soil. This allowed 64 percent of the 818 farmers using this year's test to see that they did not need to add more nitrogen to their cornfields.


RON JOHNSON

It is no coincidence the bulk of the attention on improving water quality is aimed at reducing agricultural chemical runoff. Nitrogen fertilizer and pesticide application have proven to be major factors of contamination in the last 20 or so years. Perhaps the success story in the growing push to reduce water contamination is not that ag chemicals are being eliminated, but that more judicious use of the chemicals is being employed. Farm operators have been shown that better management practices and reduced chemical loading on their fields mean money in their pockets. The old adage of "if little is good, then a lot is better" does not apply anymore to farm chemical application. And when excess ag chemicals are not applied, they will not leach through or run off into our water supplies -- the best type of pollution prevention.

The march toward improved water quality continues, with underground storage tank cleanup underway and abandoned wells being closed. There is increased surveillance and action on hazardous spills and historic hazardous waste disposal sites. Monitoring continues at water treatment systems in Iowa. As technology improves and as we increase our knowledge of contaminants and treatment, we are catching up in the race to head off contamination of the water we drink. That is not only important for us, but for the generations who will inherit our water.

Joe Wilkinson is an information specialist for the department in Iowa City.

CONSERVATION UPDATE

Peregrine Falcons Return to Iowa

by Laura Spess Jackson

This summer the Iowa Department of Natural Resources' Nongame Program initiated a peregrine falcon recovery program in Iowa. On July 26, 1989, four young peregrines, still dotted with down, arrived in Cedar Rapids. The young peregrines represented the start of a five-year project to reestablish a viable population of peregrine falcons in Iowa and contribute to the efforts across the Midwest.

LAURA JACKSON

Peregrine falcons are a crow-sized "hawk." Their closest relative in Iowa is the American kestrel or sparrow hawk. Surveys conducted in the 1930s and 1940s estimated there were over 350 peregrine falcon pairs from the Mississippi River area east. Historically, Iowa had peregrine nests in Allamakee, Clinton, Clayton, Dubuque, Linn, Johnson, Black Hawk, Boone and Dallas counties. In the early 1960s, when the survey was repeated, not a single nest or adult peregrine falcon was found in the entire eastern United States. Later the peregrine falcon was listed as an endangered species in Iowa and across the U.S.

The decline of the peregrine (and the bald eagle) was caused by DDT pesticides in our environment. After World War II, the use of DDT became widespread. The pesticides were present in insects which were ingested by a variety of birds who in turn were eaten by peregrines. With each step up the food chain, the negative effects of the pesticides were magnified. However, the DDT did not directly kill peregrines. Instead it inhibited the bird's ability to produce calcium, which resulted in thin eggshells and eggs too fragile to hatch. Ultimately after years of reproductive failure, there were no young falcons to replace the older falcons as they aged and died.

The decline of the peregrine alerted scientists and conservationists to the dangerous potential of DDT — that other birds and humans could also suffer from the negative consequences of its use.

In 1972 DDT was banned in the United States. Later, the peregrine falcon was listed as a federal and state endangered species. To restore the desperately low populations of peregrines, biologists at Cornell University in New York began experimenting with methods to artificially produce and hatch peregrine eggs in captivity and return the young to the wild. The method they refined is known as hacking.

Hacking begins with producing young peregrines in captivity at federally approved breeding facilities. Eggs are taken from female falcons and transferred to incubators, allowing the female to produce more eggs. After hatching, the young are placed with foster peregrine parents so they imprint on falcons and develop normal behavior. The parents tear the meat for the youngsters for about the first month. After the young are at least 32 days old, they are capable of tearing their own food and feeding themselves. At that point they are ready to be sent to the hack site.

In the Midwest peregrines traditionally nested on exposed cliffs along the Mississippi River, interior streams and the Great Lakes. Consequently, hack sites, which simulate nest sites, needed to be high, exposed areas. Thus hack sites in the Midwest have been located on top of tall towers, cliffs and on top of buildings overlooking "urban" canyons. At the site, a four-foot square box is used to house the peregrines.

Although the original plan was to release only five falcons in 1989, the program was able to move a year ahead of schedule and released 10 falcons in Cedar Rapids. The falcons were placed in a hack box atop the Telecom*USA building. Because they had so much down when they first arrived, they were held in the box for a few days until their feathers became more developed. The hack box was opened and the first group of four falcons was released July 30. On Aug. 14, five more falcons were received and released Aug. 19. Additionally, Iowa received a falcon which had originally been released in Columbus, Ohio. It suffered an

Falcon T-Shirts and Sweatshirts Available From IWRA and IWF

The Iowa Wildlife Rehabilitators Association is selling t-shirts and sweatshirts to raise money for the peregrine falcon restoration effort. They are available in ecru or green in youth and adult sizes. The cost is $8 plus $2 postage per t-shirt and $15 plus $2 postage per sweatshirt. For information, write, IWRA Peregrine Fund, c/o Kathy Cuddeback, Morning Star Farm, Rte. 1, Brighton, IA 52540.

The Iowa Wildlife Federation is also selling peregrine falcon t-shirts and sweatshirts. Sweatshirts are $12 plus $2 postage, and t-shirts are $8 plus $2 postage. Write Iowa Wildlife Federation, Inc., Peregrine Falcon Program, P.O. Box 1222, Cedar Rapids, IA 52406.

accident on its maiden flight and ended up needing several weeks of rehabilitation. This delayed its flight development so the Ohio peregrine was sent to join our second group of birds to learn how to fly with them.

