

KANSAS WILDLIFE

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KANSAS WILDLIFE

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Contents

The Neosho

Southeast Kansas' Neosho River—one of the richest and most varied drainages in the state

4

Urban Fishing

Every kid ought to have a fishing hole. City kids are no exception

14

Jim Hale's Wildlife in Metal

Commission Game Protector Jim Hale brings metal to life

18

Feeding the Fish

Fisheries biologists have found that extra rations for bluegill and channel catfish mean bigger fish and more of them

20

Goodbye to the Ark

The Arkansas River has always been the key to survival for much of Kansas's high plains wildlife. Will the river survive irrigation? . .

24

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Cover: Black-tailed prairie dogs by Chris Madson

Welcome Back, 1080

There are some old chains rattling in one of the Environmental Protection Agency's locked closets. The beginnings have been subtle, but there is mounting evidence that the EPA may soon lift its ten-year ban on 1080, the controversial coyote and prairie dog poison.

Sodium monofluoroacetate, the chemists call it, a stable white powder that dissolves readily in water, is easily added to grain or meat baits, and has no effective antidote. As little as one ounce of 1080-treated meat can send a coyote into convulsions and cause death. Unfortunately, 1080 baits aren't very discriminating about the victims they claim. Nearly any warm-blooded animal will succumb to a small dose.

The problem is that treated grains and carcasses lure a wide variety of animals, most of which have nothing to do with livestock depredations. A Fish and Wildlife Service publication put out before the 1080 ban states that long-term 1080 control programs in the West were not found to

have any effect on "non-target" wildlife populations when used according to FWS guidelines. It seems as though the authors of the paper want to have things two ways: 1080 controls coyote populations, they say, but it has no effect on golden eagles, hawks, vultures, bobcats, and other predators and scavengers.

Right now, the EPA is only considering 1080 use for emergency situations, but there is speculation among western stockmen and environmentalists alike that an effort will be made to legalize the poison for more general use in the near future. Wildlife damage control experts have developed more effective, more selective ways of dealing with problem predators, but many ranchers are uncomfortable without 1080 in their anti-coyote arsenals. The ban is just one of many federal monkey's they expect to have taken off their backs in the next few years.

There's not much reason to worry about the future of Kansas coyotes even if 1080 comes back

onto the American market. There has always been doubt about 1080's effectiveness as a coyote controller, and, as a gray-haired old coyote hunter once told me, the coyote will probably survive to lift his leg on the last pile of human bones on the planet, poison or no poison. I wonder, though, about some of the less tenacious residents of the plains, animals like the ferruginous hawk and swift fox that haven't shown the coyote's ability to prosper in spite of us. I guess it all comes down to deciding how much we're prepared to risk to make the world safe for sheep.

Southeast
Kansas'
"grand river"

The Neosho

Bob Mathews

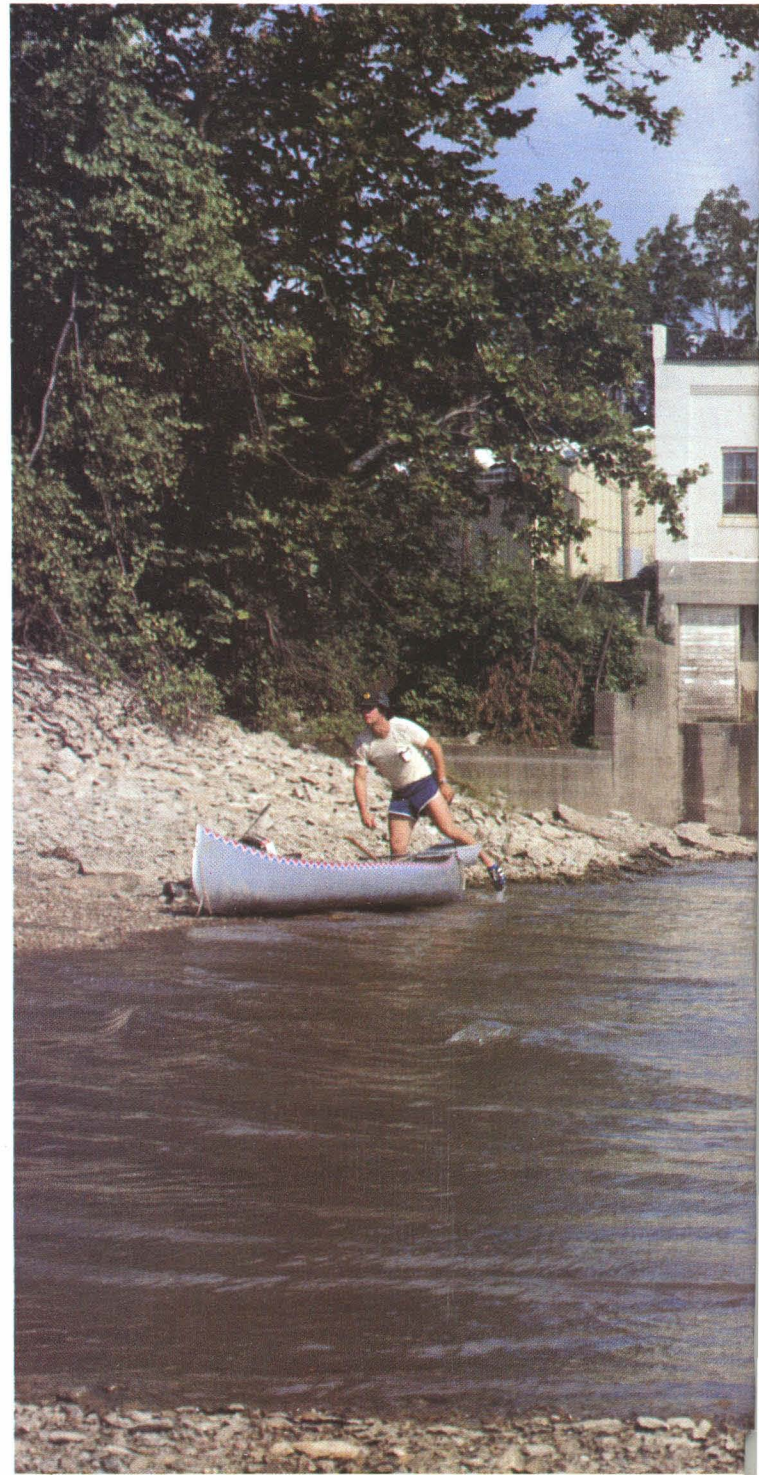
Lowell Graham stands in a 40-acre patch of waist-high native grass and sweeps his arm toward a dense stand of blackjack oak, ash, pecan, black walnut, and locust trees behind him.

"This will never be torn out as long as I'm alive," vows Graham, who farms 1700 Coffey County acres bordering the Neosho River. "This was all here for me when I was a kid and it will still be here for my grandkids." That attitude has apparently passed through several generations of the Graham family. There are several places on Graham's farm that must look virtually the same as what his great-grandfather saw when he homesteaded the place in 1861. Those places speak volumes for the great diversity and richness of the Neosho River basin, which drains more than 12,500 square miles extending from the Flint Hills of Kansas to the Ozark Plateau of southwest Missouri.

Graham, like many others who live along the Neosho-Cottonwood system, has a genuine appreciation for the river and the land it drains. Catch Lowell in a reflective mood and you'll find he'd as soon discuss Neosho River coon hunting as anything else, although his ailing knees have put an end to that sort of activity. Or, if it's not coon hunting, it's deer or quail hunting. Or fishing for channel and flathead catfish and long-nose gar. Or just watching from one of a dozen tree stands in his woods for bobcats, wild turkeys, or whatever else happens along.

From the headwaters of the Cottonwood and Upper Neosho to the river's meandering exit from the state in Cherokee County, the Neosho is one of a kind, historically rich and tremendously productive.

The region's history gives an idea of the bountiful



wildlife resources that greeted the first white men to pass through. The writer of a journal documenting a 1725 French expedition through the upper ends of the Neosho and Cottonwood valleys saw ". . . meadows covered almost entirely with buffalo, elk, and deer, so that one could scarce distinguish the different herds, so numerous and intermixed they were." The same journal relates the amazement of expedition members when they reached the site of present-day Council Grove and what was then ". . . a forest in the



prairie.” For several days before they reached this spot the only timber they had seen were the narrow bands along creeks draining the vast uplands. Suddenly they were standing in the shade of huge oak, walnut, hickory, and ash trees comprising a “forest” five miles long and as much as a mile wide. Not quite the Great North Woods but a rarity in the endless space of the tallgrass prairie.

It was here that United States commissioners met with the Osage Indians a century later to negotiate for

the right of way for the Santa Fe Trail. And it was stopping places along the Trail such as Council Grove, Diamond Springs, and Lost Springs—all part of the Cottonwood-Neosho system—that fortified travelers continuing west through the water- and wood-scarce high plains.

