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Iowa CONSERVATIONIST

July 1990

Department of Natural Resources



**Iowa
CONSERVATIONIST**
July 1990, Vol. 49, No. 7

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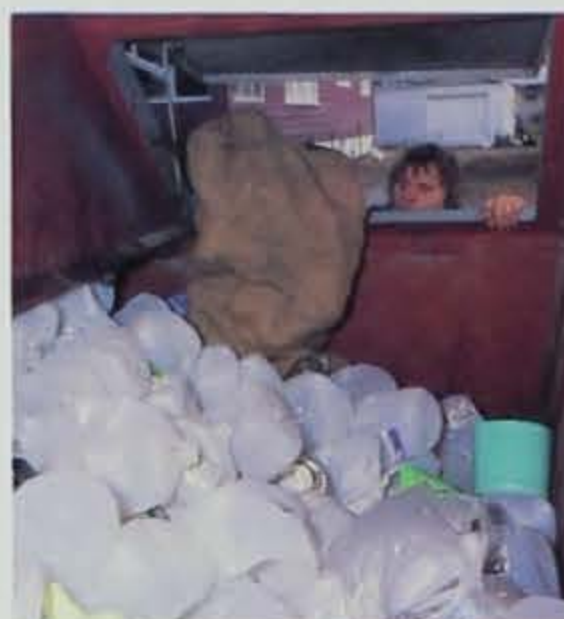
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Iowa Conservationist (USPS 268-780) is published monthly by the Iowa Department of Natural Resources, Wallace State Office Building, Des Moines, Iowa 50319-0034. Second class postage paid in Des Moines, Iowa, and additional mailing offices. Subscription rates: \$6 for one year or \$12 for three years. Include mailing label for renewals and address changes. POSTMASTER: Send changes to the Iowa Conservationist, Department of Natural Resources, Wallace State Office Building, Des Moines, Iowa 50319-0034.

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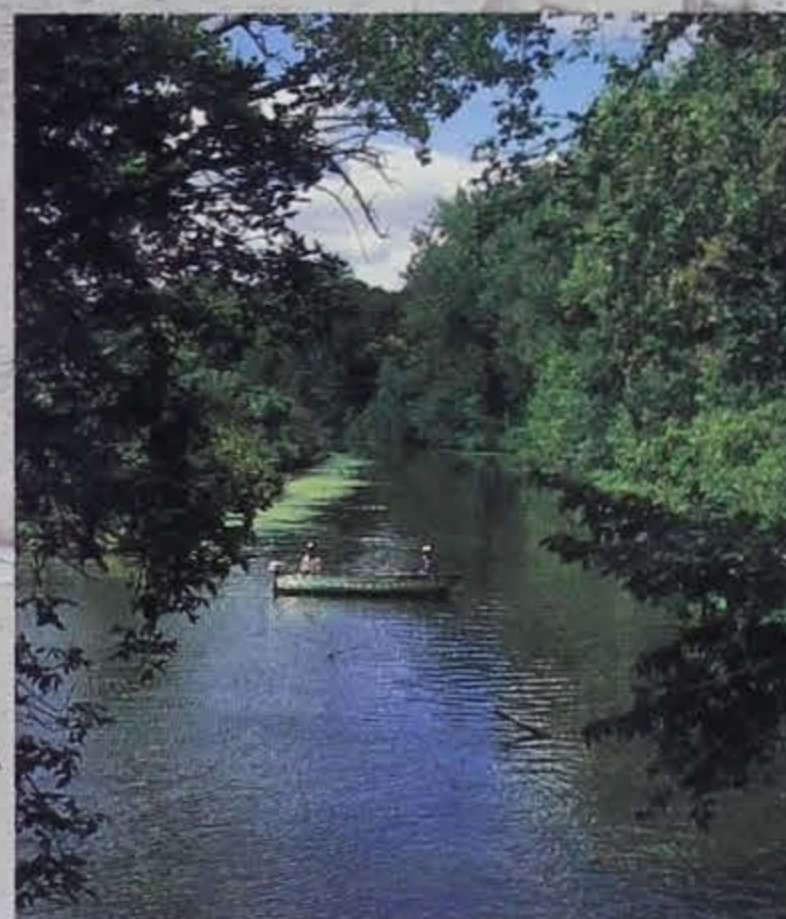


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The Great Lakes Region

Iowa's Vacation Hotspot

One of the more popular vacation destinations for residents of Iowa and the Upper Midwest is an area often referred to as the "Iowa Great Lakes" region. This area, located in Dickinson County only a few miles from the Iowa-Minnesota border, is situated on a series of glacial lakes which have hosted generations of people who love the outdoors.



Article by Dave Stoeber
and Gwen Hayes
Photos by Ron Johnson

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Access to the area is convenient via Highway 9 from the east and west and Highway 71 from the north and south. Regional population centers are within easy driving distance of this vacation playground. Sioux City, Iowa, and Sioux Falls, South Dakota, are within two-hour drives and Des Moines and Omaha, Nebraska, are within four hours.

It was well understood by early settlers that the Indians regarded the region with reverential awe. Their name for the lakes, "Minnewaukon," which means Spirit Waters, gives credence to the story. Today, visitors to this region are still in awe of these beautiful glacier-formed lakes. Spirit Lake, at 4,169 acres, is the largest natural lake in Iowa. West Okoboji Lake, at 3,847 acres, is renowned as one of three "blue-water lakes" in the world. Another very popular lake -- East Okoboji -- is 1,835 acres.

Water-related activities, such as boating, fishing, water-skiing and swimming are important to those who frequent the Great Lakes region. With an abundance of public facilities, enjoyment of these activities is easy for everyone. Six public beaches serve West Okoboji -- Emerson Bay, Gull Point, Pikes Point, Triboji Beach, Terrace Park and the Arnolds Park city beach. There are two beautiful sand beaches on Spirit Lake as well as Orleans and Crandall beaches.

Fourteen public boat ramps give access to the lakes -- four on Spirit Lake; four on East Okoboji; two on West Okoboji; two on Miniwashta; and one each on Upper Gar and Center Lake.

The numerous lakes and many species of fish available provide excellent fishing conditions. Commonly sought-after fish include walleye, perch, smallmouth and largemouth bass, crappie, bluegill, northern pike, muskellunge and bullhead. Several special facilities have been constructed in the past few years with the angler in mind. A new fishing pier, situated on the "grade area" of Spirit Lake, provides quality access to one of the better "fishing holes" in the region.



A fish cleaning station, located at Marble Beach, is a popular new addition for the angler.

Those wanting to try a different type of water activity will find several dive shops, boat rental locations and marinas willing to rent equipment and offer advice to the beginner.

For those who wish to spend more than one day in the Great Lakes region, overnight accommodations range from rustic to elegant. Motel and lodge rooms are available. Lakeside resorts and cabins nestled in the towering oaks can be rented at prices to suit everyone. There are several private campgrounds in the region. In addition, the Department of Natural Resources maintains three public campgrounds.

Gull Point State Park, located on the west side of West Okoboji, has 112 campsites with paved roads, modern shower facilities, electrical hookups, playground equipment and a sanitary dump station. Emerson Bay, located one mile south of Gull Point, has 117 campsites and is the most popular campground in the region. It has newly paved roads, modern shower facilities, electrical hook-

ups, cable TV hookups and a sanitary dump station. Adjacent to the campground is a three-lane boat ramp and large parking area for vehicles and boat trailers. Marble Beach, located on the west side of Spirit Lake, has 224 campsites. Facilities available include a modern shower building, electrical hookups and a sanitary dump station. The nearby boat ramp, parking area and fish cleaning station provide quality boating access to Spirit Lake.

Picnicking facilities are available in all of the above parks. Four additional state picnic areas include: Pikes Point State Park, located on the northeast shore of West Okoboji; Mini-Wakan, located on the north shore of Spirit Lake; and, Lower Gar Access, located on the northwest shore of Lower Gar Lake.

Several open picnic shelters are available at Gull Point, Pikes Point and Mini-Wakan state parks and may be reserved for \$15 by contacting the park ranger. The rustic Civilian Conservation Corps Lodge at Gull Point State Park is a wonderful setting for group activities and may also be reserved by contacting the park ranger.



The Gardner log cabin (left) was one of the first dwellings constructed in the area -- and is the only structure that remained following the 1857 Spirit Lake massacre.

Cayler Prairie (below) is a native tallgrass prairie that has never been mowed. It is home to hundreds of different prairie plants.

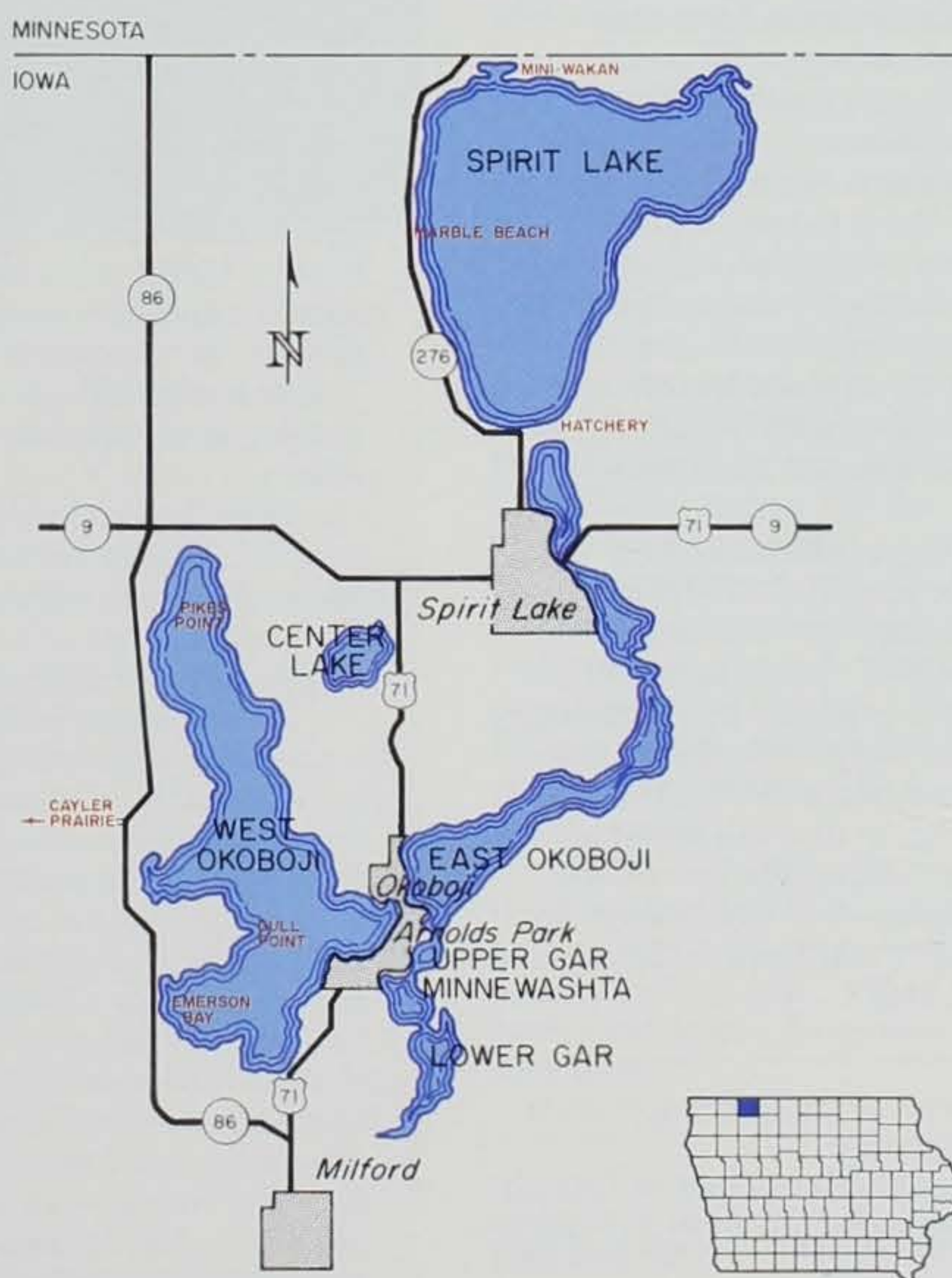


In addition to water-oriented pursuits, several attractions provide days of recreation for visitors to the Great Lakes region. The Gardner log cabin was one of the first dwellings in the area and was the only structure that remained following the 1857 Spirit Lake Massacre. The cabin has been restored to its original condition and an adjacent museum houses artifacts associated with those fateful days. A large obelisk monument marks the final resting place of many of these pioneer victims.

The Dickinson County Museum, located in Spirit Lake, highlights the lifestyles of the many colorful personalities who settled in the area and often lent their names to the natural features of the local landscape. The Higgins Museum, in the town of Okoboji, is the largest banking and banknote museum in the Midwest.

Cayler Prairie is a native tallgrass prairie that has never been plowed. It is home to hundreds of different prairie plants -- big bluestem, little bluestem, Indian grass, pasque flower, leadplant, purple prairie clover and other less common species. In addition to Cayler Prairie, several wildlife management areas surround the Great Lakes region. Most of these areas

The Great Lakes Region



are marshes providing habitat for a wide variety of birds and mammals and, consequently, providing such recreational opportunities as hunting, fishing, bird watching, canoeing and hiking.