When released, none of the falcons had any flying experience and therefore spent the next six weeks developing their flying skills. They progressed normally, advancing from a flapping-for-dear-life flight with crash landings to aerial mock combats, soaring, catching insects and flying off into the horizon. The second group of falcons had the advantage of observing the techniques of the older birds. After a month or more of flying, the peregrines started catching their main prey—other birds. Because peregrines prey on birds, they have evolved tremendous flight skills. With their wings tucked against their body, in a near vertical dive, peregrines can reach speeds over 200 mph.

In urban situations, peregrines feed on house sparrows, starlings, pigeons, jays, doves and waterfowl. They occasionally capture songbirds, but present no threat to the songbird or nuisance bird populations. Peregrines eat only the equivalent of two blackbirds a day. There are far too many urban pigeons for the falcons to "control" and the peregrines tend to migrate during the fall before the large concentrations of urban crows build up.

By the end of September, most of the young falcons had left Cedar Rapids. Although mortality is very high the first year, 9 of the 10 falcons raised in Cedar Rapids survived long enough to be on their own. Falcons which survive their first year, have an 80 percent survival rate and can live more than 12 years.

The goal of Iowa's recovery program is to release about 50 peregrines to establish five nesting pairs by the year 2000. Regionally, the Midwest's goal is to establish 25 to 30 peregrine nests. By releasing young birds, the biologists hope that three years later, when the peregrines are sexually mature, they return to the area where they were released to nest. In other states, some birds have returned, and others have moved elsewhere in the Midwest, emphasizing the regional scope of peregrine recovery efforts.

For additional information about the peregrine project, contact the Nongame Program, Iowa Department of Natural Resources, Rte. 1, Ledges Road, Boone, Iowa 50036, (515)432-2823.

We All Learn From Experience . . .

The staff of the *Iowa Conservationist* apologizes to all of you who tried in vain to write birthdays, anniversaries and other important dates on the 1990 *Iowa Conservationist* calendar. We had the same problem. To our surprise, this year's tan background made it impossible to write in the date blocks.

Thanks to all who took the time to write or call us about the problem. We will make sure next year's calendar is both beatiful AND useable.

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:
--March 1, Keokuk
--April 5, Ames
-- May 2-3, Davenport

Environmental Protection Commission:
--Feb. 19-20, Des Moines
--March 19-20, Des Moines
--April 16-17, Des Moines

Preserves Advisory Board
-- March 13, Des Moines

Trees and Shrubs Vital To Wildlife Winter Survival

With Iowa in the midst of a typical winter of subzero temperatures and strong northerly winds, the benefits of trees and woody shrubs to wildlife cannot be overemphasized, according to Bill Farris, state forester for the Iowa Department of Natural Resources.

"Trees, especially conifers or evergreens, provide critical winter cover for many of Iowa's game and nongame wildlife. If densely planted, conifer trees act as wildlife hotels, greatly reducing wind chill temperatures and allowing wildlife to conserve body heat," said Farris. In addition, conifers allow wildlife hiding cover from predators and offer some food and browse. Conifers ideally suited to Iowa's growing conditions are: white, red pine, ponderosa pine, Jack pine, norway spruce and redcedar.

Broadleaf shrubs and small trees with dense and low hanging branches provides winter cover for wildlife, and also provides a winter food source. Shrubs and small trees such as chokecherry, plum, osage orange, crabapples and Russian olive hold or drop their fruit nearby and their seeds are spread through wildlife feeding. As the snow

DNR PHOTO

becomes deeper or blows into drifts, the importance of upright woody vegetation to provide winter food or browse to Iowa's wildlife is often critical to their survival.

The state forest nursery at Ames and the satellite nursery at Montrose produce four to six million bareroot tree and shrub seedlings per year for woodlot establishment, reforestation, wildlife habitat enhancement and erosion control. According to Jerry Grebasch, manager of the state forest nursery at Ames, there is a good supply of conifer and broadleaf bareroot seedlings available for Iowa landowners. The conifers are $12.50 per 100 plants and all broadleaf are $18 per 100 plants. A minimum of 500 plants must be ordered. The nursery also offers wildlife and songbird packets of various tree and shrub seedings for smaller plantings, especially for wildlife habitat. The wildlife packet contains 200 trees and shrubs for $30 and the songbird packet contains 20 trees and shrubs for $15. To place an order, contact the state forest nursery at (515)233-1161 or your district forester.

Because the majority of land in Iowa is owned by private individuals, many local and state government agencies and non-profit wildlife organizations, such as Pheasants Forever and the Izaak Walton League, have offered incentives to encourage the planting of trees and shrubs for wildlife habitat on private lands. REAP, the Resource Enhancement and Protection Act signed by Governor Branstad in May 1989, offers 75 percent cost-share on eligible private lands to establish multiple-use woodlands and windbreaks. (See page 11 for information on REAP.)

For additional in-

formation on planting trees and shrubs for wildlife or multiple benefits, contact the local DNR district forester, wildlife biologist or your county soil and water conservation district office.

Nongame Poster Now Available

The fourth annual nongame poster, which features the peregrine falcon, is now available. The poster commemorates the peregrine falcon project which was initiated in Iowa this year by the Iowa Department of Natural Resources' Nongame Program.