The first real wave of settlement in the Neosho basin came after 1854, when the Kansas-Nebraska Act established the Kansas Territory and encouraged a steady stream of immigrants. From the 1850s on, homestead-



Paddlefisherman at Chetopa

Max Good

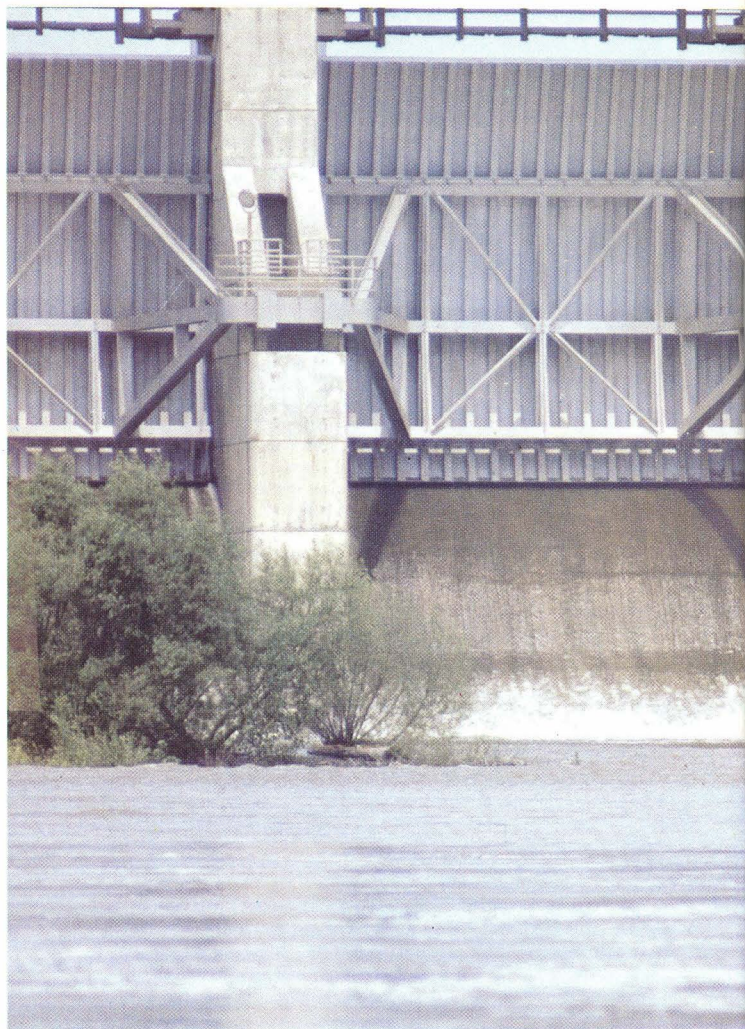
ers began to tap the rich Neosho River bottomlands for crops and the lush uplands for pastures.

Today, the wheat, corn, alfalfa, sorghum, and livestock produced in the basin are evidence of the fertile legacy accrued over the centuries through the erosion and deposition processes of water and soil.

That reputation for productivity also shows in the life that exists in the river and its tributaries. The diversity of fish species inhabiting the river is simply more testimony that a river is only as productive as the land it drains.

One reason for the diversity of aquatic life is the physical composition of streambeds of the Neosho and its tributaries, comprising large boulders, limestone outcrops, gravel, sand, and silt. That sort of environment is more productive than a river that has a predominantly sand bottom, like many prairie streams. By comparison, a sand-based stream lacks variety in the habitats it provides. The streambeds carved into the low, rolling limestone and shale hills of the Flint Hills and Osage Plains through which the Neosho and Cottonwood flow provide living space for fish as different as the Topeka shiner and the flathead catfish.

It's those big fish that have established the Neosho's



Fishermen at John Redmond

reputation among anglers as one of the best fishing streams in the state. The state record flathead—all eighty-six pounds two ounces of him—was taken from the river near St. Paul in 1966 by Ray Wiechert of Brazilton. Further downstream, the development in the 1970s of paddlefish snagging brought to Kansas a style of angling as unique as the paddlefish itself . . . and a current state record owned by Joseph Plummer of Chetopa of seventy-four pounds eight ounces.

Although more than ninety percent of the river is in the hands of private owners, numerous low water dams provide public access to help meet the strong demand for river fishing. A limited amount of work has been done to quantify that fishing pressure.

Stream biologist Ken Brunson and southeast region fisheries supervisor Bruce Taggart last year conducted a creel census of fishermen at low water dams on the river. Based on the admittedly meager information provided by one creel census, Brunson offers a guess that 50,000 man/days of fishing were devoted to low water dams on the Neosho below John Redmond Reservoir last year. Adding to that group of fishermen those who fished on private stretches of the river may



Bob Mathews

double the figure. Multiplying the average catch of censused anglers times the estimated total anglers equals a total catch in 1980 of twenty tons for the Neosho River below John Redmond.

Brunson figures that's a conservative guess, especially since 1980 was a year of unusually low flows and low fishing pressure.

Any talk of the Neosho River in 1981 brings back memories of the same river in 1957-58. Uncharacteristically dry weather the past two years had reduced the Neosho to nearly the same "no flow" conditions that prevailed in the extended drought of the mid- and late-Fifties.

When drought substantially reduces a river's flow the species composition of the river's fish population adjusts. As the Neosho mainstream becomes low and clear it takes on the characteristics of smaller tributaries. Black bullheads, spotted bass, largemouth bass, and several species of shiners and minnows assume a more prominent position in the fish fauna. Species that rely on deep pools, such as channel and flathead catfish and drum, and riffle-dwelling species, such as slender-headed darter and Neosho madtom, hold a less prominent position in the total population.

The Neosho grows big fish. It's the only river in the state that gives a fisherman the chance to catch paddlefish up to the state record seventy-four pounds, and it is a flathead catfish river par excellence. The eighty-six pound state record flathead came out of the Neosho along with 1980's biggest fish, all sixty-seven pounds of him. Council Grove also produced last year's biggest walleye, a twelve-pound, five-ounce fish. Little wonder that the river and its lakes attract so many anglers.

Once normal flows return, it doesn't take long for the species that are more mobile and less restrictive in their habitat needs to re-establish themselves. They immediately fill the available space to produce a large year-class the first year the river returns to its usual pattern.

What mainly concerns fishermen and fisheries biologists are the long term changes, most of them brought about by man, that reorder the flow, structure, and quality of the river. Like many of man's uses of land and water resources, those in the Neosho basin are a mixed bag of enhancement and degradation.

The conversion, beginning in the mid-1800's, of prairie to croplands brought about the first major change in the river's quality as fish and wildlife habitat. Subsequent establishment of numerous low-water dams introduced the next major manmade change, this