At the present time, the Dickinson County Trails Association is developing a multi-use trail. The main artery of the trail should be completed this summer. A system of trails encircling each of the lakes is envisioned for the future.

Numerous restaurants and food establishments are located in the region, ranging from fast food to elegant night clubs. For golfing enthusiasts, there are three, 18-hole and three, 9-hole courses within a 10-mile radius. There is also a newly refurbished amusement park complete with roller coaster, rides and several other attractions located in Arnolds Park.

Another area attraction is the Queen II, a reproduction of the original passenger boat used to carry visitors around the area prior to the advent of the automobile. Rides are available throughout the summer.

Summer is not the only time to visit the Great Lakes. During winter, ice fishing, snowmobiling and cross-country skiing become popular diversions. Even though the pace slows considerably compared to the summer, many facilities in the area are open year-round.

For more information on fishing or to tour the fish hatchery, call the State Fish Hatchery at (712)336-1840. Information on camping is available by contacting Gull Point State Park, Rte. 2, Box 83, Milford, Iowa 51351, (712)337-3211. And, to find out about area activities, contact the Iowa Great Lakes Chamber of Commerce, Box 9, Arnolds Park, Iowa 51331, (712)332-2107.

Dave Stoeber is the park ranger of the Great Lakes area.

Gwen Hayes is a park attendant of the Great Lakes area.

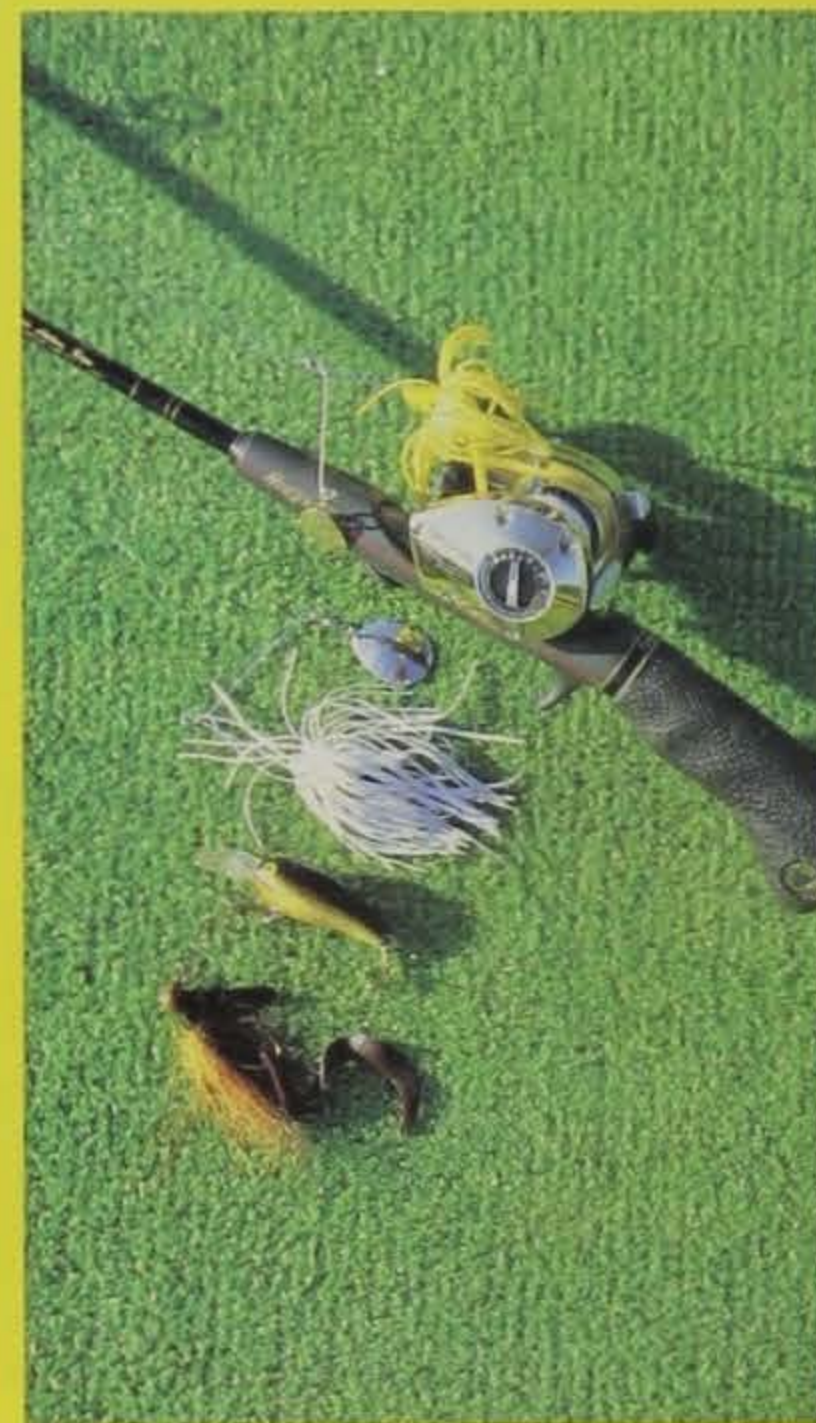
Bass Fishing In Iowa's Great Lakes

by Maury J. Muhm

Largemouth bass fishing. To most Iowans a trip to a farm pond or reservoir would come to mind; however, to an increasing number of bass anglers, Northwest Iowa's natural lakes provide superb action and quality fishing. Iowa's Great Lakes -- Spirit, East and West Okoboji, Upper and Lower Gar, Minnewashta -- while well-known for their walleye, smallmouth bass, northern pike and muskie fishing also have healthy largemouth bass populations which are mostly overlooked. Some anglers that are "in the know" have been cashing in on this fantastic fishery.

How do you fish for largemouth bass in these natural lakes? Here are a few productive patterns that will catch largemouth spring through fall.

Fishing starts with the first warm days after ice-out in the spring. Look for the warmest water areas available. A water temperature gauge is invaluable this time of year as a difference of only two or three degrees can have a significant effect on bass location and behavior. The shallow backwaters of bays, and especially artificial channels or lagoons, are the first waters to warm -- attracting bluegills, crappies and hungry bass. Bass may be holding tight



RON JOHNSON

to cover or roaming the shoreline. Spinner baits are an excellent lure at this time of year. They can be worked fast or slow in open water or cover. For bass holding in cover, unwilling to come out and chase down a bait, try weedless rubber-haired jigs tipped with some pork rind or paddle-tailed grubs on weedless jigheads. Toss them back in and under brush, docks or rocks and let them sit on the bottom while giving an occasional shake or hop. When you see the line twitch, set the hook immediately as "old bucket-mouth" has just inhaled your bait.

As spring progresses and waters warm, the bass will begin spawning. The same areas that had bass in early spring, along with bullrush and cattail beds, will be used as spawning areas. As spawning nears, bass can become very finicky and spooky. If spinner baits and jigs are not doing the trick, try twitching a minnow-imitating plug or tossing a weightless plastic worm.

With spawning over and summer on its way, deep water weed beds will begin to develop.



MAURY J. MUHM

Bass will begin to filter out of the shallows toward these deeper weed beds. Areas of growing submergent vegetation just out from spawning areas can be real hot spots. Work a diving crankbait or plastic worm on a jighead over and around these weed beds.

By the time summer arrives, bass are spread out in a variety of areas and can be caught by many methods -- however, there are a few patterns that seem to produce consistently. Docks, boat hoists, swimming platforms and submerged timber always hold some bass, especially when they extend out into deep water and are adjacent to a shallow flat. Toss plastic worms or jigs into the shaded areas provided by the cover. Current areas under bridges and in channels, where two bodies of water meet, are good spots in the early morning or evening periods. Cast

a spinner bait or surface buzz bait parallel to riprap and dock pilings in these areas. These bass are usually in these areas for one reason -- to eat -- and it is thrilling to see them suck a fast-moving buzz bait off the surface. When present, bullrush beds will always hold some bass that can be caught with spinner baits or weedless spoons and jigs.

Fishing the deep weedline will produce not only the most, but the largest bass throughout the summer and fall periods. Look for any irregularities in the deep weedline, such as points, pockets and rock piles. Bass will school in these areas and it is not uncommon to catch a dozen or more two- to four-pounders from one small spot. If you catch several bass from one area and then they quit hitting, let the area quiet down for an hour and come back and hit it again.

Plastic worms and weedless jigs are excellent baits for working deep weed growth. Docks will continue to produce during the fall as well, particularly in areas that drop off quickly into deep water.

A good all-around choice for tackle would be a casting or spinning reel spooled with 10- to 14-pound monofilament line on a six-foot medium-heavy graphite rod. The most productive bait colors are white, chartreuse and black for spinner and buzz baits; silver perch and crayfish patterns for crank baits; black, purple and brown for weedless jigs and black and purple for plastic worms.

Unless otherwise posted, there is a 15-inch minimum length limit on largemouth and smallmouth bass in all of Iowa's public lakes with a combined daily limit of three and a combined possession limit of six. The aggressive nature and high-sporting qualities of the largemouth bass make it a prime candidate for catch and release. To ensure quality fishing in the future, please practice catch-and-release. If some fish are wanted for a meal, take some time out to fish the plentiful bluegills and perch in Iowa's Great Lakes region. By the way, I forgot to mention, you might have to put up with catching a few northerns, walleyes, smallmouth bass and possibly even a muskie while fishing for largemouth in these multi-species lakes. Life's tough, isn't it?

So the next time you are thinking about an outing for largemouth bass or the walleyes have "lock jaw," give northwest Iowa's largemouth bass a try.

Maury J. Muhm is a fisheries biologist at the Spirit Lake Fish Hatchery.

Oil Overcharge Funds

A \$45 million windfall has come to the State of Iowa in recent years. Where did this money come from, and how has it been spent?

The \$45 million funding has resulted from an energy crisis, and has been put to work to prevent a future energy crunch. "Oil overcharge" money has benefitted Iowa by making us wiser energy users.

What is "oil overcharge?" As a part of the national response to the oil crisis of the 1970s, federal price controls were levied on petroleum from 1973-80. The U.S. Department of Energy (DOE), the regulatory enforcement agency, later filed lawsuits against several of the oil companies -- charging they had violated the oil price regulations. In a series of rulings, the U.S. federal courts ordered these companies to make repayments based on how much they had overcharged. Although the guidelines vary from case to case, the settlements required the funds be used for energy-related programs and in a manner that benefits those groups of customers who were over-

charged. In cases where appropriate documentation was available, large numbers of consumers were able to apply for direct restitution. In cases where the DOE could not readily identify the persons who may have been affected as a result of the violations, or could not determine the amounts the persons should receive, DOE granted residual refund money to state governments to provide indirect restitution through its energy management programs.

As a result of the federal rulings, Iowa began to receive its share of oil overcharge refunds in March 1983 and to date has received more than \$45 million. The amounts awarded to each state are based on the ratio of the state's consumption of petroleum to the individual company's nationwide petroleum sales during the price violation period.

Iowa established an energy conservation trust fund to which the interest and earnings on investments from oil overcharge deposits are credited. The money is used, in part, for

funding activities under five programs: home energy assistance program, weatherization assistance program, institutional conservation program, energy extension service and the state energy conservation program. The remaining funds have been dedicated to programs which are independently approved by the DOE. The chart on page 10 identifies the oil overcharge fund expenditures by function from FY87-FY91.

The lion's share of the state's allocations has been dedicated to the energy-related components of Iowa's comprehensive groundwater protection program and the weatherization program for low-income residents.

The Groundwater Protection Act was passed in 1987 in response to increasing concerns about the quality of the state's groundwater. Underground storage tanks, landfills, fertilizers and pesticides, together with the historical management of hazardous substances, were

Article by Sharon A. Tahtinen
Photos by Ron Johnson



A large portion of oil overcharge money has been used to weatherize the homes of Iowa's low-income residents.



all factors contributing to the urgency of groundwater protection legislation. The state recognized the need to maximize its effort by working energy management and environmental protection simultaneously. Therefore, the state dedicated oil overcharge funds to portions of the groundwater protection strategy that have energy efficiency improvements and energy resource developments as primary benefits.

The DOE approved a \$17.5 million, five-year expenditure for energy-related elements of the comprehensive groundwater program. The projects funded with oil overcharge money can be categorized as agricultural energy management, waste-to-energy solid waste management and energy resource management. The agricultural energy management program will target Iowa's substantial farm and agri-business sector. Iowa's economy revolves around agriculture and the majority of the



The DOT has received funding to implement statewide traffic light synchronization (top and above), which will minimize stopping and maximize energy conservation, as well as expedite traffic.

Oil Overcharge Funds

state's population is involved directly, or indirectly, with agriculture.

This program demonstrates integrated farm management practices that conserve energy and enhance the overall efficiency and profitability of agricultural production. Best available technology (BAT) crop production practices will be implemented through an integrated, statewide field demonstration and education program. The development of agricultural and wood resources for biomass energy production will also be promoted.

The waste-to-energy

solid waste management program will demonstrate and implement energy recovery from municipal and county solid waste in Iowa. The state will evaluate technologies such as the use of refuse-derived fuels, source reduction and recycling.