Copies of the poster are available from tax preparers for those donating to the fish and wildlife protection fund on their state income tax forms. The poster can also be ordered by sending a minimum donation of $5 to: Nongame Program, Iowa Department of Natural Resources, Rte. 1, Ledges Rd., Boone, Iowa 50036.

The fish and wildlife protection fund and direct donations are the means for funding the Nongame Program, which is responsible for Iowa species ranging from turtles to bald eagles and songbirds. The Nongame Program has been responsible for bringing river otters back to Iowa, providing eagle watches and presenting talks to more than 20,000 Iowans each year. The program has received national attention for its kestrel boxes along interstate highways and certifying the grounds of the Governor's mansion as a wildlife habitat area.

Photographs for the poster were donated by Don Poggensee, a professional photographer from Ida Grove, and DeWaine Jackson, a wildlife biologist for the DNR.

For Those Who Noticed

Some watchful eyes may have noticed the absence of our recycled logo in the January issue. As with anyone at the forefront of change, we are occasionally faced with challenges, and last month's recycled paper stock posed a few to our printer. A tearing problem was experienced as the magazine was being folded -- a problem which seems to be isolated to this particular lot of paper. We have had successful runs with the recycled paper four out of five months. Unfortunately, in the essence of time, we opted to print on regular paper stock before the problem could be resolved. As we went to press on this month's issue, our printer and the paper mill were working on a solution.

Please bear with us, our printer and the paper company. Be assured that all parties involved are dedicated to the use of recycled paper.

1990 Nongame Support Certificate Available

The 1990 Iowa Nongame Support Certificate is now available for purchase from the Iowa Department of Natural Resources, Wallace State Office Building, Des Moines, Iowa 50319-0034.The cost of each is $5.

This year's certificate features a bald eagle photographed by Don Poggensee. Each of the 3,000 prints are individually numbered. Revenue from the sale of these collectors' items will be placed in the Fish and Wildlife Protection Fund and will be used specifically to enhance Iowa's nongame species.

REAP Assemblies Scheduled For February and March

The assembly phase of the Resource Enhancement and Protection Act (REAP) will be held in February and March. The assemblies, which are open to the public, will cover all aspects of REAP.

During the assemblies, delegates will be elected to serve on the REAP congress. The congress will hold its first session in Des Moines this summer.

For more information, contact Kevin Szcodronski, Iowa Department of Natural Resources, Wallace State Office Building, Des Moines, Iowa 50319-0034, (515)281-8674.

Bald Eagle Days, March 10-11

Pella Community Center is the location for indoor programs with live bald eagles and outdoor observation areas where eagles can be viewed in the wild.

For more information, contact the Iowa Department of Natural Resources, Boone Research Station, Ledges Rd., Rte. 1, Boone, Iowa 50036, (515)432-2823.

COUNTY CONSERVATION BOARD FEATURE

Changes in Attitudes by Ann Burns

Weird! Mean! Scary!
Cool! Awesome! Neat!

Which set of words would you use to describe a big brown bat, or a great horned owl?

Having experienced a change in attitude toward these two misunderstood, and often unappreciated, animal groups, more and more Jackson County elementary students are using the second set of adjectives to describe bats and owls.

The Jackson County Conservation Board Environmental Education program has provided students the opportunity to touch a stuffed bat and owl, see bat "products for people" and owl "leftovers," and listen to owl calls. The chance to touch, see and hear during the programs helps the students to understand how these nocturnal animals are adapted for their niche, or job, in nature.

From the programs, the students became more familiar with these seldom seen animals. They also learned the truth about such myths as "bats like to nest in women's hair" and "owls can twist their heads all the way around in a circle."

Children have a natural curiosity about the world around them. They love to know the *what*, *why* and *how* of the things they see hopping, crawling, and flying around them. After playing the game "bat and moth" and experiencing how a bat must "listen" for the night-flying insects it eats, the students have a better awareness and appreciation for the bats they see flitting around the backyard on warm summer evenings.

After learning that in about an hour one bat can eat more than 500 insects, including mosquitoes, students express greater concern for the bats they see in their neighborhoods.