Great blue heron

Max Good



Opossum

Jean and Ed Schulenberg

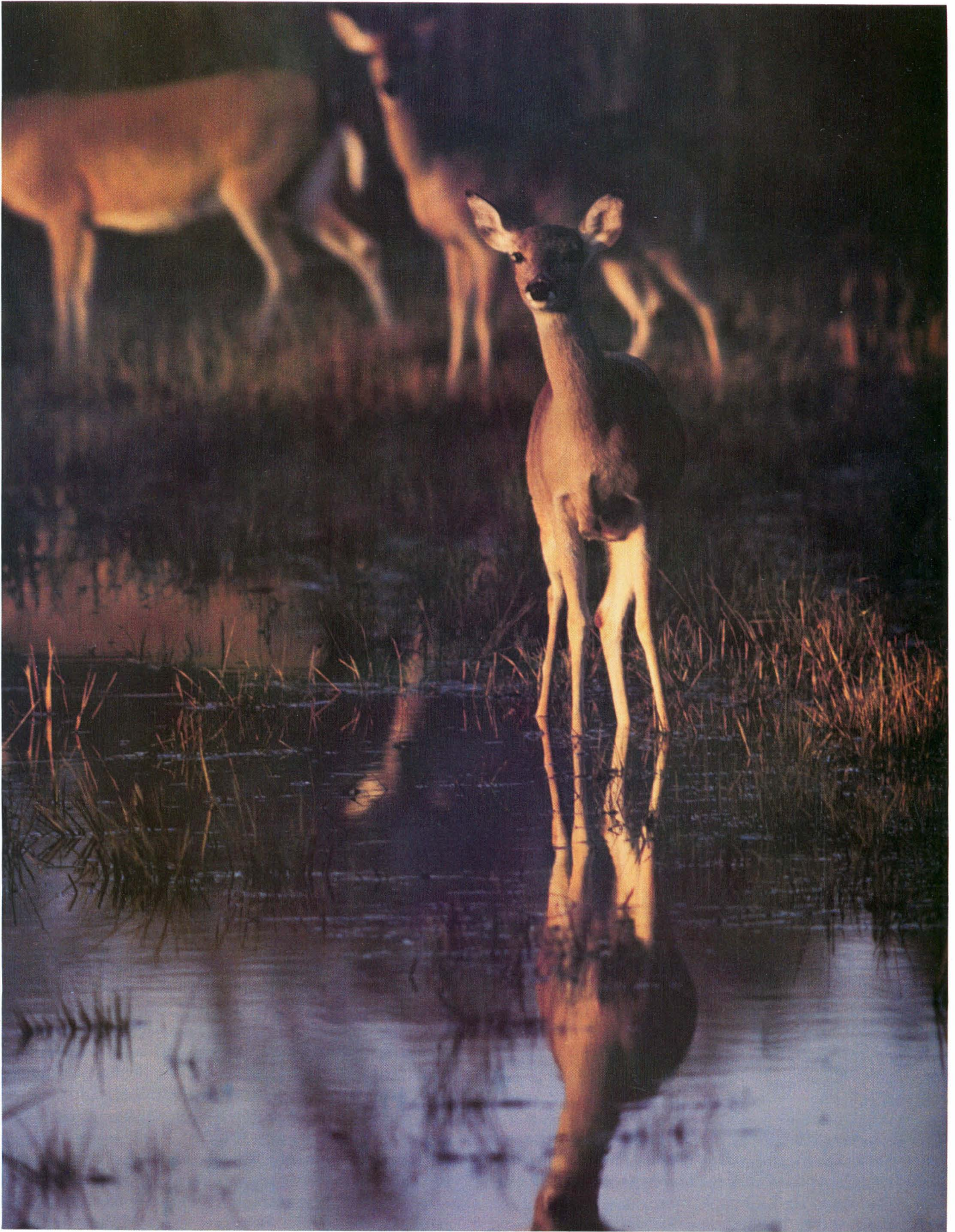


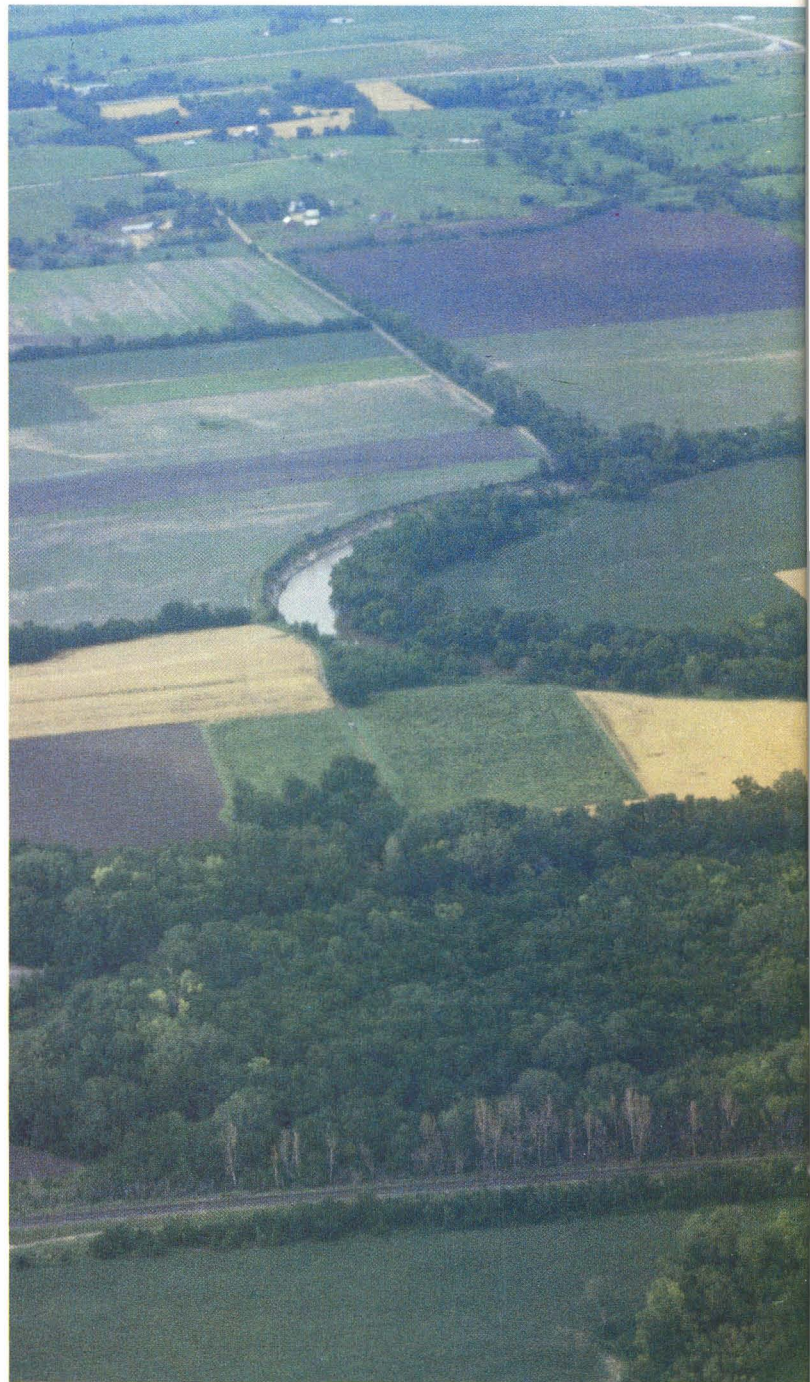
Red foxes in Neosho bottoms

Jean and Ed Schulenberg

time involving a more direct effect on the river by obliterating some riffle areas and establishing more slack water. Municipal and industrial wastes became a problem with the rapid economic growth of the region around the turn of the century. Increased demand for food, especially during World Wars I and II accelerated the conversion or more land to agricultural use.

The unrelenting demand for agricultural crops and livestock in the past thirty years has brought about even more changes in land use, such as establishment of large cattle and hog feedlots, whose wastes sometimes resulted in fish kills before state and national legislation mandated changes in handling of those wastes.





Like any large river, the Neosho lays claim to a big piece of real estate along its banks. Flood control afforded by John Redmond Reservoir has encouraged farmers to clear much of the bottomland timber that once flourished along the river, but there is still a fringe along the banks. Oxbows like the ones shown above are excellent habitat for wetland-loving species and also make fine loafing cover for deer. Aerials by Bob Mathews, deer by Jean and Ed Schulenberg.

The impoundment of three large federal reservoirs—Marion, Council Grove, and John Redmond—inundated thousands of acres of woodlands and grasslands but provided habitat more to the liking of waterfowl. Winter abundance of waterfowl has in-

creased dramatically with the construction of reservoirs. The impounded water has had a positive effect on creatures such as bald eagles and great blue herons, also. Angling opportunity has been diversified with the stocking of white bass, largemouth bass, walleye and northern pike. Public use areas—with the three reservoirs and expansive Flint Hills National Wildlife Refuge above John Redmond—have been greatly expanded. The reservoirs, notably John Redmond, have performed their main functions of flood control. But the altered flows of the river resulting from prolonged releases of flood waters held in check has aggravated bank erosion problems along the middle and lower



portions of the river; as post-flood releases through the gates soak into unprotected banks, it increases their vulnerability to erosion. Corps of Engineers plans to stabilize the banks are currently in inactive status.

One of the most noticeable land use changes in recent years is the removal of streamside timber to expand cropfields. To get an idea of the scope of timber removal, district biologist Bob Culbertson compared aerial photographs of two counties—Coffey and Allen—taken at intervals over the past thirty years. By surveying approximately fifty percent of the river in each county, then projecting that data to estimate total streamside timber losses, Culbertson estimated a loss

of 250 acres of timber in Coffey County and 220 acres in Allen County.

“Most of the areas being cleared did not involve more than ten acres,” Culbertson said. “However, when several small timbered areas are lost over the years, the total cost to wildlife is high. The effects on terrestrial wildlife are fairly easy to identify. The eastern turkey is one species of much interest to people in the area and one creature that will definitely suffer if the trend continues. If only a narrow band of timber is available along the Neosho, the river will not be home for a large number of turkeys and the wide variety of wildlife associated with the river.”



Lesser snow geese

Bruce Kintner



Bluewing teal

Bob Mathews



Lesser snows

Lowell Graham believes most farmers along the Neosho realize the importance of streamside timber, both to their own farming operations and the wildlife that depends on it, but he recognizes the tendency for some to convert all available land to cropland.

"I can remember as a kid being able to walk through timber all the way from Le Roy to Neosho Falls," he says. "Now you can almost see that far."

Woodlands bordering the river serve as a nucleus for the support of many forms of wildlife throughout the basin. Populations of whitetail deer, the only big game mammal occupying the basin in significant numbers, vary directly with the amount of wooded habitat available. Bottomland hardwoods provide necessary habitat for squirrels. Cottontails rely on the food and cover available in lowland wooded areas and nearby

grassland thickets. Bobwhites and doves occur along the woodland edges where annual grasses, perennial native grasses, and forbs provide much of the food and shelter they require. Furbearers such as muskrats, beavers, minks, raccoons, skunks, and opossums also depend on this habitat. Wood ducks use the natural cavities in mature trees to bring more wood ducks into the world. Numerous species of songbirds nest along the timbered or brushy areas along the river.

Besides the natural qualities inherent in the streams and soils of the Neosho basin, the geographic location of the region adds to its value as wildlife habitat. Since it lies on the border of the Great Plains and the deciduous forests of the Mississippi Valley, it is a transitional zone for many forms of plant and animal life. It's a place, for example, where many birds characteristic



Bruce Kintner

of eastern forests coexist with birds characteristic of the central grasslands. It also marks the distribution limits in North America for scores of species of plants more common east or west from the region.

There probably is no river in the state more important to the people who live near it. It serves as domestic water supply for numerous municipalities along its banks. It flows through rich pastures and croplands. It is solidly established as one of the best hunting, trapping, and fishing regions of the state.

In a time when environmental threats can cast a gloomy shadow, there are positive elements that help balance the Neosho River basin's environmental threats. Protective legislation and enlightened land use practices give rise to some optimism. But the most significant positive aspect of the Neosho basin's future

may lie in the diverse natural wealth that has always characterized the region. Those who see and experience that wealth will understand that the land is more than just soil and the river is more than just flowing water. And that point of view, shared by many, will do as much as anything to assure the future of the Neosho River basin.

Max Good, one of the photographers who contributed pictures for this article, is a seasoned wildlife photographer from Parsons, Kansas. An active member of the Audubon Society, Max spends spare moments developing the wildlife habitat on a forty-acre tract of retired farm ground. In the fall, he spends most of his time up a tree with a bow.

Jean and Ed Schulenberg are constant contributors to KANSAS WILDLIFE. They are in the second year of a least tern research project but still find time in the off-season for photographic expeditions to Texas and other parts of the West.