The energy resource development program will focus on the development of oil, coal and gas resources in the state. Of the three, Iowa knows most about the availability of an estimated seven billion tons of coal reserves. When compared to Wyoming coal, Iowa coal produces between 1,500 and 2,300 more BTUs per ton. This coal represents a significant potential source of energy. While some preliminary work has occurred in identifying Iowa's energy resources, much additional work remains. This program will expand initial efforts into a program using digital procedures and data for mapping and inventorying potential energy (oil, gas, coal) re-

sources. Information from the system will be used to promote future energy resource exploration and expansion of energy production locally. The identification of local sources of energy is significant to Iowa, which imports 98 percent of its energy at a cost of more than \$5 billion annually.

The integration of energy management and environmental resource protection has additional energy benefits worth noting. Much of the operating cost of a public water supply is related to energy consumption, for pumping (production and distribution). In general, 20 to 50 percent of the energy budgets of many municipalities are used for water treatment and distribution. Growing problems with contamination only result in increased costs for the consumer.

Because some of the water quality problems in Iowa are related to agricultural chemicals, synthetic organic chemicals and petroleum fuels, it

Oil Overcharge Fund Expenditures by Function (In Millions)

Function	FY87	FY88	FY89	FY90	Recommended FY91	Five-Year TOTAL	% of TOTAL
Public Transit Assistance	\$4.7	\$2.3				\$ 7.0	13.5%
Low-Income Energy Assistance	3.0	3.4	3.3	3.0	3.0	15.7	30.2%
Local Gov't. Energy Audits	1.5	0.5		0.5		2.5	4.8%
Composting Demo Project				0.2		0.2	0.4%
Regents	1.5		0.5			2.0	3.8%
Competitive Grants	0.9	1.5		0.5		2.9	5.6%
Model Farm Demo Projects				0.6	0.6	1.2	2.3%
Geographic Information System				0.5		0.5	1.0%
Administration	0.5	0.2	0.2	0.3	0.3	1.5	2.9%
Groundwater Protection	1.0	5.5	4.0	3.3	2.7	16.5	31.7%
Other State Energy Programs		0.4	0.3	0.2	0.2	1.1	2.1%
Other	0.2	0.2	0.5			0.9	1.7%
TOTAL	\$13.3	\$14.0	\$8.8	\$9.1	\$6.8	\$52.0	100.0%

makes economic sense to approach the problem from both an environmental and an energy perspective.

The second largest expenditure of oil overcharge funds has been used to weatherize the homes of Iowa's low-income residents.

Weatherization improvements, such as caulking and insulation, help make low-income Iowans' homes more comfortable and affordable.

There is also a net positive economic spinoff of jobs and income in Iowa communities as a result of more weatherization contracting and local sales of supplies.

The state energy conservation program which provides for energy conservation planning and programs and the energy extension service which provides for energy management outreach and demonstration programs receive annual allocations. Many programs have been funded under these umbrellas. Iowa's public building energy management programs have been able to use oil overcharge funds as seed money to leverage millions of private dollars to finance energy management projects. This leveraging is significant because the public building programs have taken on the immense task of making Iowa's public and non-profit buildings energy efficient by 1995. Iowa's self-sustaining programs are recognized nationally and are being used as models in a number of other states.

As part of the umbrella, the DNR offered competitive grant programs totalling \$1.9 million. Grants were available to individuals, businesses, local governments and others to deliver cost-effective and environmentally sound energy conservation and renewable resource projects. A vast array of projects were funded through two cycles of the competitive grant program, including lighting retrofits,

energy management finance programs for hospitals and non-profit organizations, energy management in hog confinement

operations, promotion of ethanol as an octane enhancer, weatherization programs for group homes, and several education- and research-oriented projects.

The transportation sector has received considerable funding for innovative projects. For example, the Department of Transportation (DOT) has received funds to implement statewide traffic light synchronization; to develop an intermodal transportation site; and to provide grants and loans for local transit companies to complete energy management projects such as improvements to facilities or scheduling of routes.

The intermodal transportation project is a revolving loan fund which teams up the DOT, Quad Cities Container Terminal Corporation, the City of Davenport and the Soo Line

Railroad in an effort to construct a doublestack container terminal in Davenport. This project will prevent back hauling of trucks of freight that pass through Iowa by rail resulting in substantial energy and cost savings. The bottom line is to provide a more energy-efficient means of handling and transporting to a more energy-efficient means.

The DNR has been interested in exploring and introducing programs which transcend all energy-consuming sectors of our society -- effectively reducing the current levels of consumption and replacing nonrenewable energy sources with renewables when possible.

Oil overcharge monies have afforded Iowa an opportunity to assess its needs and develop a coordinated plan which will address all energy-consuming sectors. With the experience and information gathered to date, the state is in a better position to link energy, the environment and the economy and maximize the impacts of our programs.

Together with aggressive legislation, oil overcharge funds have escalated Iowa's leadership role in energy management. From a crisis came a goal to prevent crises by making Iowa less vulnerable to the rise and fall of world oil markets. To do that, we must increase energy efficiency and the use of alternative energy resources. Although the majority of oil overcharge funds have been spent, they have put Iowa in a better position to take charge of its own energy destiny.

Sharon A. Tahtinen is the supervisor of the transportation and planning section of the DNR's energy bureau.

The lion's share of the state's allocations has been dedicated to the energy-related components of Iowa's comprehensive groundwater protection program and the weatherization program for low-income residents.

Everything Old is New Again

Early humans left only bits of bone, stone tools and charcoal as evidence of their stay on earth. Even in these fragments however, they left behind a record of individual recycling efforts. Remains of stone tools show evidence of "remanufacture" from larger, undoubtedly broken tools.

Recycling by individual households has a long history in Iowa. It stretches from those first residents and their stone tools to later Native Americans' use of all parts of the buffalo for food, raw materials, tools and clothing, and on to homesteaders' and settlers' first farms. On those farms one either "used it up or wore it out," even when "storebought" goods finally became readily available. Glass or ceramic containers were "stoppered" or corked to hold a variety of liquids until the bottles or jugs finally broke. Clothes were used until threadbare or scaled down for other family members until the final, small scraps were pieced to become quilts used as bedding and decoration. And, during WWII, saving and sorting out tin cans, iron, tires and paper was as much a part of the homefront war effort as victory gardens and war bonds.

Today curbside recycling is a continuation of these individual household efforts. Separating

Article by Kathryn Stangl
Photos by Ron Johnson



Lee County's curbside recycling program includes every-other-week pickup. Households are asked to sort their trash into basic recyclable categories. Annually, their efforts save approximately a quarter-ton of garbage per household from going to the landfill.

recyclables from the waste stream is part of the daily routine in more and more homes across the nation. Many think recycling is only feasible on a large scale -- at government complexes, large institutions or industrial sites -- but individual recycling works well when designed as a curbside collection program. Here in Iowa, one curbside recycling program has drawn a great deal of positive attention.

Lee County's curbside collections began as a pilot program in March 1988 with a \$200,800 grant from the DNR's Landfill Alternatives Program. In October 1988, it became a full-time operation. Initially, the operation covered only the city of Fort Madison, but Montrose and six subdivisions were added in January 1989, Keokuk in July 1989, and Westport and Donaldson were added in January 1990.

Education and organization are important tools for a successful curbside program and Lee County's program has both.

The program's educational efforts reach out to the schools and community by debunking some common recycling myths. *'It is too hard too do.'* *'It takes special tools.'* *'It takes a lot of space and it is dirty and attracts pests.'* *'It is too time consuming.'* were commonly heard complaints, says Ron Mace, director of the Lee County Solid Waste Commission.

"Really, it is simple requiring only the rinsing of bottles and cans, and sorting them into the proper containers," says Mace. "Water is necessary to rinse off food and beverage residues and a bottle brush makes rinsing easier. A screw-driver or needle-nosed pliers helps remove the metal rings from bottle necks. Armed with these items and some grocery sacks you have all the 'special tools' you need.

According to Mace, rinsed and

packaged items stored for recycling require only slightly more space than unsorted trash. It is actually more sanitary and pest-free than "regular" trash. And, actually, sorting and preparing recyclables takes two minutes extra per day, less time than feeding pets or watering plants.

"When people see that they set out only two bags of 'regular' trash instead of four, they can instantly see that their efforts make a difference," says Mace. "Comments, now, are more like -- *'This is not nearly as hard as I thought it would be.'* or *'We should have been doing this all along.'*

"We extended the life of our landfill by five percent last year and that is something people can easily understand," says Mace. "The program's participation rates mean that every other week, 20 pounds of garbage per participating household, stays out of the landfill. During a year, that is more than 500 pounds, a quarter-ton of garbage per household that does not enter our waste stream and take up space in our landfill."

The benefits of participating in the curbside program stretch far beyond these obvious, very visible signs. By reducing the amount of energy (primarily from fossil fuels) necessary to extract, transport, process and refine raw material into new products, recycling helps prevent further destruction of the ozone layer and consequent global warming.

For example, using wastepaper saves 10,000 kilowatts per ton of paper produced. And, for every million tons of scrap iron used in manufacturing, the energy equivalent of three million barrels of crude oil is saved. Recycling scrap aluminum requires only five



percent as much energy as is required to produce it from bauxite ore. Looking at it another way, each beverage can recycled saves the energy equivalent of six ounces of gasoline.

In fact, while the money received from the sale of recycled materials is one of the first benefits seen by the public, at today's energy costs, the energy savings from recycling equals three times the revenue from recycled materials.

Continuing education is an important part of Lee County's efforts, and recent results demonstrate the wisdom of that approach. Following an Earth Week promotion of the program, participation in Fort Madison increased 30 percent during the next week. Another recent educational effort tied into Earth Week culminated in 100 percent participation in a wastepaper collection program among schools across the county. All paper used in the schools is now collected for recycling.

The organization behind the curbside program appears simple, but that belies the attention to detail, market investigation and storage designs that are the backbone of the Lee County program.

Looked at simply, each participant in the program receives a plastic bucket, a burlap bag and a brochure telling them how to sort their household waste. The basic recyclable categories are newspaper, corrugated cardboard, high-grade paper, glass, aluminum, textiles, motor oil, tin cans, plastic such as milk and detergent bottles

and lead-acid automotive batteries.

Households prepare their wastes by placing rinsed plastic containers (caps removed) and

rinsed tin and aluminum cans in the burlap bag. Rinsed, unbroken glass containers with caps and neck bands removed are placed in the

bucket. Clean clothing is bundled and placed in a plastic sack. Newspaper, with the glossy, magazine inserts removed is stacked inside grocery bags and corrugated cardboard is flattened and bundled. High-grade paper, including typing, notebook, ditto, mimeo, photocopy and writing paper, is sorted into white and colored paper and sacked.

The lead-acid batteries are set out for collection and motor oil is placed in a sealed container. The sorted recyclables are then placed at the curb by 7 a.m. on the day of their every-other-week pickup.

At the recycling center, materials begin their transformation from "old" to "new." (See chart at left.)

Recent improvements to Lee County's program include newly designed, 10-compartment roll-off units

used in small, unincorporated areas with populations below 300. These units are used as community drop-offs and are monitored and emptied when full. Participation in these predominantly rural areas appears to be high. A commercial pickup program also collects wastes -- primarily glass and plastic bottles, corrugated cardboard and office waste paper -- from interested businesses.

To comply with the state ban against the landfilling of yard wastes effective January 1, 1991, the program has had a drop-off site where yard waste was composted and branches were chipped. Starting this month the curbside program will utilize a new collection program for yard wastes. Participants will initially pay 75 cents for a 30-gallon bag constructed of brown kraft paper. This container, filled with leaves or grass clippings, can be run through the grinder prior to composting. By using this container there is no need to worry about nondegradable bags contaminating the compost.

In nature's cycle of birth, growth, death and decomposition nothing goes to waste. Matter and energy run again and again in endless cycles. Iowans need to follow Lee County's example and return our "used goods" to the production cycle instead of burying them unused to truly waste in a landfill. A throw-away society leads inevitably to pollution and depletion of our natural resources. Recycling promotes an environmentally stable future while still providing raw materials for our consumer society.

Well-organized efforts with high individual household participation such as Lee County's curbside program make it easy to have "everything old new again."

Kathryn Stangl is an information specialist for the department's information and education bureau in Des Moines.

Products Made From Recycled Materials

Glass

New glass containers, glass wool insulation, brick terrazzo, glassphalt, abrasives, reflective paint, ceramics, reflective signs, plastic/glass compounds, glass "bricks"

Aluminum

Aluminum ingot to make doors, window frames, lawn furniture, beverage containers, any kind of extruded aluminum products, tools, utensils, tentpoles, boats

Textiles

Industrial wipes (cleaning cloths), remanufactured clothing, raw textile material for primarily foreign markets

Motor Oil

New motor oil, fuel for waste-oil furnaces

Plastic

Plastic film, traffic/parking barriers, fiberfill insulation, drainage pipe, flower pots, artificial flowers, garbage bags, utensils such as appliance handles, plastic bottles for non-food liquids, water sport items such as water skis and toys, boat hulls and sails

Newspapers

New newsprint, cereal boxes and other food packaging, industrial packaging and wrap, wallboard, cellulose insulation, molded paper products such as egg cartons and paper mache items

Corrugated Cardboard

New corrugated packaging, tissue products (industrial paper towels and wipes), box board (cake mix, tissue packages)

High-Grade Paper

New "high-grade" office papers (notebook, copy, typing, computer, etc.), tissue products

Lead-Acid Batteries

New lead-acid batteries

Tin (actually steel) Cans and Appliances

Tin ingot, steel piping, steel castings, manhole covers, new cans and containers, automobile parts

Yard and Organic Waste

Compost used as a soil conditioner

WARDEN'S DIARY

Famous Last Words In Boating by Chuck Humeston

When it comes to working navigation enforcement, sometimes situations and statements come up that I just do not understand. It makes me wonder if I'm out of sync with the world.