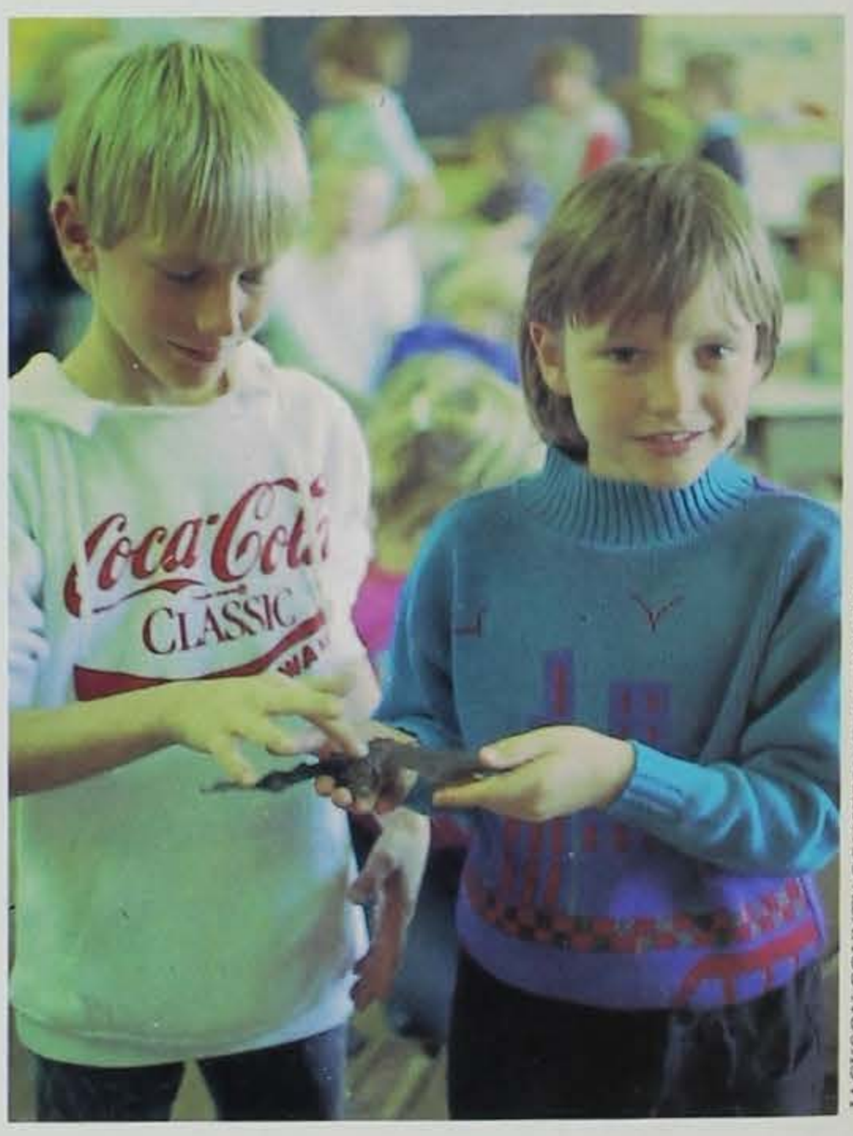
Students with rural backgrounds have often learned to think of owls as farmyard marauders. When they learn that owls eat far more grain-robbing rodents in the fields and nearby buildings, they decide that an owl is a good animal to have around.

Environmental education programs in schools help develop students' awareness and appreciation of the natural resources around them. The students learn their interdependence with the animals, plants and other resources of the world. This awareness and knowledge will help the students grow to make informed decisions, behave responsibly, and take constructive action concerning our precious natural resources.

More than half of Iowa's 99 county conservation boards offer environmental education programs for schools and the general public. Contact your local conservation board to learn more about the programs offered.

Ann Burns is a naturalist for the Jackson County Conservation Board.

ANN BURNS



JACKSON COUNTY CONSERVATION BOARD

Students play "bat and moth" (above) to learn how bats use echolocation to hunt their insect prey. The chance to touch a stuffed big brown bat (right) will help students remember bats are flying mammals, not birds.

JACKSON COUNTY CONSERVATION BOARD

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Designed by Gaye Wiekierak

FEBRUARY

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				**1** Planting season is just around the corner. Order your seedlings from the State Forest Nursery today (see page 22).	**2** Rust remover -- Briskly rub rust spots with a piece of crumpled aluminum foil, shiny side up.	**3** To repel flea beetles, steep fresh catnip in water and sprinkle on plants.
4 Never burn treated wood in a fireplace; it can release toxic fumes.	**5** Check your smoke detector. Some contain small amounts of low-level radioactive waste. Send used or broken detectors back to the manufacturer for proper disposal.			**8** Use equal parts white vinegar and warm water to wash windows or glass. Dry with a soft cloth.		**10** Porcelain cleaner -- Rub surfaces with cream of tartar sprinkled on a damp cloth.
11 Relax -- Read the Sunday paper. If your area does not yet have a paper recycling center, try calling your humane society to see if they can use old paper for animal bedding.	**12** Arrange for a waste management presentation for your club or business. Call **1-800-532-1114** for information.	**13** To repel flies in the coming months, scratch the skin of an orange and leave it out. The citrus repels.	**14** Recycle this calendar -- share it with a friend.	**15** To clean copper-bottom pans, soak in a flat dish of sour milk for one hour. Rinse and dry.	**16** When using hazardous products, use only what is needed. Twice as much does not mean twice the results.	**17** Toilet bowl cleaner -- Sprinkle with baking soda and drizzle with vinegar then brush.
18 To deter ants, grow spearmint or tansey plants around the border of the house.	**19** Plan your troop's next scouting activities. Consider waste reduction and recycling activities.	**20** Theatre groups, schools and churches are often happy to accept leftover paint.			**23** To renew stiff paintbrushes, soften in hot vinegar for a few minutes. Then wash in soap and warm water.	**24** Redeem beverage containers from last night's party!
	**26** Never pour any chemicals down a basement drain or storm sewer; they will go directly into waterways.	**27** Plant chives as a companion plant to carrots, as a non-toxic way to improve the growth and flavor of the carrots.	**28** Post the Groundwater Protection Hotline number near your phone: **1-800-532-1114**	**Think Globally -- Act Locally**		

"Earth Day 20" is April 22, 1990.