Wlathe
Sportsmen
Club

*Now city
kids have a
chance to wet a line*

Urban Fishing

Mike McFadden

Photos by Ross Harrison



A lot of people take fishing for granted. I know I always did. I was so young when I took my first trip down to the Cottonwood River with my grandfather that I can barely remember the outing. His tackle was simple—a willow limb, some baling twine, a nut for weight, a cork for a float, and a hook—but what he lacked in sophisticated equipment, he more than made up for with his knowledge of the river. Some of the fish we brought home were nearly as big as I was.

Growing up along a river in the country is a luxury that few kids have a chance to enjoy these days. In many urban areas, thousands of children grow up without ever threading a worm on a hook or watching a bobber. Many larger cities simply do not have any lakes or streams, and if there is water available, it may be polluted, turbid from silt run-off, or so well fertilized that all its oxygen is consumed by rotting vegetation and its fish suffocate. An urban lake that avoids all these difficulties is usually fished out so rapidly that introduced fish never get a chance to grow or reproduce.

What different does a lack of city fishing make? More than you might think. Cities are artificial environments. The air is either filtered and temperature controlled or badly polluted; the landscape is concrete or neatly manicured bluegrass. Food comes wrapped in

plastic and is obtained by giving a grocery clerk a check. It's easy for urban residents to come to the conclusion that city living is the only kind of living there is. Their knowledge of natural resources, wildlife, or even domestic animals is often limited to an occasional contact with the neighbor's Chihuahua or a few park pigeons. As a result, many urbanites think of fish and terrestrial wildlife more as cartoon characters than as real, self-sustaining populations of predators and prey. They fail to realize that, in spite of all the progress man has made, he is still dependent on the land and its crops. We still eat meat and plant life. As an old man once told me, "Boy, when you're hungry, you won't worry about the feelings of that animal." The Fish and Game Commission's new urban fisheries program not only attempts to supply urban anglers with some hometown sport but aims at breaking down some of the misconceptions that have grown up around the sports of hunting and fishing.

Maintaining a good fishing lake in a big city is harder than it sounds. It's vital to have an estimate of the local demand for fishing. If the use is likely to be high, fisheries biologists usually manage on a put-and-take basis. Probably the most effective way of stocking fish on a put-and-take fishery is to meter them out slowly, stocking a relatively small number of

catchable-size fish at frequent intervals. Under such stocking schedules, there are always a few fish in the lake. Occasional stockings of larger numbers of fish lead to a week or two of filled stringers followed by a long period of poor fishing.

The kinds of fish that are stocked can influence fishing success. Game fish like largemouth bass, do not usually do well in urban situations because they have a low tolerance to pollution. Many states with urban fisheries programs have used carp and bullhead. Channel catfish are one of the best fish for urban stocking because of their universal popularity and their resistance to fishing pressure. They last longer than bullheads.

The biggest problem with put-and-take stocking is finding fish to stock. Raising fish to catchable size is an expensive proposition and seldom used to support put-and-take management. In Kansas, we take many of our urban fish from salvage operations in stilling basins below reservoirs. The basins have to be drained occasionally to allow upkeep and repair. When the water is drawn off, Fish and Game personnel net the fish for use in other places. We also obtain some of our urban fish from commercial fish farmers and the Commission's hatcheries. None of these sources is dependable, but in spite of occasional shortages, we have stocked a large number of fish in urban lakes in Kansas City, Wichita, Topeka, and Hutchinson. Since the beginning of the program, we have released nearly 48,000 channel catfish averaging a third of a pound apiece, and nearly 2,650 pounds of mixed fish, including carp, white bass, crappie, channel catfish and bullheads taken from fish salvages.

Given a chance, fisheries biologists prefer not to resort to put-and-take stocking. They would rather establish self-sustaining populations of gamefish. There are a few urban lakes in the state where fishing pressure is low enough to allow fish reproduction and growth to replace that which is caught. In such situations, populations of prolific fish like bluegill can be maintained, and the fishing can be extremely good. It may even be possible to raise bass in such situations, although bass always have smaller populations than bluegill in a given body of water, so bluegill offer more fishing opportunity.

Sometimes, a combination of put-and-take management and the establishment of self-sustaining populations is called for. Since channel catfish rarely reproduce in small impoundments in Kansas, they have to be stocked on a put-and-take basis or, if fishing pressure is low enough, a put, grow, and take basis.

The urban fisheries program doesn't end with supplying fish. We improve access to some lakes that are hard to fish, control aquatic weeds, and sometimes install aeration devices to get oxygen into the water to improve water quality. We also spend a lot of time talking to the public. The Commission has established

an office in Kansas to give urbanites a place to get general information on fishing techniques and fisheries management, fishing hotspots, and hunting and fishing laws.

The most rewarding method in meeting our goal of providing the opportunity and exposure to fishing, are fishing clinics. We try to help people learn to catch fish and prepare them for the table, and we expose them to general conservation principles. The instruction is followed up with some hands-on experience in some actual fishing.

There are basically two types of fishing clinics. The traditional clinic is usually co-sponsored by sportsman's organizations, civic groups and others. Prizes are awarded to successful anglers and even fish fries or picnics or held.

The other type of clinic is held more frequently with recreation departments. Children, sometimes adults, are bused to the site or find their own way. The content of the clinics is basically the same. We have provided free stringers and bobbers to participants in some clinics. These clinics are scheduled into recreation programs and reach a much greater number of people that ordinarily would not fish.

Fishing clinics are occurring in the Kansas City, Topeka, Wichita and Hutchinson areas. Many of these clinics would not have been possible without the support of many residents of the communities.

The results to date are very encouraging. We are providing more and better fishing. Bait store owners have told me that their business has never been so good. Employees of city and county governments have documented an increase in public use of their areas. They have indicated that they have never had so many fisherman as they've had this year. It's not all roses, though. This is a new program and it has some growing pains. The increase in fuel costs prevent an accurate measurement of the worth of the program to be made, since it would result in a change in public use of the water. I'd like to think, that because of the excellent help from both the public and my fellow workers, we are doing some good. Any problems that program has will be overcome in the future.

New development projects that would enable this program to be more effective in other areas have run into legislative opposition, but with enough public support, we should be able to offer more in the future. There's a lot of hard work ahead of us, but seeing those youngsters catch their first fish, the excitement and smile on their faces, makes all the work worthwhile.

Mike McFadden is the Commission's first urban fisheries biologist and is stationed in Kansas City where he handles inquiries on every aspect of Commission activity, gives talks, writes articles, and even gets a chance to stock a fish once in a while.

the YELLOW Pages

INSIDE

Short Stuff	5
Kansas News	6-7
Sportsman's Calendar	8

LETTERS to the editor

THINK POSITIVE

In the May-June issue of the magazine, you answered a letter with a sarcastic remark about Overland Park residents. Well, here is some free criticism: Because one Overland Park resident would rather not pay for this magazine doesn't give you the right to condemn the rest of us.

I think if this one person would rather get the Missouri magazine, let him move to Missouri. I am proud to be a resident of Overland Park—which makes me proud to live in Kansas—where I don't expect anything for free. From now on, why don't you keep the negative regional remarks out of your magazine.

Thomas S. Hermes
Overland Park

P.S.—I like *Kansas Wildlife* better than the *Missouri Conservationist* anyway.

We certainly didn't mean to offend Overland Park residents, since some of our best friends live there. We realize each person has a right to his or her own opinion. That's why we'll continue to welcome any constructive criticism from our readers. It helps us do our jobs. Thanks for your interest and comments.

FAN OF KANSAS

After getting the May-June issue, I want to be sure we don't

miss an issue, so I'm renewing for three more years. I think the magazine is worth every cent and more. Too bad the man from Overland Park doesn't.

We have traveled a lot, but no place is as beautiful as Kansas. We belong to NCHA and KCA and camp a lot in Kansas. I'm proud of Kansas.

E. L. Uttinger
Kansas City, KS

NO FREE LUNCH

Congratulations! I appreciated and fully agree with your comments to the Overland Park person regarding the cost to subscribers for this fine publication versus *Missouri Conservationist's* "free lunch."

Unfortunately, some of the Kansas City area Kansans associate more with Missouri than Kansas. However, most of us are Kansans through and through and are accustomed to paying our way. I, for one, appreciate that privilege. There ain't no free lunch.

This is an excellent publication and worth every penny and more.

Bill Leonard
Olathe

'SUPERB'

Just read the May-June issue of *Kansas Wildlife*. Regarding the answer to the letter from J. S. Bosley of Overland Park: Superb, sir, superb. The only thing that could have pleased me more would have been that I made such an answer myself. Can't tell you how much I enjoy your fine mag-

and all the articles and photography. Please keep up the fine work.

Patrick McKenna
Kingman

OKAY TO PAY

I live in Merriam, a border city of Overland Park. Believe me, Overland Park is not a free place to live or shop. Mr. Bosley has much to learn. I do not object to paying for my magazine, nor those from Missouri or Louisiana. As the years pass, I will subscribe to other states I am interested in. This reading is much better than *Good Housekeeping* diet plans and football news. Keep up the good work and articles like "The Least Tern." I would like to mention that I keep my books. Never know when I will want to read an article I never had time for when received. Also, I enjoy the lack of advertisements in the magazine.

Charlene M. Wetzsteon
Merriam

P.S.—We have a hive of bees and belong to Northeast Kansas Beekeepers. How about an article on these little darlings sometime?