For example, I can buy a \$15,000 car which can travel up to 65 miles per hour on some highways, and I have to pass a course of instruction and be licensed in its operation, but I can buy a boat costing just as much and can travel just as fast, and to put it on the water I don't have to know a thing about it.

And why does a great hue and cry arise about drinking and driving in a car until it is legally and socially unacceptable (very simple--it kills!), but drinking and operating a boat seems to be "recreation"? Does it not kill too? I know it does -- I've seen it happen.

I ponder things like this. Am I missing something? Once in a while other things happen on the water leaving me perplexed and scratching my head. Here's one case in point.

A young couple was having a problem sliding their boat off a trailer at a ramp. Motoring up to them, I could see water spewing like Old Faithful into the hull through the drain hole. I jumped into the boat asking, "Where is the plug?" The owner had no idea. I yelled, "Turn on the bilge pump!" The owner had no idea about that either. We were sinking at the ramp.

Running to the bow, I hooked up the winch line and gave a couple of cranks, promptly snapping the line due to the weight of the boat. No matter -- by now the boat had settled solidly on the back half of the trailer. Trying to pull out the boat with the attached car caused the car to skid off the ramp.

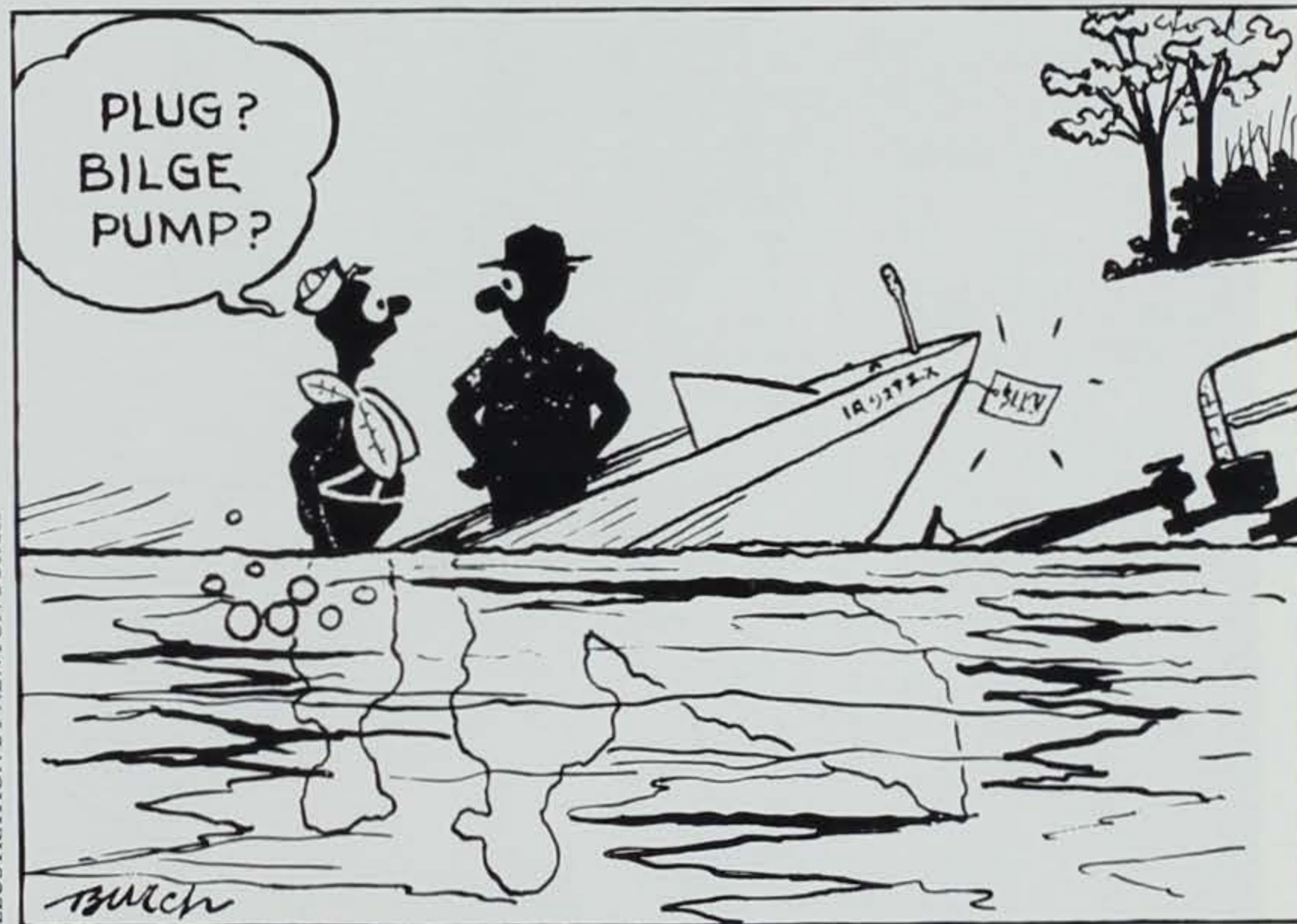


ILLUSTRATION BY NEWTON BURCH

A good samaritan in a four-wheel-drive hooked on to everything and pulled it out. The owner walked up to me, and said, "Thanks, we just got the boat, and we've never been boating before." Imagine my surprise!

A man who had a pontoon boat with a 9.9 horsepower motor asked, "Do I need to have a fire extinguisher?" I replied not at that horsepower. He said, "I just wondered, we like to go out on the lake, set up the grill and cook a few steaks." I pointed at the two fuel tanks, and asked if it wouldn't be a good idea to take along a fire extinguisher anyway. He agreed, "Yeah, I guess it would."

A boat pulling a water skier passed me on the Iowa River. I noticed the skier was wearing a ski belt. Stopping the boat, I waited for the operator to pick up the skier, and I pointed out that the belt did not meet regulations. The skier held the belt in front of my

face, saying, "Maybe you've never seen one of these before." That's true, I haven't seen one, I've seen hundreds. He told me, "I won't wear a vest. They're too tight." I explained the danger in hanging upside down in the water with a belt wrapped around your legs. Well, he left unhappy, yelling he was going to sell his boat.

A person was riding on the bow. It's perfectly legal, but I have to stop them anyway to point out the danger involved. "But it's fun with the wind blowing in my face." Would it be fun to have the prop run up your back when you fall off? Boats have terrible brakes. I don't get it. Do I just not like to have fun?

Finally, doing a safety check and finding no life jackets, you hear the classic, "We were just going across the lake, besides, we can swim."

Famous last words.



B A D G E R

The Ultimate Four-Wheel-Drive Animal

Article and photos by Lowell Washburn



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When backed into a corner by an over-zealous observer, most kinds of wildlife will go the other direction. There are two animals, however, that can pretty much be counted on to violate this rule — the northern water snake and the badger. Both possess a vile temperament and, more often than not, will come straight toward you — very fast and very mad.

The badger pictured on this month's cover is no exception. Within seconds of having his portrait snapped, this large male came boiling out of his den with a hair-raising snarl that left little doubt as to his intentions. I took the hint, and sprinted due south with the boar's jaws snapping at my heels.

Satisfied that I was leaving the area, he turned his full attention to my companion, DNR furbearer specialist, Ron Andrews, who likewise lost no time in leaving the vicinity. So, did two grown men feel somewhat foolish over being chased from the premises by an animal that probably didn't stand over a foot and a half tall? Not in the least. You see, no one (at least those in their right mind) sticks around to mess with the business end of an irritated badger.

Other animals don't fool with the critter either, making

the badger one of the few species with virtually no natural enemies. Most dogs won't take on a badger, and the survivors of those that do have the sense not to try the stunt again. Dachshunds were supposedly developed to fight and kill badgers. Because dachshunds were built low to the ground they could supposedly kill a badger before it could get to and shred their underside. It all makes for a good story, but I'd have to see it to believe it.

Aside from its acidic disposition, the badger is perhaps best known as nature's champion earth mover. Excess dens are eagerly utilized by species which seldom, or never, excavate their own sites such as fox, bullsnakes, skunks, and burrowing owls. However, most tunnels are a by product of hunting activities which focus on the underground pursuit of pocket gophers and ground squirrels. Historically, this has

resulted in a "catch 22" relationship with farmers and ranchers who hate the rodents but also hate badgers because of the holes they dig while eliminating these pests. Before the days of modern agriculture badgers suffered the same image problems with cowboys, and before that with buffalo hunters who often sustained serious injury when a running horse snapped a leg in the badger tunnels that dotted the prairie.

A badger in hot pursuit of its prey is a sight to behold with all four feet scratching and throwing dirt up to three feet into the air. It is a well-known fact that a badger can easily out-dig a person with shovel. One notable exception was Sherwood Loops, former caretaker of the Regular Baptist Camp located along Clear Lake's north shore. One year during the late 1960s, a pair of wondering badgers moved into the camp and began voraciously tunneling after the resident population of 13-lined ground squirrels. The camp is noted for its immaculate appearance, and the ensuing craters were more than Loops (now retired) could bear.

Armed only with a sand shovel, he set out to evict the pair. It should be noted that Sherwood Loops was what I would refer to as your "old-time strongman" — the likes of which our push-button society is no longer capable of producing. And in a never-to-be-forgotten demonstration of shovelmanship, Loops out-dug and removed not one but both marauding badgers. I have always wondered if that feat shouldn't have qualified him for the Guinness Book of World Records.

In earlier times, the badger's two-tone pelt was in great demand for producing the famous badger

hair shaving brushes that graced the medicine cabinet of every 19th century home. Although still legal today, the badger goes largely unnoticed by modern trappers.

As with other prairie wildlife, the badger has been greatly reduced in numbers. But in Iowa, the population appears stable. Badgers still occur in all 99 counties with the greatest densities in the grasslands of central and western Iowa.

In spite of the pressures of civilization, the badger remains largely unchanged. It is the ultimate four-wheel drive animal that goes where it pleases when it pleases. Some animals survive because they learn to adapt.

The badge is still here simply because it's tough.



Continuing Quality

Water quality standards are adopted by every state. These standards include a designated use, such as fishing and swimming, for bodies of water and prescribed numerical criteria to protect that use. The criteria are pollutant-specific and represent permissible levels of substances in Iowa's streams and lakes that enable the intended uses to be achieved. Water quality standards are the basis for nearly all water quality management decisions and are used to control or reduce pollutants.

Because states are required to review and revise their water quality standards every three years, the DNR recently adopted rules establishing new standards. To meet this federal mandate, water quality standards were adopted that introduce new use designations, provide a more detailed description of the mixing zone, add numerical criteria for additional chemicals, and identify both acute and chronic toxicity levels for these chemicals. The standards are enforced to protect the public health or welfare and enhance the quality of water.

New Use Designations

The water quality standards now include use designations for lakes and wetlands, limited resource warm-water streams and significant resource warm-water streams. Previously there was only one use designation, that included all three of these uses. The uses were separated to provide the flexibility needed to protect Iowa streams.

In addition to these new use

designations, the use designations for whole body contact, drinking water supply, high quality resource and high quality waters remain the same.

In designating uses for a water body, physical, chemical and biological characteristics of the water body are looked at. The geographical setting, and scenic qualities, and the socio-economic and cultural characteristics of the surrounding area may also be considered.

Use designation have not been set for all water bodies. This will take place over the next three years and citizens are encouraged to provide the DNR with information indicating how they think their favorite stream or lake should be classified.

Numerical Criteria

Numerical criteria, was already in place for some pollutants. To assure that criteria for all pollutants that are discharged into Iowa streams were available, 14 chemicals were added to the water quality standards. Numeric criteria for these chemicals provides the tools necessary to control discharges of wastewater into Iowa's streams. The numeric criteria will be reviewed every three years to assure Iowa's streams are being protected.

Mixing Zone Description

In order to assure that discharges of wastewater are not affecting the water quality in a stream for long distances, specific rules were added that limit the distance downstream from the

discharge pipe that can be affected — in other words, limiting the area pollutants mix within the stream. Actually, two mixing zone requirements were adopted, one for ammonia and another for all the other pollutants.

Generally, the distance to the juncture of the next stream downstream from the discharge, distance to a public water supply intake, recreational areas, bends in the stream where water moves from one bank to the other and to the next mixing zone, will be taken into account. If none of these factors are involved in setting the mixing zone length, then the length of the mixing zone will be limited to 2000 feet.

The width of the mixing zone is also covered in the water quality standards. The principle behind establishing a width for the mixing zone is to assure that aquatic organisms can pass by the discharge without being affected by the wastewater. In most cases the width is set at 25 percent of the width of the stream at low flow conditions.

Acute and Chronic Toxicity

Specific criteria are now included in the water quality standards to protect aquatic organisms from both acute and chronic toxicity. Previous standards primarily protected for chronic toxicity.

Acute toxicity protection means aquatic organisms will not be subject to an immediate, severe impact when wastewater is discharged into a stream. This may mean cities and industries will

by Darrell McAllister

Monitoring Iowa's Water Quality

Along with setting water quality standards, the Department of Natural Resources has a network of fixed monitoring stations to regularly check the quality of Iowa's water. The map below indicates where samples are taken, monthly or quarterly. The water quality data is reviewed quarterly, or more often, if necessary, to determine if there are problems

needing immediate attention. By evaluating this information, the DNR is able to determine if the body of water's intended use is being met, and the control programs are working.