From Nauvoo
to Miller's Hollow

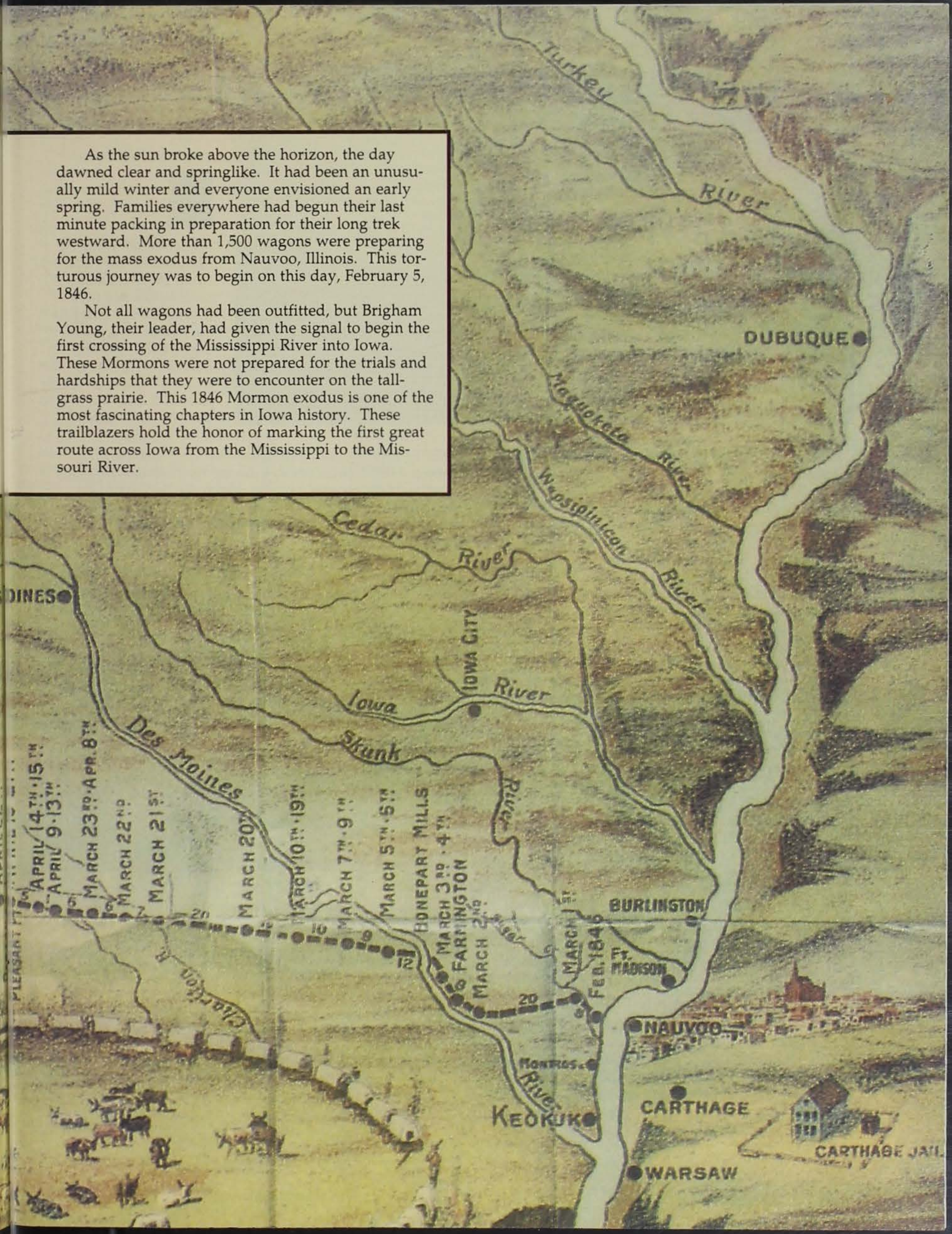
The Mormon Trek Across Iowa

by Wendy J. Zohrer

Map courtesy of the Utah State Historical Society. Copyright 1899 by Millroy and Hayes. Photo by Ron Johnson.

As the sun broke above the horizon, the day dawned clear and springlike. It had been an unusually mild winter and everyone envisioned an early spring. Families everywhere had begun their last minute packing in preparation for their long trek westward. More than 1,500 wagons were preparing for the mass exodus from Nauvoo, Illinois. This torturous journey was to begin on this day, February 5, 1846.

Not all wagons had been outfitted, but Brigham Young, their leader, had given the signal to begin the first crossing of the Mississippi River into Iowa. These Mormons were not prepared for the trials and hardships that they were to encounter on the tall-grass prairie. This 1846 Mormon exodus is one of the most fascinating chapters in Iowa history. These trailblazers hold the honor of marking the first great route across Iowa from the Mississippi to the Missouri River.



RON JOHNSON

Site of Sugar Creek in Lee County, the first camp the Mormons established in Iowa during their journey to Salt Lake City, Utah. Sugar Creek became known as the "place of extreme hardship" as Iowa's winter blasted the pioneer travelers.

Fighting extreme cold and snow, the Mormons only averaged three miles per day during the first month. A 15-month-old infant and a young man were the first to die along the journey, at Richardson's Point camp in Van Buren County. Before their travels would end, hundreds more would perish.