WORTH THE MONEY

Just a note to congratulate you on your excellent journal. I would also comment on J. S. Bosley's letter. The Bosley attitude is what has gotten the country in the mess it's in. I live in Missouri, so the *Missouri Conservationist* is free to me. However, if the journal were to require a fee I would

still subscribe. *Kansas Wildlife* is worth the money, and all true outdoorsmen would rather a Fish and Game department's budget be spent on fish and game, not on subscriptions for freeloaders.

Thanks for the great journal and I agree with your response to Bosley 100%. I only hope he stays in Overland Park and doesn't decide to move to Missouri to get a free subscription.

M. W. Wilson
Smithville, MO

THE KNOT

The "Fishing Machine" article by Tommie Berger in your last issue brings back a memory to me about the knot. I have been on this earth 61 years and the largest fish I ever caught was not more than two pounds . . . and not many of them. Last spring I bought a fishing boat. My son, Rick, who is the state game protector for Pottawatomie and Wabaunsee counties, and my three other children gave me the rest of my fishing machine.

Rick showed me how to tie the cinch knot and gave me some other pointers on how to catch fish. On one of our first fishing trips we were trolling on Milford Reservoir when I hooked my first "whale." During the next few minutes I was having the time of my life fighting with that fish when suddenly the line went limp. I was sick. It had got away. I reeled in the limp line with great disappointment.

The line had broken or come untied at the lure. Then I remembered I had not followed Rick's directions on how to tie a knot. I had just tied a knot which could have been an overhand knot Mr. Berger warned against in his article.

Rick said it had to have been a big fish but we'll never know what kind or how big. The moral to this fish story is that I had good equipment to the end of the line, but the wrong kind of knot

lets me tell the old story of the big one that got away.

B. L. Campbell
Goddard

CONCERNED FOR CLINTON

Being a resident of Lawrence and an avid fisherman, I have naturally taken an interest in the development of Clinton Reservoir. I feel that we anglers here in Douglas County are extremely fortunate with such a fine recreation area so close to home. However, as time progresses many of us fishermen are saddened to see what is taking place at Clinton.

I realize that state laws govern fish quotas statewide, but I feel that new impoundments such as Clinton require special attention, if the quality of fishing is to remain as high as it started out. Being a new reservoir, Clinton during the past several years, has been subjected to tremendous fishing pressure, with a good deal of it coming from residents of the state of Missouri. On a weekend, it is virtually impossible in the springtime to find a place to park (on state-charged lots) due to the arrival of three-day weekend out-of-state residents. Parking regulation has a minimum enforcement, and checks on the water for out-of-state licenses are nonexistent, to my knowledge. Plainly put, the people of Kansas are supporting a fish haven for Missouri residents. It would seem justified that out-of-state residents should be required to pay a parking fee that is substantially higher than residents.

In addition, being a new lake, crappie pressure has been unbelievable, coming from both residents and nonresidents. Wouldn't it be feasible, and in the best long-range interest of the lake, to place a limit on crappie for several years? Thousands upon thousands of crappie were taken this spring. Stringers of 80 to 100 crappie were commonplace, day in and day out. Another species

to suffer in Clinton is the walleye. Having no size limit on walleye is doing a large injustice to the walleye population. Anglers are keeping walleye down to a half-pound, not giving the species the time it needs to become established. I am certainly no authority on fish, but I have heard it stated that walleye need three years in order to reproduce. If this is so, I am surprised to see any walleye over two pounds at Clinton at all (and have yet to hear of three pounds or bigger).

Wouldn't it be possible to put a daily limit on crappie, and a size limit on walleye for three or four years, at least to buy some time to establish the populations of both these great fish? Otherwise, I can envision Clinton as other new reservoirs—with great fishing the first four or five years, but after that, forget it!

Robert D. Cox
Lawrence

We appreciate your interest in preserving good fishing at Clinton.

First of all, use of state park areas (where most of Clinton's parking lots are located) falls under jurisdiction of the Kansas Park and Resources Authority, not our agency. Enforcement of boating and fishing laws, on the other hand, is a function of Kansas Fish and Game. With just one game protector patrolling all of Douglas County, it's impossible to constantly guard every lake and public use area in the county. However, Clinton is often the subject of selective law enforcement, in which several game protectors from other parts of the state converge on the lake during periods of especially heavy use.

Clinton is a fertile reservoir with a rich forage base for fish like crappie and walleye. The fact that big stringers of crappie have been taken there reflects a dynamic crappie population; while many crappie are being caught, many are also being produced. We be-

lieve that imposing a walleye size limit would not contribute significantly enough to the walleye fishery there to justify such a limit. The mortality rate of hooked and released walleye, especially during the summer months, is high.

It's typical for a new reservoir to offer excellent fishing for the first few years after impoundment, then fall off somewhat as the lake ages. But improved fisheries management and the physical characteristics of Clinton Reservoir itself, with good fish habitat preserved during construction of the lake, should minimize the "boom and bust" cycle so typical of manmade lakes.

A SUGGESTION

Your magazine is wonderful. I especially like to read the letters. I hope this little criticism will be constructive.

I have wondered how much time and work it would take for the caretaker at Pottawatomie Fishing Lake No. 2 to take a bulldozer or grader and fill the mud holes and make drainage ditches on the road along the southwest part of the lake.

It is a little disgusting to wash the car and go out there to fish or picnic and have to drive through those mud holes. I imagine there has been a few mothers with small children that might have felt the same way. I'm sure it would improve the image of the area a great deal.

Bert Simon
Manhattan

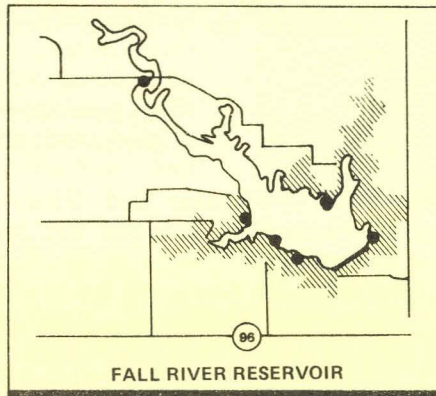
CORRECTION

Kansas Wildlife is an excellent publication, and my dental patients enjoy each copy as it arrives. However, it would be nice if you correct the number and locations of the boat ramps at Fall River Reservoir as they were published in the May-June

issue.

Keith L. Rowe, DDS
Wichita

Right you are. The illustration below shows correct locations of Fall River boat ramps.



WILDLIFE'S FUTURE

Wildlife is an inseparable part of life in Kansas, probably more so than in other states because of the variety of wildlife present here.

We all know Kansas is in a turmoil of rapid human population growth and vigorous resource development. The future of our wildlife rests upon what we are willing to do to save or rebuild its habitat in the face of such drastic changes. The Kansas population increased almost six percent during the last ten years. During this same period, Kansas lost 650,000 farm acres.

WILDTRUST is certainly a step in the right direction. But if our children are to enjoy and pass on to their children what we have now, more must be done to expand and improve wildlife habitat. I think the Kansas Fish and Game Commission is one of the best in the country, so let's back them up with some of that green stuff. A good start would be a habitat stamp like they have in Nebraska.

Tom Galliher
Manhattan

DRYLAND FISHING

Enclosed is my check for another year of your great magazine. I have been a resident of St. Francis, Cheyenne County, for 70-plus years and have enjoyed the wildlife and fishing in this area all that time.

We are out in this area where most others think the Indian and buffalo still reside. We must rely on Colorado and Nebraska for our fishing resources and, as you know, that is very inconvenient and expensive.

In reading the May-June issue of *Kansas Wildlife*, in the "Fishing Guide to Kansas" (page 16, item 15 under state fishing lakes) the description of the sandpit and location would direct any interested party to within several hundred yards of the Cheyenne County Land Fill, where there is not a cup of water for miles. This, to me, merely shows how insignificant the extreme northwest part of the state is.

I'll admit that any fisherman could catch about as many fish at the land fill as he could at the manmade sandpit.

I really do enjoy your little magazine and am proud to be a Kansan, but couldn't resist this chance to correct you.

T. T. Lockard
St. Francis

We thank you for setting us straight. The St. Francis GMA Sandpit is located southwest of St. Francis, not east.

RE-UPPING

I'm extending my subscription to *Kansas Wildlife*. Thanks for a beautiful, well done piece of work. My wife's cousin, who is an artist in Little Rock, Ark., uses it in her work and loves it.

Dr. H. J. Johnson
El Dorado Springs, MO

DOGS AND CONSERVATION

I believe that you would do sportsmen a great service if you would publish annually a list of Kansas sporting dog clubs. Each year when hunting the public areas I meet people who wish that their dog could be useful to them. It is only because they don't know how to train their dog and don't know who to turn to for help. Dogs are some of our finest conservationists and I am sure that all sportsmen would like to see more well-trained ones.

There are two active retriever clubs in Kansas—the Jayhawk Retriever Club based in the Wichita area and the Topeka Retriever Club which has active training groups in Kansas City, Topeka, Emporia, and Manhattan. Each of these clubs holds field trials several times each year. I would encourage anyone wanting to train a retriever for hunting and field trial to contact me.

Hanley Jackson
Manhattan

LIKES FISHING GUIDE

First, let me give you a long applause for the outstanding synopsis of fishing in Kansas in the guide published in your May-June issue. Now we can select where to go knowing what facilities are there, and what type of fishing to expect. This will become a permanent part of my mini home library.