The DNR also does intensive stream surveys designed to identify specific problems or show improvements after new treatment plants have been built.

have to provide additional treatment to meet this standard.

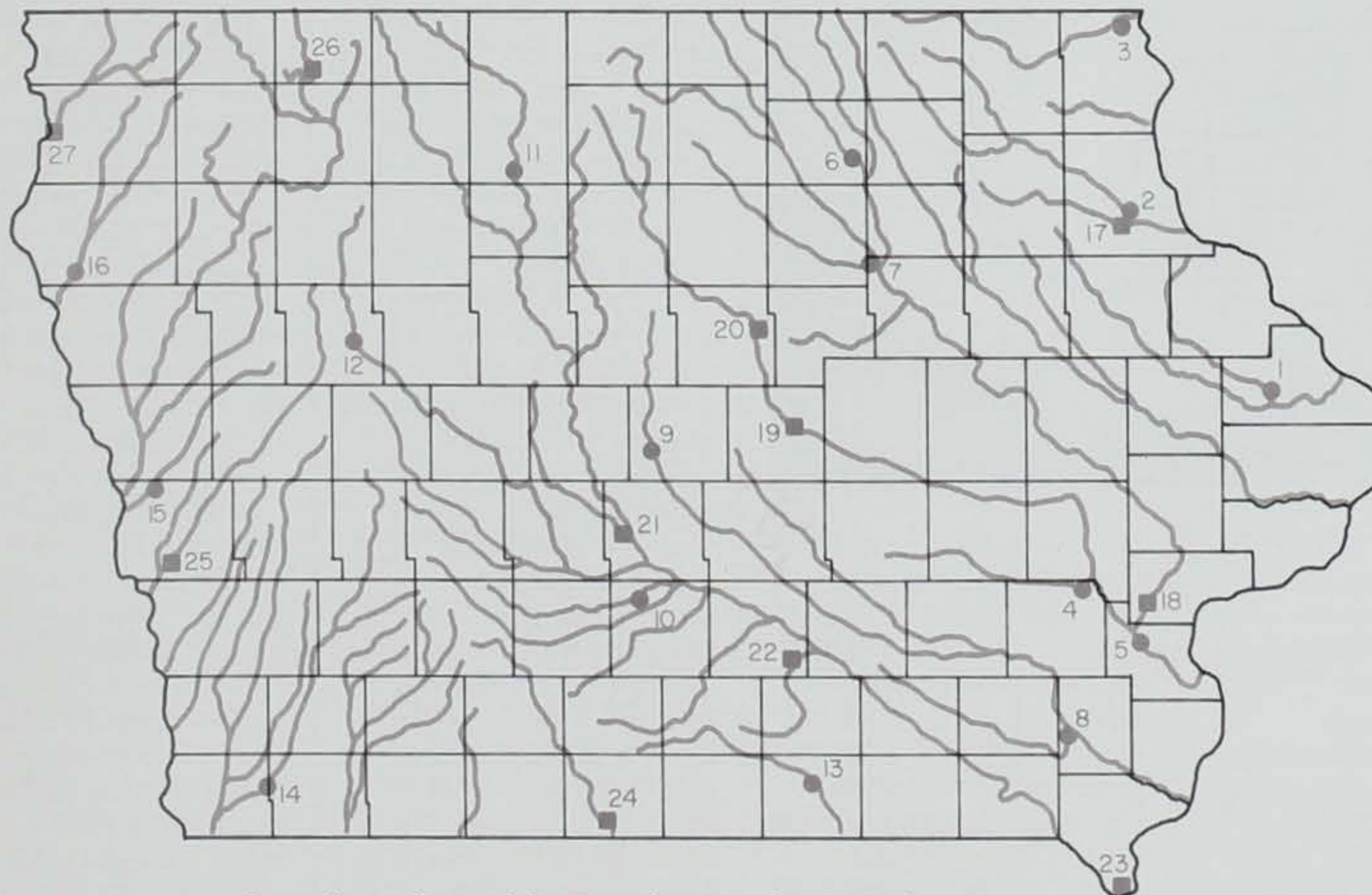
Chronic toxicity protection means the levels of pollutants in a river, over a long duration, will not cause an adverse effect on aquatic organisms.

Overall, it is expected the new water quality standards will protect and improve the quality of Iowa's streams and lakes. Improvements will be seen as the standards are implemented and wastewater treatment plants begin meeting more stringent requirements. We also expect to see some cities increase their rates for construction and operation of wastewater treatment plants in order to meet these standards. So when you notice an increase in your monthly bill, remember it is going towards protecting the lakes and streams we all enjoy.

Stream/County

1. N. Fork Maquoketa/Jackson
2. Volga/Clayton
3. Upper Iowa/Allamakee
4. English/Washington
5. Iowa/Louisa
6. Cedar/Floyd
7. W. Fork Cedar/Black Hawk
8. Cedar Creek/Henry
9. South Skunk/Story
10. North/Warren
11. E. Fork Des Moines/Kossuth
12. North Raccoon/Sac
13. Chariton/Appanoose

14. E. Nishnabotna/Fremont
15. Soldier/Harrison
16. Floyd/Plymouth
17. Turkey/Clayton
18. Cedar/Muscatine
19. Iowa/Marshall
20. Iowa/Hardin
21. Beaver Creek/Polk
22. Cedar Creek/Marion
23. Des Moines/Lee
24. Thompson/Decatur
25. Boyer/Harrison
26. Little Sioux/Dickinson
27. Rock/Sioux



Locations of monthly ■ and quarterly ● stations.

Darrell McAllister is chief of the department's surface and groundwater protection bureau in Des Moines.

CONSERVATION UPDATE

ISU's Solar Car Readies For Race

by Kristen Andrews, energy information intern

Powered by sunlight, the latest technology and more than 30,000 hours of hard work, an ISU-built car will compete in a national solar auto race. A corp of volunteer students at Iowa State University and their solar-powered car, PrISUM, have earned a position in the General Motors Sunrayce slated to begin July 9.



The ISU car is one of only 32 cars competing in the Sunrayce which begins July 9 in Orlando, Florida, and concludes July 19 in Warren, Michigan. Powered by the sun, the PrISUM can reach speeds of 35 mph, and with battery assistance can attain speeds as high as 60 mph.

The Sunrayce will be the first transcontinental solar car race ever to be held in the United States and will cover 1,800 miles of highway. The competition will set out from Disney World in Orlando, Florida and end up at GM's technical center in Warren, Michigan. A staged race, the Sunrayce will progress over eleven days with

timings recorded daily. The car with the shortest total time at the end of the race will be the winner.

ISU was one of 32 schools selected for the nationwide contest out of 100 schools that entered. The PrISUM project will cost approximately \$150,000. Without any state assistance the solar car undertaking will be funded entirely by private donations, \$50,000 of which have already been raised. Even at \$150,000, PrISUM has a modest price tag compared to some cars in the competition which are expected to cost half a million dollars.

"Energy efficiency is the key to our design," said Dr. James Hill, professor of chemical engineering at ISU and faculty advisor for the project. Basic functions such as turn signals and the horn have been modified to save 80 percent of the normal energy output.

PrISUM is powered by an array of more than 700 solar cells and is propelled by a state of the art electric motor. The revolutionary car also has a lightweight composite shell, an aluminum frame and two computers on board. The space-age design features a white exterior with yellow and red ISU decals, a silver hood and bluish-tinted solar cells at the rear of the car. It measures about 20 feet long and six feet wide. PrISUM should cruise at more than 35 mph on sun power and with battery

assistance could attain speeds as high as 60 mph.

The solar team is comprised mainly of engineering students, although there are no restrictions on who can become involved. The unique project has attracted students majoring in English, speech, finance, journalism and meteorology. And a textile and clothing major joined the team to design the car's seat.

"It's the perfect student project because it's multi-disciplinary and requires student collaboration," said Hill. "It's an environmentally benign technology."

"I would estimate that 100 people have worked on the project," said Kerry VanDer Kamp, a computer engineering major and project manager. "About 99 percent of what we do is done by the students."

The solar project was not without setbacks. VanDer Kamp explained some of the problems students encountered when ordering parts and their experiences with industry lag times.

"When you're in industry you expect materials to come two weeks late," said VanDer Kamp. "As students, we weren't aware of this."

The ISU solar team will travel to Florida with support transportation including lead and chase vehicles to act as buffers for the solar car since the race will take place on secondary highways with through traffic. The fleet will

also include an RV equipped with computer apparatus to serve as the command center for communication, and a route van to carry equipment for any on-the-road repairs.

"We'll have a virtual machine shop on wheels, including a portable welder," said Hill.

A pool of six drivers will be on hand to take turns driving PrISUM and meteorologists in Ames will keep the crew informed of weather changes via ham radio.

VanDer Kamp forecasts that the team's biggest obstacle will be the July heat. The sun that will power PrISUM's trek will also heat the enclosed cab to nearly 100 degrees, he predicts. The plan is to allot two- or three-hour shifts for the drivers who will wear "as little as possible," said Hill.

"No one will drive for an entire day," said VanDer Kamp.

Ironically the Sun-rayce finish line will only be the beginning for PrISUM. According to Hill the project will continue for years to come as an educational tool he hopes to share with grade schools, high schools and colleges around the state. In the near future, spectators can see PrISUM exhibited at the Iowa State Fair.

"We're confident of our chances to win the race," VanDer Kamp said. "But regardless of how we end up, I think it's been a very worthwhile project for those involved."

1989-90 Small-Game Harvest Results

Iowa small-game hunters had a better year in 1989 than in 1988 according to Terry Little, wildlife research supervisor for the Department of Natural Resources.

The estimated Iowa pheasant harvest was 1.44 million roosters, up 27 percent from the 1.14 million of 1988. The number of resident and non-resident pheasant hunters increased four percent to 211,500 in 1989. The number of pheasants taken per trip increased to more than 1.6 roosters. The 1988 estimate was about one rooster per trip. The distribution of pheasant-hunting trips and harvest returned to more average patterns in 1989. In 1988 more than half the kill and 43 percent of the trips occurred in the opening two weekends and intervening week. In 1989 approximately 39 percent of the kill and only 27 percent of the trips took place in this period. "This pattern is more typical of hunting seasons, when pheasants are more plentiful and hunters continue to be successful later in the hunting season," said Little.

The quail harvest rebounded to 426,000 birds, up by nearly 50 percent over the previous season. Quail hunters increased to 80,000 -- up 10 percent. Hunters averaged 1.4 quail in the bag per trip.

The Hungarian or



Pheasant hunters harvested a record number of roosters during 1989 -- more than 1.4 million birds. This figure represents a 27 percent increase from 1988 when 1.1 million birds were taken.

gray partridge harvest increased 14 percent over 1988 to 118,000 birds. This is a record high harvest, breaking the 1987 record of 109,000 birds. About 18 percent of Iowa's small-game hunters pursued partridge.

The 1989 squirrel harvest was estimated at 583,000, a 14 percent increase over last year. A decade-long decline in squirrel hunter numbers was halted and increased six percent to 81,000 in 1989. Squirrel hunter numbers are still only about half the 1963 estimate.

Cottontail rabbit harvest changed little from last year, up three percent to 436,000. A similar increase in rabbit hunters was noted.

More than 2.58 million small-game hunting trips were taken in 1989. "Pheasant and quail hunting were generally better over most of the state in 1989,

and this accounted for the increased harvest on most small game animals," said Little. "Many of the partridge, squirrel and rabbits harvested are taken by hunters that are basically bird hunting. The two-year drought in southern Iowa produced generally poor hunting in our traditionally good pheasant and quail range, but game bird populations were much better north of Interstate 80 and hunting was good to excellent wherever habitat was found. The best populations were associated with Conservation Reserve Program (CRP) set-aside land."

According to Little, the increased rainfall in most areas of Iowa this spring should improve nesting conditions in 1990. Given average weather conditions during the rest of the spring and summer, an excellent fall hunting season is expected.

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

Natural Resource Commission:

--July 12, Estherville

--Aug. 9-10, Clear Lake

--Sept. 6, Missouri Valley

Environmental Protection Commission:

--July 16-17, Des Moines

--Aug. 20-21, Sioux City

--Sept. 17-18, Des Moines

State Preserves Advisory Board:

(The September meeting had not been set at press time. Please contact the above address for the date.)

Iowa Conifers Suffering From Winter Drying

Many homeowners and Christmas tree growers across Iowa are noticing that certain conifers or evergreen trees and shrubs are turning brown. The main cause seems to be winter burn or drying according to John Walkowiak, forestry projects coordinator for the Department of Natural Resources.

Winter burn was caused by Iowa's warm winds this winter that dried foliage and twigs when water uptake was restricted by frozen ground. In addition, the general lack of snow cover this year did not allow any protection for wind exposed trees and shrubs. According to Walkowiak "conifers such as arborvitae, Scotch pine and others exposed to these dry winds are now showing classic winter burn or drying signs." In most cases, reddening, browning and drooping of foliage became apparent in Iowa during late winter and early spring. "The amount of winter burn or drying appears higher this year due to complications from drought conditions the last few years," Walkowiak said.

If winter burn is severe enough, buds may be killed and later the affected branches. Sometimes the tree may die. Usually only a few buds are killed and trees produce new foliage.