STATE HISTORICAL SOCIETY OF IOWA

Troubles had plaqued the Mormons for some time in their small village of Nauvoo, Illinois. Joseph Smith, the original leader of the Mormons, was the mayor of Nauvoo. Smith ordered the destruction of a newspaper's presses, published by a man who opposed Mormonism. After the presses were destroyed, Joseph and his brother were arrested and jailed. An angry mob stormed the jail and the Smith brothers were killed. Brigham Young then became leader of the Mormons.

Much pressure was put on them to leave, and finally in the late winter months of 1846, the first crossing of the Mississippi was made.

Families immediately began to outfit their wagons with important staples for survival. It was proposed that a family of five needed oxen, two cows, two beef cows and three sheep. Other necessary provisions included 1,000 pounds of flour, 20 pounds of sugar, one rifle and ammunition, 10 to 20 pounds of seed, 25 to 100 pounds of farming tools, a tent and other personal items. The total estimated cost was $250. Soon they were to experience the prairie fires, mud, rattlesnakes, bear problems and floods on their 300-mile trip across Iowa. It was to take five long months before the Missouri River would be sighted. Approximately 15,000 Mormons moved west across the territory during that spring of 1846.

The springlike weather quickly changed after establishing the first camp at Sugar Creek. The temperatures plummeted to 20 degrees below zero, and it began to snow. Sugar Creek became known as the "place of extreme hardship" because of the inadequate shelter and improper clothing. Finally on March 1 they were able to break camp and travel five miles on the first day of their long journey. They were soon to discover that they would only average three miles per day the first month.

Wagons broke down and were left behind at settlements. Too many wagons were being lost, so the Mormons stopped for much needed repairs at Richardson's Point and established the first way station.

These first months were extremely cold and, at Richardson's Point, a 15-month-old infant and a young man were the first to die on this infamous trail. Many more became ill and died during the long journey, and these first two graves are only two of hundreds that dot the prairie landscape.

The snow and cold weather of February and March

The Handcart Expedition

More than one Mormon trail crossed Iowa during the 19th century. The trail stretching from Iowa City to Council Bluffs, known as the handcart trail, was undertaken by 2,962 people in nine companies between 1856 and 1860. Hazel Jensen's book describes this route, "No oxen or horse-drawn wagons made this trail. It was made by the footsteps of people walking — walking across the hot, dusty, wet, muddy state, pushing or pulling small handcarts laden with their belongings."

Mormon converts emigrated from Europe and traveled to Iowa City by railroad during that summer. Iowa City was the endpoint of the trail line. Many of these Mormon travelers were poor and could not afford a wagon and oxen. Handcarts were designed and constructed specifically for their westward journey.

Promotional material encouraged the use of handcarts and stated, "Fifteen miles a day will bring them through in 70 days, and, after they get accustomed to it, they will travel 20, 25 or even 30 with ease, and no danger of giving out, but will continue to get stronger and stronger; the little ones and sick, if there are any, can be carried on the carts, but there will be none sick in a little time after they get started."

Archer Walters, a 47-year-old carpenter from Sheffield, England, kept a journal of his family's trek across the tallgrass prairie state. The rose picture painted by the Mormon leaders did not prepare these newcomers for the challenges ahead. This 275-mile trip took an average of 25 days at a rate of 11 miles per day.

Walter's family left with the first Mormon Company on June 7, 1856. The expedition crossed Iowa through the present day towns of Homestead, Marengo, Newton, Des Moines and Adel. Beyond here, they passed through or near the historic towns of Fairview, Bear Grove and Dalmanutha in Guthrie County. An old state road then took the travelers southwesterly where it joined the older Mormon trail near Lewis in Cass County.