Next, a few choice words for Mr. Bosley of Overland Park. I, too, get *Missouri Conservationist* (I'm a Missouri resident) but your publication is far better and well worth the fee. I prefer Kansas to Missouri because it's not as crowded, and the state parks are better laid out. The exception is Perry — no layout, no facilities, too many people (especially on weekends).

Next, I commend the law en-

forcement department in their search to catch the two 19-year-olds who gunned down the elk. A real case of attention to duty and dedication. Wouldn't it be wonderful if we could expect the same out of our elected officials in Washington.

Keep it up. You're doing great.

Andrew Morris
Gladstone, MO

P.S. — Kansas and Missouri are wintering grounds for lots of hawks. I love to watch them hunting the roadsides for a meal. Sometime could you print an article describing the various types of hawks that winter in Kansas?

TRANSPLANTED KANSAN

After spending the first 30 years of my life in Kansas I have decided to pursue my profession in the state of South Dakota. I grew up in Lakin, KS (25 miles west of Garden City) in the days of the soil bank program when the pheasants had more nesting, rearing, and escape cover and would rise in waves down the big draws. Lake McKinney was still there then and, with its stretch of the Arkansas River, was the gem of what is now the High Plains Mallard Management Unit. Lake McKinney is now a cornfield. The Arkansas no longer has a year-round flow.

I had the privilege of knowing the late Turk Rutherford and hunting his good sections when he took care of the little cacklers in southeast Colorado. There were other good men who taught me: Hoppas, Nash, Schultz, Sayer, Kelley, Carter, Leonard. Some have passed on, some have hung up their guns, some still hunt, hoping for the few good days that remind us of the good times.

A large part of my decision to

come to South Dakota was based on the deteriorating surface water conditions in western Kansas. I have to have duck hunting and my years in college convinced me that the slob-infested reservoirs of eastern Kansas would not suffice. Most people up here are very crude in their duck hunting. Few own Labradors and many shoot at ducks with magazine-loading shotguns. Many jump shoot, a sport akin to bashing babies' heads against trees, but there is a lot of water and there are a lot of ducks with little interference for the dedicated decoy hunters.

I applaud the efforts of Kansas Fish and Game to wage a war against overwhelming odds with very limited resources. I will continue to buy Kansas hunting, fishing, and trapping licenses. Last year my family kept track of all such expenditures and matched that amount on the income tax wildlife checkoff. I urge all Kansas sportsmen to do at least this much.

Please continue my subscription for another three years.

M. E. McCarthy, DVM
Clark, SD

WHERE IS IT?

I thoroughly enjoy your magazine with its many interesting articles, but do wish you would put locations or identifying information on your pictures. For example, in the May-June issue, none of the pictures in the "Fishing Guide to Kansas" tell where these men were fishing. I'm especially interested in the locations of pictures appearing on pages 9 and 23.

Bonnie Groat
Wichita

The photo on page 9 was taken at Webster Reservoir; page 23 is Clark State Lake.

— SHORT — STUFF

OKLAHOMA CHECKS OFF — Oklahoma enacted its first nongame wildlife legislation on May 26, establishing a nongame checkoff program similar to that developed initially by Colorado in 1977. The program permits those filing state income tax returns to designate portions of any refund to support nongame management. In addition to Kansas, other states with checkoff programs now include Colorado, Idaho, Kentucky, Minnesota, Oregon, Utah, Virginia, and West Virginia.

POPULATION POLICY — Conservationists are rallying around legislation that would establish a U.S. policy on human population, the Wildlife Management Institute reports. The bill, H.R. 907, would "declare the goal of population stabilization, by voluntary means, as the keystone of a national policy . . ." Introduced by Congressman Richard L. Ottinger (N.Y.), H.R. 907 would give the federal government authority and resources to forecast more accurately and respond to short-term and long-term trends in the relationships between population, resources, and the environment. It also would establish an Office of Population Policy which would promote federal policies and programs to suit shifting demographic patterns.

PRAIRIE TAX BREAK — Landowners in Minnesota are exempt from property taxes on that portion of their holdings that is maintained in native prairie, according to the Wildlife Management Institute. In addition, the owner will receive a credit on the taxes paid on other property as long as the native prairie is maintained. Preserving what is left of Minnesota's prairie is the goal of a new law passed by the 1980 Legislature. To participate in the program, a person must own at least 10 acres of prairie dominated by native plants (five-acre minimum in certain counties). The tract must never have been plowed, and the owner must agree to preserve it in its natural state in order to continue receiving tax credits. The agreement is nonbinding and the landowner retains full control.

STRIPER STAMPS — The American Striped Bass Society will produce a limited edition of 1,500 signed and numbered striped bass stamp-prints and 7,000 stamps in 1981. The 1981 stamp depicts a striped bass-white bass hybrid, known as the "wiper" in Kansas, and was painted by noted artist Les Kouba. The prints will sell for \$125 complete with mint stamp. Individual stamps are \$5 each and \$50 for a collector sheet of ten stamps. Revenues derived from sale of the prints and stamp will be devoted to striped bass



research. For more information on the stamp and print, write Striped Bass Stamp, Striped Bass Building, Edgefield, S.C. 29824.

LICENSE REVENUES UP — Americans who hunted and fished last year spent a record \$418 million on licenses, tags, permits, and stamps, according to Interior Department officials. Totals included \$222 million for hunting licenses (up \$23 million from 1979) and \$196 million for fishing licenses (up \$22 million from 1979). Revenues from the sale of hunting and fishing licenses pay for state fish and wildlife management programs. The numbers of license holders in each state are used by the U.S. Fish and Wildlife Service to determine the amount of funds apportioned to the states under the Federal Aid in Fish and Wildlife Restoration programs.

YEAR OF THE EAGLE — The National Wildlife Federation has called upon the nation to observe 1982 as the "Year of the Eagle" to commemorate the 200th anniversary of the selection of the bald eagle as its national symbol. The bald eagle, now an endangered species throughout most of the country, was adopted as the central figure of the great seal of the United States by the Second Continental Congress, June 20, 1782.

CUTBACK VICTIM — The 22-member Missouri River Basin Commission will meet in August for what is likely to be the organization's final regular session. The state-federal commission is not included in the Reagan administration's fiscal year 1982 budget. At the last quarterly meeting in May, state members established a committee to study alternatives for continuing commission activities under other auspices. The committee will be recommending that a states' association be established to complete unfinished water resources activities among all levels of government throughout the 10-state Missouri River Basin. The Commission was created in 1972 by executive order, at the request of governors of the 10 basin states, including Kansas.

ACROSS KANSAS

ATTENTION TEACHERS, PARENTS, GROUP LEADERS . . .

Beginning with the September-October issue of *Kansas Wildlife* there will be an activity in The Yellow Pages for your use. The activity will be in the format of a lesson plan, hopefully easy to follow and requiring little additional equipment. Stay tuned to your next issue for a lesson on: **FOOD WEBS.**

* * *

THE WHITE HOUSE
WASHINGTON

NATIONAL HUNTING AND FISHING DAY, 1981

Our nation's wilderness and wildlife are among our most precious resources and are enjoyed by millions of Americans each year.

Less than one hundred years ago, however, many species of American wildlife faced a bleak and uncertain future. To ensure that future generations could enjoy America's wildlife, hunters and fishermen helped found the conservation movement.

Since then, America's wildlife has staged a dramatic comeback. Elk, deer, antelope, and wild turkey, which had been reduced to small and scattered populations, have been restored to healthy and abundant numbers.

This has been due to wildlife management and habitat restoration programs financed largely by sportsmen's contributions. These programs benefit hundreds of non-game as well as game species. Through special fees and private contributions, hunters and fishermen have provided more than \$5 billion for conservation.

In recognition of the historic and continuing contributions made to conservation by America's sportsmen, it is fitting to recognize September 26, 1981, as National Hunting and Fishing Day.

On this tenth anniversary of National Hunting and Fishing Day, I want to take the opportunity to commend hunters and fishermen for their efforts on behalf of conservation and urge all Americans to join with them to ensure the wise use of our natural and wildlife resources.

Ronald Reagan

NATIONAL HUNTING-FISHING DAY PLANNED SEPTEMBER 26 Keep your ears open for announcements of National Hunting and Fishing Day celebrations in your area. September 26 marks the 10th anniversary of National Hunting and Fishing Day. Since the day was established by Congress in 1972, it has earned the support of each President. President Ronald Reagan has continued the tradition by proclaiming the Sept. 26 date National Hunting and Fishing Day, 1981.

In his proclamation (inset) President Reagan pointed to the important role sportsmen have played in conservation. "To insure that future generations could enjoy America's wildlife, hunters and fishermen helped found the conservation movement," said the President. "Since then," he said, "America's wildlife has staged a dramatic comeback. Elk, deer, antelope, and wild turkey, which had been reduced to small and scattered populations, have been restored to healthy and abundant numbers. The restoration of wildlife populations has been due to wildlife management and habitat restoration programs financed largely by sportsmen's contributions."

Over the past decade, National Hunting and Fishing Day has continued to grow both in size and impact. Millions of sportsmen and non-sportsmen participate each year.