The two best solutions to winter burn or drying is to plant species of conifers or evergreens that are more resistant to winter burn and to plant less-resistant conifers behind wind-protected areas. White pine, red pine, redcedar, Black Hills spruce and specific varieties of Scotch pine, blue spruce and white spruce hardy to Iowa winter conditions show the least signs of winter injury.

For existing trees and shrubs now showing signs of winter injury, tree growers should mulch with wood chips, prune out dead branches and water during periods of warm weather. Watering should be heavy (eight to 10 gallons per tree), but infrequent (every 10 days), and continue through the winter, especially for conifers. In late fall, winter-injury-susceptible conifers such as arborvitae may be covered with burlap to reduce loss of water from the foliage.

For more information on winter burn or drying contact the Forests and Forestry Division, Iowa Department of Natural Resources, Wallace State Office Building, Des Moines, Iowa 50319-0034.

22 Communities Designated As "Tree City USA"

Twenty-two Iowa communities received national recognition for proper management of their street and park trees

by being named 'Tree City USA' by the National Arbor Day Foundation.

'Tree City USA' designation was given to: Amana, Ames, Boone, Burlington, Cedar Falls, Cedar Rapids, Council Bluffs, Davenport, Des Moines, Dubuque, Dysart, Elk Run Heights, Fort Dodge, Harlan, Hopkinton, Hudson, Iowa City, LaPorte City, Maquoketa, Onawa, Rockwell City and Waterloo.

Communities entering the nationwide program receive 'Tree City USA' designation upon recommendation by the Iowa state forester. Communities qualify by having a tree board or forestry department, by having a city tree ordinance and forestry budget of at least \$1-2 per capita, and by observing Arbor Day.

"Trees have long been recognized for the beauty and value they lend to our homes, neighborhoods, parks and business areas. At the same time, these trees help clean the air and reduce global warming," said John Rosenow, executive director of the National Arbor Day Foundation.

"An effective community forestry program is an ongoing process of renewal and improvements -- a program of tree planting and care that continues through the years," said Rosenow. "Iowans should be proud of

these communities for their hard work and dedication to good forestry."

Wild Game Cook-Off At State Fair

A wild game cook-off will be held Aug. 25 during the Iowa State Fair. The contest is open to the public and deadline for entry form and fees is July 16.

Iowa's law enforcement officers will be the judges for the cook-off. Any recipe using fish or game of Iowa is permitted. Entrants should ensure they have the proper permits to possess game during the closed season. The prizes are: first place, 12-volt electric variable speed file knife; second place, *Warden's Cookbook*; and third place, *Waterfowl in Iowa*, a hard-bound book containing color plates of Maynard Reece paintings.

For more information and an entry form, contact the Iowa State Fair, Statehouse, Des Moines, Iowa 50319.

Warden's Cookbook and *Waterfowl in Iowa* can also be purchased separately. To order *Warden's Cookbook*, send \$10 plus \$2 postage to George Hemmen, Rte. 1, Box 105, Guthrie Center, Iowa 50115. To order *Waterfowl in Iowa*, send \$3 to Iowa Department of Natural Resources, Wallace State Office Building, Des Moines, Iowa 50319-0034.

Classroom Corner

by Robert P. Rye

Earth Day 1990 brought the environmental issues to the attention of educators, students and the public. Have you become more environmentally aware because of what you have done and learned from Earth Day? Try answering the following questions to see if you are environmentally aware.

- Name one gas that contributes to "global warming."
- Where is the "hole" in the ozone layer?
 - over the Arctic Circle
 - over Antarctica
 - over the U.S.S.R.
 - over North America
 - over the Indian Ocean
- What is the current, generally accepted rate of species extinction worldwide?
 - one per day
 - 10 per day
 - 100 per day
 - 500 per day
- Which of the following is being considered for declassification as an endangered species?
 - bald eagle
 - giant Panda
 - white rhinoceros
 - timber wolf
 - black-footed ferret
- What term defines a group of organisms of the same species living in the same habitat?
 - ecosystem
 - population
 - community
 - biosphere
- Name the four life support systems of planet earth.
- Which of the following does a tree NOT do?
 - put water in the atmosphere
 - generate oxygen
 - cool the atmosphere
 - absorb carbon dioxide
 - provide habitat
 - trees do all of these
- When is the sun lowest in the sky at noon?
 - spring
 - summer
 - fall
 - winter
- Which of the following activities contributes to ozone depletion?
 - manufacturing of computers
 - discarding a refrigerator
 - using hair spray
 - using air conditioning
 - all of these
- Name the five ways to dispose of solid waste.

ANSWERS:

1. CO₂, CH₄, CFCs 2. b 3. c 4. a 5. b 6. soil, water, air, sunlight 7. f 8. d 9. e 10. Reduce volume at the source; recycle/reuse; incinerate with energy recovery, incinerate for volume reduction; landfill.

COUNTY CONSERVATION BOARD FEATURE

Scenic Drive Along the North Raccoon River

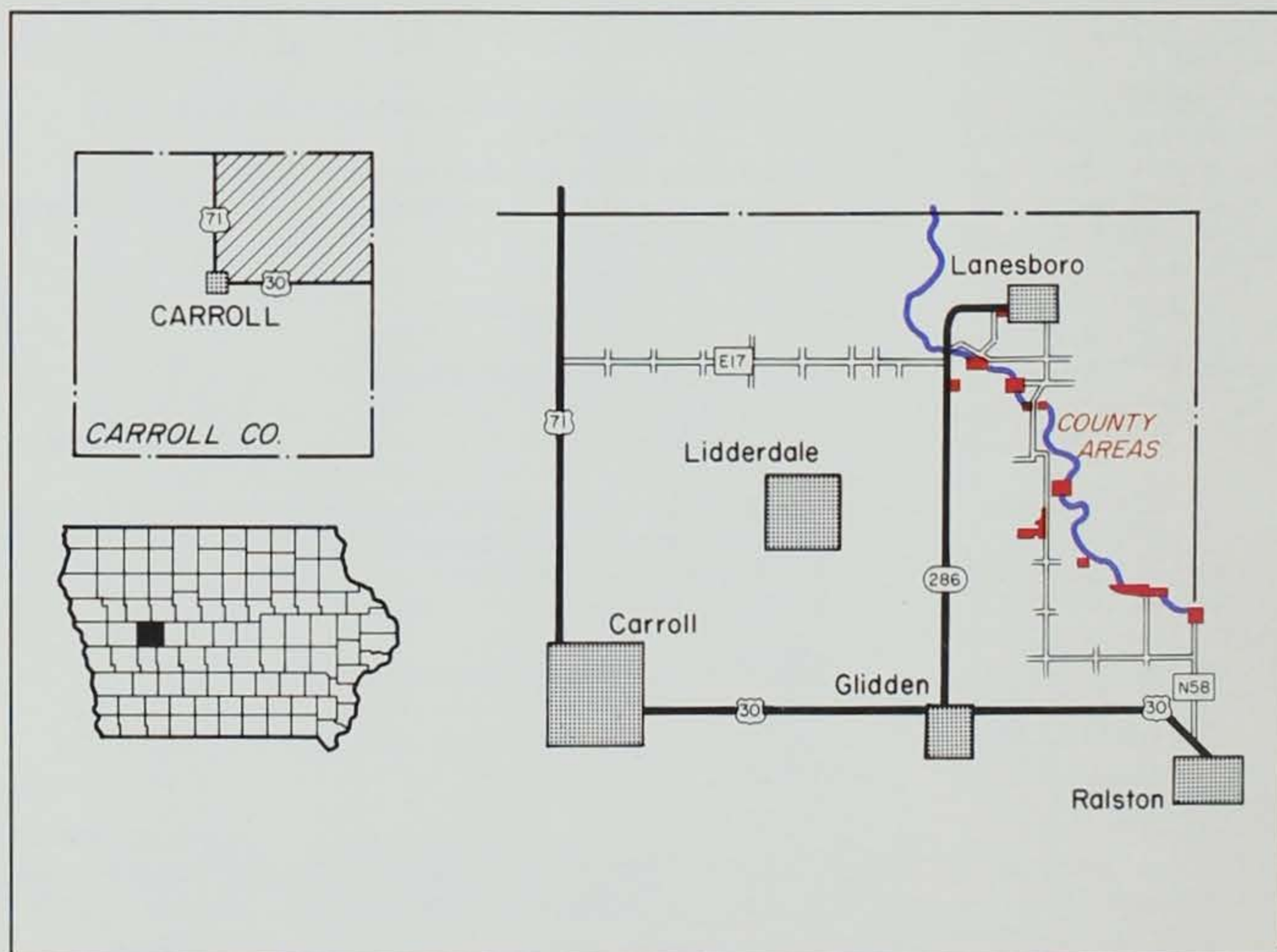
by Joe Halbur

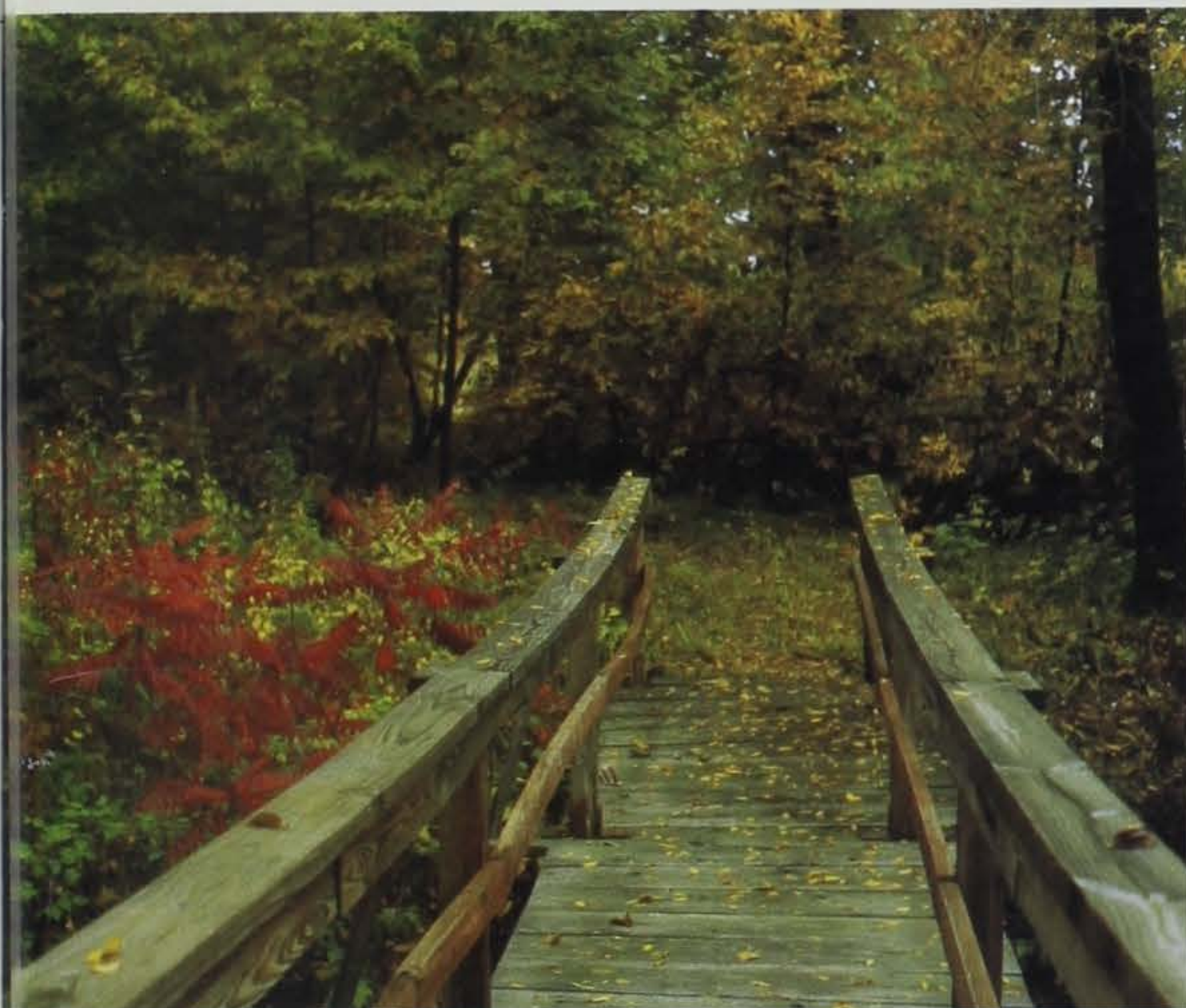


The bald eagle was perched on the naked branch of the tree overlooking the rock rubble dam. The bird had been perched for some time, watching for the chance to snatch a carp or catfish if it showed itself in the unfrozen water. The blue-sky backdrop was clear and bright. It was a postcard picture.

You do not have to travel to Alaska or the Mighty Mississippi to view scenes like this. You only need to travel along the North Raccoon River in Carroll County to enjoy and photograph these natural wonders as you drive along the Scenic Drive Route of northeast Carroll County.

The Scenic Drive Route follows the North Raccoon River





CARROLL COUNTY CONSERVATION BOARD

The scenic drive along the North Raccoon River passes by and through 11 natural areas managed by the Carroll County Conservation Board, including river access areas and woodland parks consisting of more than 780 acres. Visitors along the route are likely to catch a glimpse of several species of wildlife -- from bald eagles to white-tailed deer.

as it meanders through Jasper and Glidden townships of Carroll County. Be it spring, summer, fall or winter, the natural scenery viewed as the gravel and blacktop roads parallel and cross the North Raccoon River can be, as school children say, awesome.