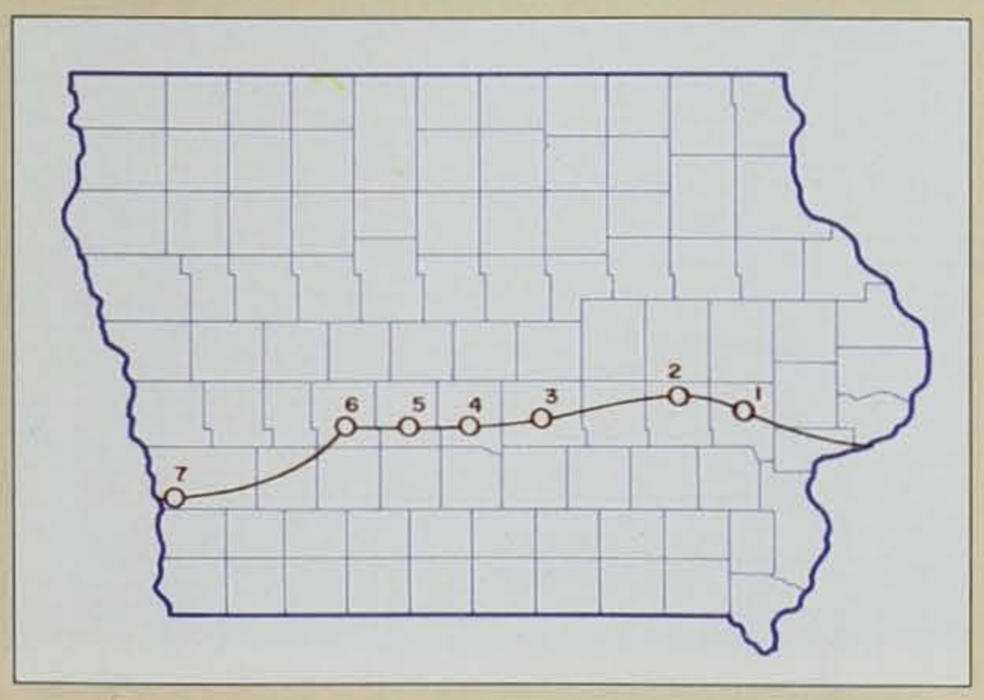
STATE HISTORICAL SOCIETY OF IOWA

These people had to face the dust, heat, starvation and death as they made the first hardcart journey across the prairie. Five children and one man died on their 32-day trek through the state. Walter writes about these deaths. "Got up about 4 o'clock to make a coffin for my brother John Lee's son named William Lee, aged 12 years . . . Went and bureid them (John Lee's son and Sister Prator's child) by moonlight at Bear Creek.

Hunger was common during this long trip. Bear problems made matters worse because they would ransack the Mormon camp for food during the night. Therefore, the name, Bear Grove, was selected for this new community.

Walter's family finally reached the Missouri River on July 8, crossed the river and camped at the city of Florence. Here they rested before continuing their grueling trip to Salt Lake City, Utah.

-- *WJZ*



1. *Iowa City*
2. *Marengo*
3. *Newton*
4. *Ft. Des Moines*
5. *Bear Grove*
6. *Miller's Hollow*

WENDY J. ZOHRER

Cemetary at Bear Grove.

was soon replaced by the thawing and spring rains. The prairie became a sea of mud and after the first 100 miles, the travelers had to make their own trails. Many people had substituted horses for oxen, and it was soon discovered that the horses could not pull the heavily laden prairie schooners (wagons) through the mud.

Camps were made along streams and rivers which flooded after heavy rains and the spring thaw. Orson Pratt described these situations in his journal. "The mud and water around our tents were ancle (sic) deep, and the rain continued to pour down without cessation. We were obliged to cut brush and limbs of trees, and throw them on the ground in our tents, to keep our beds from sinking in the mire."

It was a struggle to continue as their schooners became stuck in the mud, but eventually the countryside dried. Still other unexpected hardships began. Rattlesnakes emerged after the long winter hibernation and the oxen and horses were bitten as they ventured too close to these well camouflaged creatures. These bites often resulted in the death of the Mormon's livestock.

In late April 1846 these trailblazers stopped for a couple of weeks and cleared 300 acres of land and established the Garden Grove camp. Log cabins were built and crops were planted. Before moving on nearly a month later, logs had been cut to build an additional 40 cabins. Not all of the travelers resumed the trip, as some remained behind in the settlement.

More than 2,000 Mormons pitched tents at the next major camp, Mt. Pisgah. This was the first settlement in what is now known as Union County. Caves were dug for shelter until log cabins were erected. But the lack of food and inadequate shelter took its toll on the new settlement. More than 160 people died the first six months.

Settlers found it impossible to break the tough prairie sod with their equipment. Instead, they went to the nearest timber and girdled hundreds of acres of trees. Girdling is done by stripping a section of bark around the entire tree trunk. The tree would then die and be removed. The soil was then plowed for crops.

Pottawattamie Indian chief, Pied Riche, bid them welcome as they set up camp at Mt. Pisgah. The Pottawattamie and Mesquakie tribes lived nearby. Chief Pied Riche and his tribe had been driven from their home which is now known as Michigan. These native

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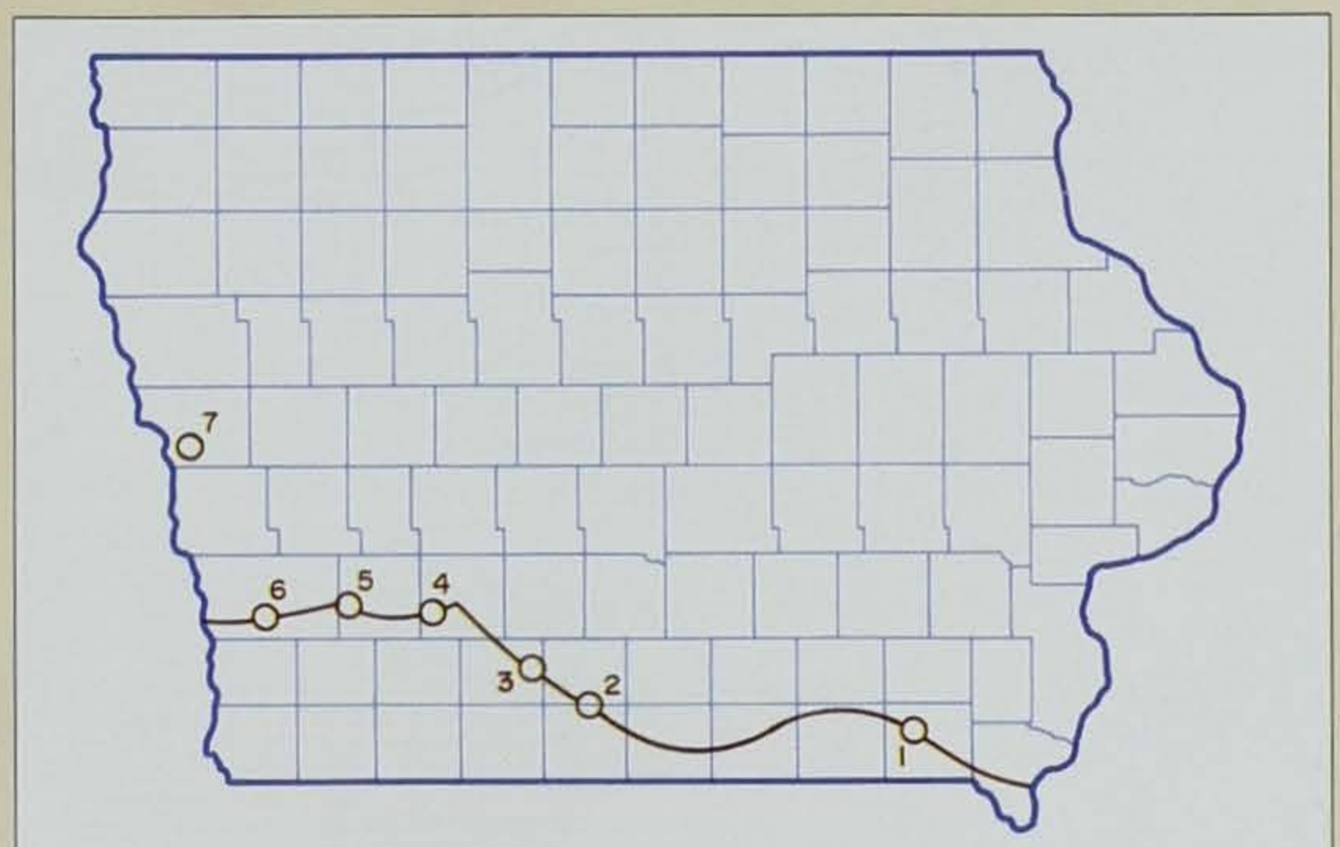
After five months of hardships, the Mormons reached Council Bluffs in July 1846. Baylis Park, on South Main Street in downtown Council Bluffs, contains a boulder with two markers honoring the Mormon pioneers.