* * *

TURKEY CHAPTER DONATES ROCKET NETTING GEAR

The Kansas chapter of the National Wild Turkey Federation is wasting no time getting actively involved in restoration of the wild turkey to Kansas. The group recently donated three rocket nets, complete with rockets, to the Fish & Game Commission for use in turkey trap/transplant programs in the state. The Kansas chapter was organized in March of this year and raised money for the nets at a banquet. The chapter, working with Fish & Game biologist Carroll Lange, aimed their first fund-raising effort at providing the rocket nets to aid Fish & Game efforts to re-establish the eastern subspecies of wild turkey to eastern Kansas, said Dick Feldman, secretary-treasurer of the chapter. The rocket nets normally work better in trapping eastern turkeys than do drop nets, which have been and continue to be used to trap the Rio Grande subspecies. Rio Grande turkeys have made an encouraging comeback in Kansas in recent years and, through Fish & Game's trap/transplant program, now occupy much of the suitable habitat that exists for them in the state.

Sportsmen interested in supporting or joining the wild turkey chapter should contact: Don Hardesty, Suite 900, First National Bank Building, Topeka, KS 66603.

* * *

ACROSS KANSAS

NONGAME CHECKOFF YIELDS \$126,000

each to the fund, which will be used in a variety of ways to improve living conditions for the state's non-game wildlife.

The counting is virtually done. Kansas taxpayers, in the first year of the "Chickadee Checkoff," contributed \$126,000 to the Nongame Wildlife Improvement Fund. Some 24,000 returns contributed an average of about \$5

* * *

THE KANSAS TURTLE WATCHER'S HANDBOOK

State Biological Survey. The 67-page guide features color photographs of all 14 species occurring in the state, with precise range maps for each species, and identification keys. The book is co-authored by Janalee Caldwell and Joseph T. Collins. Copies (\$5.25 each) may be obtained by writing to: AMS Publishing, Rural Route 2, Lawrence, KS 66044.

Persons interested in learning more about the turtles of Kansas should take a look at a new guide to "Turtles in Kansas." The book, published in June, was produced by the University of Kansas Museum of Natural History and

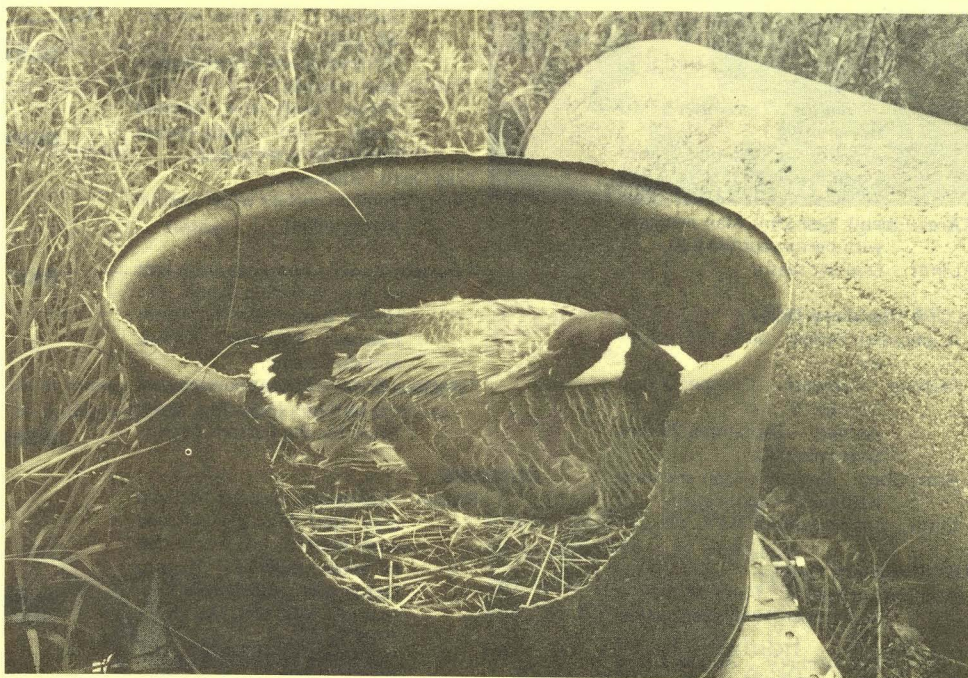
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BENEFACTORS BOOST GOOSE RESTORATION

The Canada goose restoration program has received several big boosts this year. A pen at Marais des Cygnes Wildlife Area was finished, 260 giant Canada geese were obtained, and 30 goslings hatched this past spring. Recently, the size of the flock was nearly doubled when Fish & Game obtained 211 geese from Colorado.

A WILDTRUST memorial established in the name of Kim Steadman, Overland Park, is helping to pay for some of the costs of the program. That fund, along with contributions from the Shawnee Mission Ducks Unlimited chapter, paid the costs of transporting those 211 geese back from Colorado. All of these recent developments have put the project several years ahead of schedule, hastening the day when free-flying Canada geese will call Kansas home.

Since it is the nature of wild geese to return to breed and nest in the areas where they learned to fly, the re-established flock will eventually spread to areas surrounding Marais des Cygnes, the nucleus of the goose restoration effort. Efforts will be expanded in the coming year, when a winter restoration flock will be established at Cheney Reservoir. Fish & Game staff members also will begin work to re-establish Canadas on private land in the Flint Hills.



—EARLY SPORTSMAN'S CALENDAR—

SQUIRREL

Season: June 1 thru December 31
Area Open: Statewide
Limit: Daily limit 5; possession limit 10 after first day.

RABBIT

Season: Year around.
Area Open: Statewide.
Limit: Daily limit 10; possession limit 20. No daily or possession limit on hare/jack rabbit.

COYOTE

Season: Year around except during firearms season.
Area Open: Statewide.
Limit: No daily or possession limits.

BULLFROG

Season: July 1 thru September 30.
Area Open: Statewide.
Limit: Daily limit 8.

BIG GAME

DEER (Residents Only)

Application Period: Firearms — June 22 thru July 21.
Archery — June 22 thru September 30.
Seasons: Firearms — December 5 thru December 13.
Archery — October 1 thru December 2, AND December 16 thru December 31.
Area Open: See Unit Map enclosed with permit application.
Limit: One per season.

ANTELOPE (Residents Only)

Application Period: June 1 thru June 23.
Seasons: Firearms — October 3 thru October 5.
Archery — September 26 thru September 30.
Area Open: See Unit Map enclosed with permit application.
Limit: One per season.

TURKEY (Residents Only)

Application Period: Fall Firearms — September 1 thru September 15.
Fall Archery — August 1 thru August 20.
Seasons: Fall Firearms — October 31 thru November 8.
Fall Archery — October 1 thru October 31.
Area Open: See Unit Map enclosed with permit application.
Limit: One per season.

FURBEARER

HUNTING

Season: (Opossum, raccoon, red and gray fox) November 15 thru January 15, 1982.
(Badger and bobcat) December 1 thru January 31, 1982.
(Striped skunk) Year around.
(Otter, swift fox, spotted skunk, black footed ferret, beaver, mink, muskrat and weasels) No open season.
Area Open: Statewide.
Limit: None on species which can be legally taken.

TRAPPING

Season: (Opossum, raccoon, weasel, red and gray fox) November 15 thru January 15, 1982.
(Mink and muskrat) December 1 thru February 28, 1982.
(Badger and bobcat) December 1 thru January 31, 1982.
(Beaver) Eastern Zone* — January 1, 1982 thru February 28, 1982. Western Zone* — January 1, 1982 thru January 31, 1982.
(Striped skunk) Open season year around.
(Otter, swift fox, spotted skunk, and black-footed ferret) No open season.
Area Open: Statewide.
Limit: None on species which can be legally taken.

* Eastern Zone — Those counties east of and including Smith, Osborne, Russell, Barton, Rush, Pawnee, Edwards, Kiowa, and Comanche.

* Western Zone — Those counties west of, but not including, those listed for the Eastern Zone.

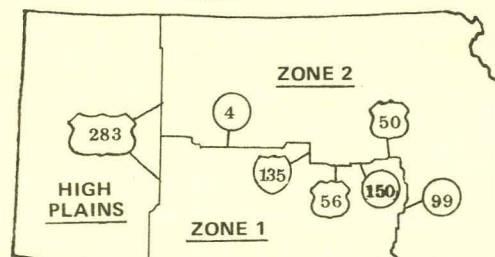
RUNNING

Season: (Opossum, raccoon, red and gray fox) May be pursued with hounds, but not killed or taken, from July 15 thru October 20, AND from February 1, 1982 thru March 15, 1982.
(All other furbearers) No open season.
Area Open: Statewide.
Limit: No furbearer can be killed or taken during Running Season.

WATERFOWL (All seasons are tentative and subject to change.)

DUCKS

Season: (Zone 1*) October 24 thru December 6, AND December 26 thru January 10, 1982.
(Zone 2*) October 31 thru December 13, AND December 26 thru January 10, 1982.
(High Plains Zone*) October 10 thru December 6, AND December 12 thru January 5, 1982.
Area Open: See Zone descriptions below and check with season dates.



DARK GEESE (Canada and whitefront)

Season has not yet been established.

DOVE

Season: September 1 thru October 31
Area Open: Statewide.
Limit: Daily limit 12; possession limit 24.

RAIL (Sora & Virginia)

Season: September 12 thru November 20.
Area Open: Statewide.
Limit: Daily limit 25, in aggregate; possession limit 25.

SNIFE

Season: September 12 thru December 27.
Area Open: Statewide.
Limit: Daily limit 8; possession limit 16.

WOODCOCK

Season: October 3 thru December 6.
Area Open: Statewide.
Limit: Daily limit 5; possession limit 10 after the first day.