Starting seven and one half miles north of Glidden on Highway 286, the Scenic Drive Route heads east on a gravel road and passes by and through 11 natural areas managed by the Carroll County Conservation Board, including river access areas and woodland parks consisting of more than 780 acres. The route ends on the Carroll-Green county line (County Road N58).

While traveling along the route, you may want to take the opportunity to enjoy these public areas. The river offers fine fishing for catfish, walleye and

smallmouth bass. Wildlife of all species appear as you take a leisurely drive along this 12-mile marked route. Two of the access areas have concrete boat ramps that offer canoeists easy access to the river. Many of the areas offer camping sites at little or no cost, and hiking trails tempt visitors at several of the parks.

County history tells about how the first white settler to Carroll County lived in this area because of all the natural resources it had to offer. More than 130 years later, the North Raccoon River Scenic Drive still attracts people who enjoy the outdoors. Come to Carroll County and see for yourself!

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

CALENDAR

JULY 21-22

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

JULY 29

Folk Arts Festival. Waubonsie State Park, Fremont County, is the location for a festival of folk artists such as wood carvers, blacksmiths and buckskinners. For more information, contact Waubonsie State Park, Rte. 2, Box 66, Hamburg, Iowa 51640, (712)382-2786.

JULY 21-22

Black Hawk Water Carnival. Carnival, street parade, water float, fireworks and 10k run at Black Hawk State Park, Sac County. For more information, contact Black Hawk State Park, P.O. Box 7, Lake View, Iowa 51450, (712)657-8712.

AUGUST 25

Iowa Wildlife and Hunting Photo Contest. Contest with two classes (amateur and professional) and two categories (color and black and white). Entry fee. For more information, contact Bert Hallewas, Black Hawk County Conservation Board, 2410 W. Lone Tree Road, Cedar Falls, Iowa 50613, (319)266-6813.

AUGUST 25-26

Iowa Game Fair and Outdoor Recreation Show. Black Hawk Park is the location for the fifth annual game fair. Events include shooting activities, outdoor recreation exhibits, seminars and demonstrations. For more information, contact Bert Hallewas, Black Hawk County Conservation Board, 2410 W. Lone Tree Road, Cedar Falls, Iowa 50613, (319)266-6813.

A Benefit to All

by Jim Hansen

It is quite obvious that many people in Iowa care about nongame wildlife — the hundreds of species ranging from butterflies to bald eagles, from shrews to turtles. The signs are everywhere. We put up bird houses and bird feeders. We wear butterfly jewelry, we decorate our walls with wildlife pictures and sculptures, and we buy clothing, greeting cards and mail boxes with birds or other wildlife on them. All of these things proclaim that "we care about wildlife," and it is great to know that so many people do care.

Beyond enjoying and being interested in nongame wildlife, how many of us give much thought to what all of these species need to survive? The key to wildlife abundance, be it nongame or game, is the same for all species — habitat. If we provide a suitable place, in all seasons of the year, with shelter, nesting areas, food and water, we will have wildlife.

In managing for wildlife we should try to concern ourselves with habitats and with populations of species, rather than becoming overly concerned about individual animals. For example, if an oriole flies into your picture window and injures or kills itself, it is unfortunate, but as long as the grove of trees next to your house remains intact, a different oriole is likely to return the following year. However, if the grove of trees is cut down, you will no longer have an oriole, even if it avoids your picture window.

I mentioned earlier the need to provide suitable habitat in all seasons of the year. We can provide suitable habitat in Iowa for resident species, those individual animals that never leave the state. However, species of migrating birds, are in Iowa for only a few



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months of the year, so we can supply their habitat needs for only that period of time. There is increasing concern about the effects of the destruction of the tropical rain forests in Central and South America where many of our migrant birds spend fall and winter. Be that as it may, it does not mean we should do less for a species in Iowa just because it is only here part of the year. Providing habitat for migratory species while they are in Iowa should be our contribution to the stewardship of an international resource.

So, how are we doing at saving our original wildlife habitat in Iowa? Not well at all, I am afraid. We have lost much of our original

habitat in the state, due primarily to changes for agricultural purposes, but also for cities, roads and other developments. Iowa has lost about 80 percent of its original forest area, 98 percent of its wetlands, and 99.9 percent of its native prairie.

With the loss of habitat, one might expect that most wildlife populations would have also declined. For most nongame wildlife species, such as frogs, snakes, turtles, shrews and butterflies, there is little or no quantitative data to document how numbers have changed. For birds, our most visible nongame animals, there is some quantitative data, but this data is very recent. Except for

Providing quality habitat is essential to proper stewardship of our wildlife resources, whether they are game or nongame species. Over a 21-year period Iowa's grassland species, such as the meadowlark (right), have declined significantly. Recent programs, particularly the Conservation Reserve Program, are helping supply needed habitat.



some general impressions we do not really know what changes have occurred from 50 to 75 years ago.

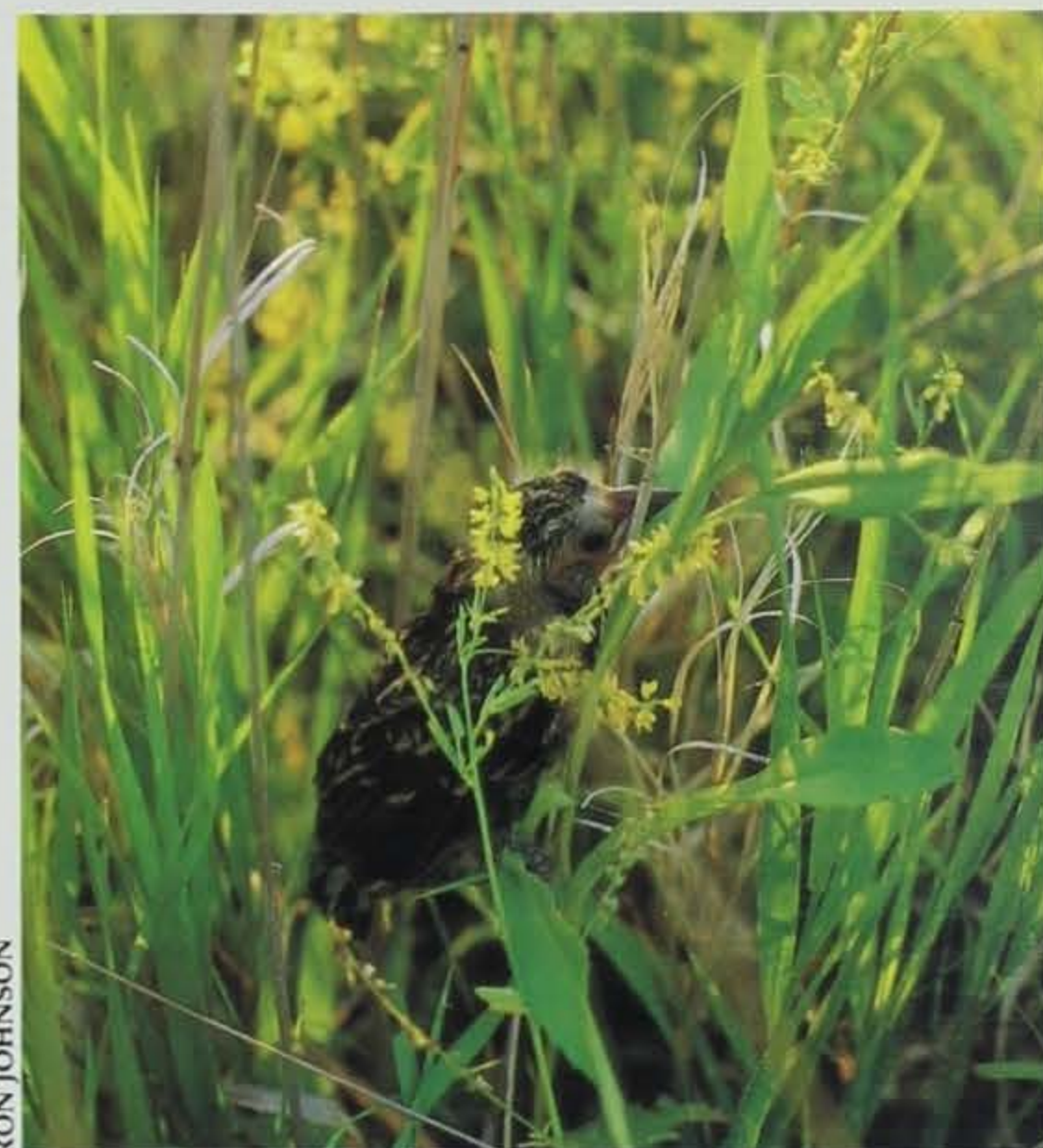
The bird population data we have for Iowa comes from 34 Breeding Bird Survey (BBS) routes that were set up by the U.S. Fish and Wildlife Service and run by volunteers each year since 1967. Each route consists of 50 stops a half-mile apart. At each stop an observer counts all the birds seen or heard during a three-minute period. Over a 21-year period, (1967-87) for which Iowa data has been analyzed, there has been a downward trend for many species, especially those associated with grasslands (or hayfields and small grain fields, the modern-day

replacements for native grasslands). The percent annual change (uncorrected for changes in observers) from 1967 to 1987 has been significant for grassland bird species such as the dickcissel, down 5.5 percent per year; grasshopper sparrow, down 4.5 percent; bobolink, down 4 percent; eastern meadowlark, down 4.1 percent; and western meadowlark, down 4 percent.

Even though hayfields provide some replacement habitat for grasslands, they are not necessarily comparable in producing nongame birds. A recent study of nongame bird use of Iowa alfalfa fields done by Brian Frawley and R. Louis Best of Iowa State University indicated mowing destroyed many nests, and for some species productivity was estimated to be below levels needed to compensate for nest failure.

There may be a bright spot on the horizon for Iowa's grassland nesting birds, however. The conservation Reserve Program (CRP) provision of the 1985 Food Security Act (1985 Farm Bill) pays farmers to take highly erodible land out of production for 10 years and plant it to grass or trees. Through the eighth CRP signup period in 1989, nearly 1.8 million acres had been put into CRP in Iowa, with about 30.6 million acres nationwide. Additional signups will add more acres to these figures. The vegetative cover on these areas should provide good habitat for both nongame and game species. On the down side, farmers in Iowa were allowed to mow hay and graze CRP land which resulted in nearly 139,000 hayed acres and 2,000 grazed acres -- about eight percent of the total acreage.

In addition to providing



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grassland habitat for wildlife, the Conservation Reserve Program has provided an excellent opportunity to restore drained wetland habitat. Creating shallow water areas for wildlife is an approved CRP practice, so landowners can still collect their payment on areas with restored wetlands. The Iowa Department of Natural Resources, the U.S. Fish and Wildlife Service, county conservation boards, and, most notably, many interested landowners have cooperated to restore more than 500 wetlands totalling more than 2,500 acres since 1987. These will provide habitat for many nongame and game birds and mammals, as well as frogs, turtles and other species.

We have not yet documented a resurgence in nongame species due to CRP, but it may well be occurring with the large acreage involved.

It will be interesting to look at the results of the Breeding Bird Surveys and other studies in three or four years to see if some increases do indeed occur.

In addition to the benefits of CRP to nongame wildlife, these species also gain habitat whenever a state, federal or county agency acquires an area and preserves or develops wildlife habitat. Although many worthy acquisitions

More than waterfowl will benefit from wetlands restored through the Conservation Reserve Program and Iowa's Prairie Pothole Joint Venture.

are made for wildlife, one project, in particular, is worth noting. As a result of the North American Waterfowl Management Plan, 35 counties in northwest and north-central Iowa have been included in what is called the Prairie Pothole Joint Venture. The Iowa DNR has set a goal of acquiring 2,000 acres of wetlands and adjacent uplands each year for 15 years in these counties. From mid-1987 through 1989, 5,283 acres were acquired. Money for the acquisitions has come from many sources, including the U.S. Fish and Wildlife Service, habitat and waterfowl stamps purchases by outdoor enthusiasts and contributions from many conservation organizations as well as interested individuals.

In addition to the 35 counties, the DNR and county conservation boards have acquired land for wildlife all across Iowa, with funding from many sources. The nongame program of the Iowa Department of Natural Resources depends on funding from donations on state income tax forms, and simply does not have money for large land acquisitions. Therefore, nongame species will continue to benefit from acquisitions funded primarily by those mainly interested in game species. The important point is these areas are needed by game and nongame species alike. The consumptive and non-consumptive users of our wildlife resources should not be working against each other because there is too much at stake. Stewardship of our wildlife resource, specifically by providing habitat, should be foremost in everyone's mind.