State and County Parks Along the Original Mormon Trail



1. Lacey-Keosauqua State Park -- 2,200 acres; six miles west of Richardson's Point or 12 miles northwest of Bonaparte; picnicking, camping, hiking, lake.

Historic site -- Ely Ford; the Mormons did not use the ford in 1846 but later emigrating companies did.

2. Trailside Historic Park -- 3 acres; managed by Decatur County Conservation Board; 1/2 mile west of Garden Grove; picnicking only.

Historical marker.

3. Mt. Pisgah Park -- 8 acres; managed by Union County Conservation Board; 5 miles southwest of Lorimor; picnicking only.

Historical marker.

4. Mormon Trail Park -- 170 acres; managed by Adair County Conservation Board; 1-1/2 miles southeast of Bridgewater; camping, picnicking, shooting, range, hunting, lake.

Historical marker.

5. Cold Springs Park -- 104 acres; managed by Cass County Conservation Board; 1 mile south of Lewis; camping, picnicking, hiking, lake.

Historical feature -- nearby fields show dim traces of trail.

6. Old Towne Park -- 8 acres; managed by Pottawattamie County Conservation Board; 1 mile west of Macedonia; camping, picnicking, hunting, stream.

Historical feature -- Macedonia founded in 1848, possibly by Mormons.

7. Preparation Canyon State Park -- 344 acres; 15 miles southeast of Onawa; picnicking, hiking.

Historical feature -- Preparation Camp where 50 to 60 families settled.

-- WJZ

Americans were friendly and understood the hardships of being driven away.

Chief Pied Riche stated, "We must help one another and the Great Spirit will help us both. Because one suffers and does not deserve it is no reason we shall suffer always. We may live to see it right yet. If we do not, our children will."

Indian Town, near another Pottawattamie camp, was located on high ground east of the Nishnabotna River, about 2-1/2 miles west of the present-day town of Lewis. The native Americans in this area were also friendly and were often visited by the Mormons.

Despite sympathy from the Indians, occasionally the westward trek was hampered by Native Americans. Prairie grass could grow to heights of eight to 10 feet and Indians would clear large stretches of prairie grass by setting fire to it. These fires were terrifying to early travelers. At times the flames themselves were visible at night up to 25 miles away. Every light in the sky told of a prairie fire in that direction. In self-defense, "backfires" would be started close to the wagons and tents. The purpose of the burnt strip around the camp was to protect the people and their possessions. It was hoped that if a prairie fire did veer near the encampment it would not be able to jump the burned strip of land.

After leaving Indian Town, the Mormons followed an Indian trail which ended at the Missouri River. After five months of hardships, Brigham Young and the first Mormons reached the Missouri River on July 9, 1846. It was decided to build a settlement which would withstand the upcoming winter. The westward movement would be delayed until the next spring.

Not all people continued the journey with Brigham Young the following year, but left the Winter Quarters and returned to the Iowa side of the river and established a new community near Indian Creek in the vicinity of an old fort. The settlement was named Miller's Hollow and was eventually changed to Council Bluffs.

Today, few traces remain of the Mormon trails crossing our state. Blue and white "Mormon Pioneer Trail" signs and brown and white signs mark this historic route. Iowa history springs to life as today's travelers see and touch the faint track of prairie schooners or pitch a tent at one of these historic sites.

Wendy J. Zohrer is an environmental educator and a freelance writer from West Des Moines.