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

JERRY LEONARD



Iowa's Conservation Reserve Program Acreage (Totals by County*)

Adair	24,959.9	Grundy	1,446.5	Plymouth	26,079.7
Adams	31,447.4	Guthrie	33,324.6	Pocahontas	3,462.0
Allamakee	31,412.6	Hamilton	6,556.3	Polk	5,374.5
Appanoose	23,495.0	Hancock	13,770.7	East Pott.	5,769.2
Audubon	30,914.6	Hardin	6,709.2	West Pott.	6,063.2
Benton	17,600.7	Harrison	15,664.6	Poweshiek	40,317.8
Black Hawk	3,433.0	Henry	16,787.2	Ringgold	59,390.3
Boone	6,672.7	Howard	38,182.0	Sac	5,868.8
Bremer	7,541.8	Humbolt	1,438.6	Scott	2,919.9
Buchanan	5,283.3	Ida	12,094.6	Shelby	9,552.4
Buena Vista	5,349.3	Iowa	36,287.4	Sioux	8,874.1
Butler	28,634.0	Jackson	35,523.9	Story	5,183.7
Calhoun	5,180.3	Jasper	25,240.5	Tama	29,748.7
Carroll	7,014.9	Jefferson	22,750.6	Taylor	58,357.1
Cass	18,269.0	Johnson	18,664.3	Union	28,066.3
Cedar	14,610.1	Jones	15,125.3	Van Buren	32,941.3
Cerro Gordo	20,465.6	Keokuk	49,623.6	Wapello	17,942.4
Cherokee	5,742.6	Kossuth	13,800.0	Warren	12,796.7
Chickasaw	24,786.9	Lee	10,734.9	Washington	23,467.6
Clarke	33,169.8	Linn	16,826.1	Wayne	56,620.3
Clay	16,947.3	Louisa	16,581.4	Webster	3,292.3
Clayton	43,396.9	Lucas	34,052.8	Winnebago	23,893.5
Clinton	26,365.2	Lyon	8,389.8	Winneshiek	46,926.3
Crawford	27,498.3	Madison	23,041.8	Woodbury	55,306.2
Dallas	12,218.4	Mahaska	30,797.0	Worth	19,892.1
Davis	34,805.9	Marion	24,327.2	Wright	10,576.5
Decatur	42,531.7	Marshall	30,223.5		
Delaware	12,714.6	Mills	10,082.2		
Des Moines	6,797.5	Mitchell	14,185.8		
Dickinson	18,003.1	Monona	27,301.4		
Dubuque	18,222.3	Monroe	21,326.6		
Emmet	17,149.4	Montgomery	16,513.1		
Fayette	23,179.8	Muscatine	8,820.3		
Floyd	21,527.0	O'Brien	2,474.8		
Franklin	13,790.6	Osceola	4,852.4		
Fremont	13,197.3	Page	21,592.7		
Greene	7,827.7	Palo Alto	25,280.0		
				TOTAL	2,011,233.2

**Totals are following the ninth sign-up period, July 17, 1989 - August 4, 1989.*

Largemouth Bass Questions?

Ask Bernie the Biologist

Article by Bernie Schonhoff

Photos by Ron Johnson



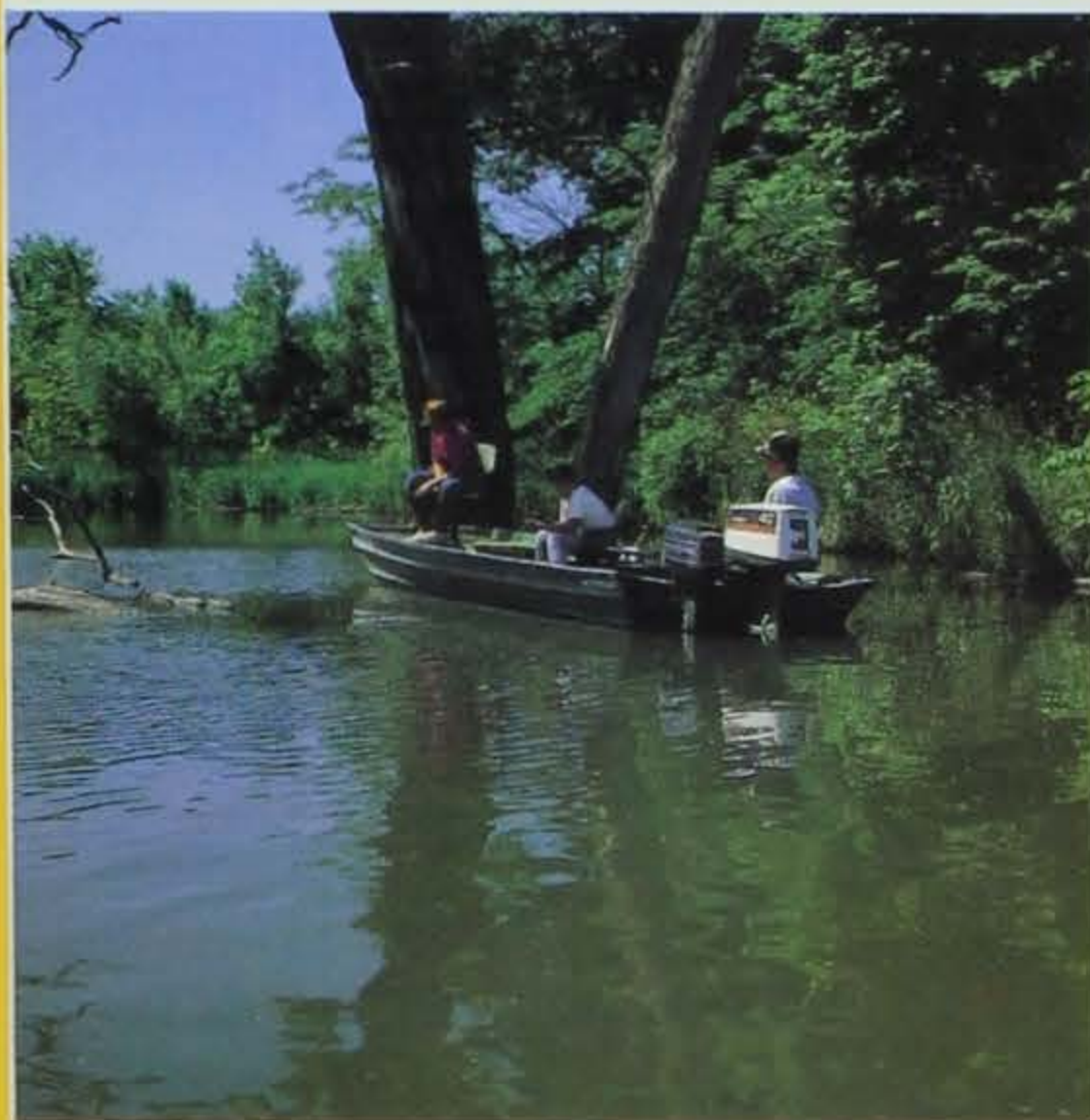
Today let's take the opportunity to answer some often-asked questions about largemouth bass, one of Iowa's more popular sport fish, and one that has received considerable attention from tournament promoters and anglers in the last few years. Although some of the information is specific to largemouth bass, much of the information is also true for most freshwater fish. The last three questions relate to largemouth bass in the Mississippi River, a slightly different environment from the lakes and streams scattered across the state of Iowa.

Q: *At what temperature does spawning begin for bass?*

A: In Iowa's latitude, spawning will begin when water temperature is somewhere between 63° and 68°F. The exact time also depends on what the water temperature has been for the previous few days. If it has been several degrees colder, it will take a couple days of warm weather for the eggs to finally mature.

Q: *What roles do the male and female have during the spawning process?*

A: The male has the most active role during spawning. He usually selects the nest site and prepares it by fanning a shallow depression in the bottom. He will then attempt to attract a female to the site at the same time guarding the site from other male bass or other fish that come too close to the area. During spawning the male may nudge or vibrate against the female as a way to induce her to release the eggs. As the eggs are released the male releases milt to fertilize the eggs. Once the eggs are in the nest, the male will guard them against all



Research on Mississippi River bass shows structure to be the most important "necessity." Excessive handling of a bass, or any other fish, can remove its protective "slime" layer, subjecting it to possible fungal infection.

intruders, and will often fan the eggs to keep them from being covered by bottom sediments and to keep oxygenated water flowing over them.

Q: How many eggs will a typical bass lay in proportion to its weight and age?

A: This depends on the condition of the fish, but in general a three- to five-year old female will produce a peak number of eggs. Fish younger or older lay fewer eggs. A typical female largemouth bass in good condition between three and five years will release 10,000 eggs. Bass ages one or two will have fewer eggs, as will bass age six and older, although the older fish may produce slightly larger eggs.

Q: At what water temperature do bass begin to "stress-out"?

A: In general the higher the temperature the faster the bass will become stressed. There are a couple of reasons for this. One, because bass are cold-blooded animals, their body temperature will be very close to what its surroundings are, so at higher temperatures the fish's metabolic rate is higher and requires more oxygen. At the same time, as the temperature of the water increases, the amount of oxygen the water can contain decreases. For example at 50°F the saturation level for oxygen is 11 ppm, while at 80°F the saturation point is only eight ppm. So just as the fish's demand for oxygen is going up, the amount of oxygen available is going down. Other factors, including excessive handling, will have an effect. In general, fish are very comfortable at temperatures below 70°F.

Q: It has been said that a fish can drown. Will you tell us a little about what this means?

A: This is rather a complex question that may require a little chemistry course to understand, but, here goes. First, the term "drown" may not be technically correct, but fish can take on water. Freshwater fish are said to be hypertonic to their environment. This means they have a higher

concentration of salts in their body than the water that surrounds them. If you recall from high school chemistry, whenever there is a high concentration of salts separated by a membrane (the fish's gills) from a low concentration of salts (the water), there is an osmotic pressure set up. This osmotic pressure is the tendency for things to move from an area of high concentration to an area of low concentration (the same reason sugar dissolves throughout your glass of tea). With this osmotic pressure to overcome, freshwater fish are constantly working to maintain what salts they have and to excrete excess water that is being forced in to dissolve the salts. When a fish becomes stressed, one of the first things that happens, is it loses its ability to osmoregulate (the ability to control the concentration of salts). When this happens, the fish begins to lose salts and gain water. When enough salts are lost or water gained, the fish may go into shock. For this reason, isotonic (having the same salt concentration as the fish) salt preparations are recommended in live-wells and holding tanks at fishing tournaments. Isotonic solutions relieve some of the work a fish has to do to maintain its salt balance. So, although the fish technically may not drown, it can die from having too much water to dilute its essential salts.

Q: Excessive handling of fish can cause it to contract a fungus. How long does it take for this disease to affect the fish?

A: The length of time it takes a fungus to develop depends greatly on the water temperature. The warmer the water, the faster the fungus can grow. In very warm water it may take only a couple of days for the fungus to affect the fish. Another important factor is the health of the fish. If the fish is in good condition, it can effectively fight the fungus infection. If the fish has been stressed, then its ability to fight any disease is reduced. One of the main defenses a fish has against fungal infection is its "slime" covering. Therefore, excessive handling or rough

treatment in a live-well, or with a landing net, can remove some of this protection and leave the fish open to infection.

Q: Do fish, particularly bass, change color with their environment?

A: Yes, Bass are predators and have the ability to change the colors on their bodies. If you catch a bass from discolored or murky water, you will notice it will be almost silvery. However, a bass from clear water will have very bold and contrasting colors. This helps camouflage the bass so it can capture food.

Q: What is the most important thing to bass -- food, structure, water temperature or pH?

A: Telemetry work on bass, in the Mississippi River has shown that structure is probably the most important. But, bass are predators that usually attack by ambush, and any type of structure would provide more hiding places than would open water. Therefore, bass may be using structure to orient to or as an ambush location which would provide more food. Telemetry has shown that bass will remain near structure rather than move to an area with preferable water temperature but no structure. There are limits to this when the water approaches lethal or detrimental temperatures. Temperature also has an effect on the amount of dissolved oxygen that water can hold. In general, the warmer the water, the less oxygen it can hold. Yet bass will remain near structure where there is considerably less oxygen rather than move to an area with higher levels of dissolved oxygen. I only have limited information on pH, but feel as long as it is within tolerable levels, the bass would remain near structure rather than seek a location with more preferable pH level.

Q: If bass are released at a site considerably up or downstream from where they were caught, will they migrate back to their original home? If so, how long will it take?

A: First of all, let's define a considerable distance and where

the fish remains in the same pool. If talking about a half-mile or less, the bass will probably return, but let's look at a more typical situation where the bass is hauled several miles and released. In this case, the answer to the question varies with the time of year. Information from Mississippi River studies shows that during the spring and summer fish are less likely to return to the location they were caught if they are moved a great distance. They will move about and, if they are fortunate, will find an area to support them. During the fall and winter periods, bass tend to congregate in certain areas of the Mississippi. These areas provide protection and desirable water characteristics to help the fish through the winter. Data indicates that bass which moved out of an area during the summer may return in the fall. These may be adaptive strategies developed by the bass to help it survive the winter and an anticipated spring flood. In telemetry work on the Mississippi less than half the fish returned to the location of capture and those that did took several months to do so.

Q: In the winter, do river bass seek deep holes or ledges and steep drop-offs?

A: There has only been a limited amount of information collected on winter habitat of bass in the Mississippi River. In those studies, the area used by bass in the winter would be described as a backwater protected from the current, but with a connection to the current to allow for the exchange of oxygenated water. In my studies, the bass were near a 20-foot deep hole in the backwater. In studies done by John Pitlo, DNR fisheries research biologist, the bass were in a shallow area. In both studies, however, the bass moved closer to the source of fresh water as the winter progressed.



Telemetry aids the fisheries research biologist in studying the habits of largemouth bass. This Mississippi River bass has been fitted with a radio transmitter. The antenna protrudes from its belly.

Bernie Schonhoff is a fishery biologist for the Mississippi River area at Fairport.