TEAL

Season: September 12 thru September 20.
Area Open: Statewide
Limit: Daily limit 4; possession limit 8.



Bobcat by Suzan Klassen

Enjoy the finest in wildlife art

Forty of the finest wildlife artists in the Midwest will gather in Wichita this September 25 and 26 for a repeat of last year's wildlife art exhibit. Work in oil, watercolor, acrylic, bronze, and wood will be shown. The show promises to be a perfect counterpoint to Kansas City's immensely popular National Wildlife Art Show. Make plans to attend. Exhibit hours: September 25—5:00 p.m. to 10:00 p.m.; September 26—9:00 a.m. to 5:00 p.m. at the Holiday Inn Plaza.

National Hunting and Fishing Day Wildlife Art exhibit

Game
Protector
Jim Hale
models steel
with an acety-
lene torch and a
vivid imagination

Wildlife in Metal

Bruce Bertwell

A visit to Jim Hale's home southwest of Topeka reveals a lot about the man. The radio-equipped Fish and Game pickup parked outside tells the observer that a State Game Protector lives here. To one side of the entrance in a shop area is an array of gas bottles, torches and electrodes, the tools of a skilled welder. Inside, it becomes clear to the visitor that this is the home of a wildlife artist too.

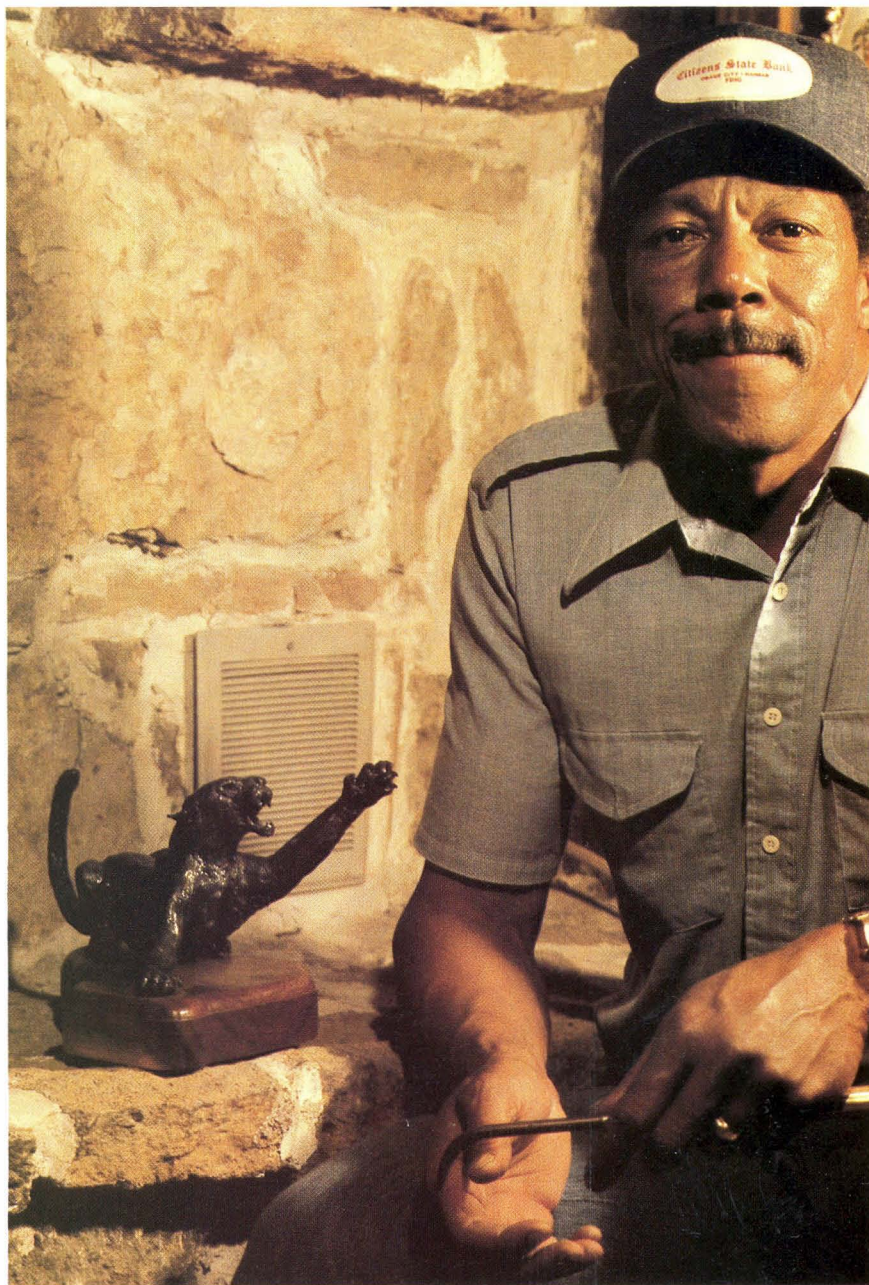
Metal sculptures catch the eye wherever one looks. On a low table a pointer stands frozen on point on a base of Kansas walnut. Over there is a crouched mountain lion snarling in defiance and threatening with one outstretched paw. On a rock shelf integral with the native stone fireplace sits an African elephant. Its head almost seems to sway.

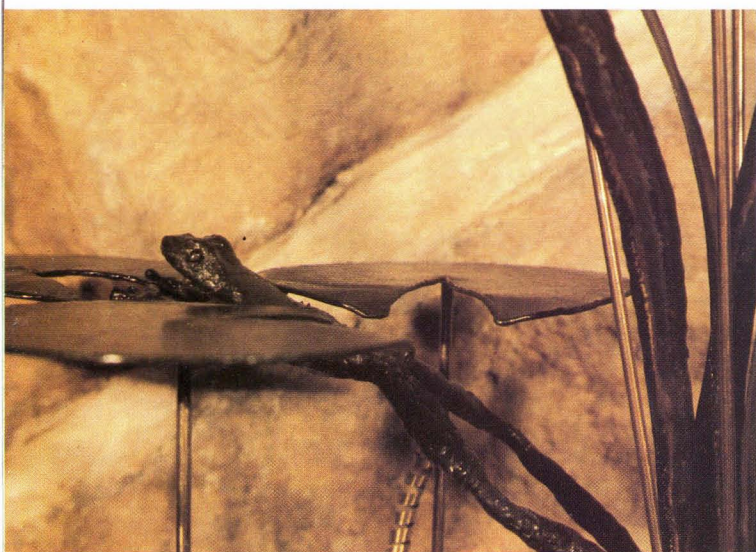
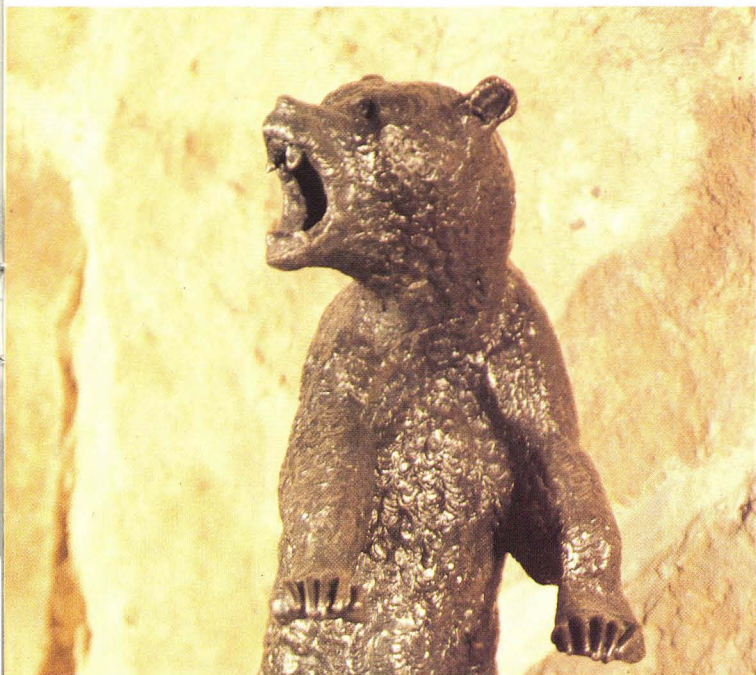
A grizzly bear rears on its hind legs to investigate a

sound and a great blue heron probes shallow water reeds for a fish. A hawk takes to the air, struggling to clear a smooth white marble base with a freshly killed rabbit. In another corner is a bass rising beneath a bed of lily pads.

Jim Hale combines unusual talents. He is a skilled welder who became a Game Protector ten years ago and combined his craft and love of wildlife to become an artist. Born one of nine children fifty years ago in San Augustine, Texas, Jim came to appreciate the outdoors quite naturally. He wandered the river bank near his boyhood home, fishing, hunting and observing.

"I guess that's what started it all," Hale says, "living on the river, seeing the animals and learning about them and their signs. There was clay there and I made figures of the animals I saw and baked them and took





them to school. The school I went to had grades one through twelve and by the sixth or seventh grade I liked to draw and only one other kid liked art. The two of us made all the posters.”

Jim came to Kansas when he joined the Air Force. After duty in Korea he was assigned to Forbes Air Force Base in Topeka. He married and decided to make Kansas his home. After leaving the service, he began work with the Veteran’s Administration and State hospitals, attended Topeka Trade School where 2900 hours of instruction made him adept at gas, arc and heliarc welding, and enrolled in a curriculum at Washburn University coordinated with his work at the State Hospital. At Washburn, he got into a class in ceramics and metalcraft.

The metalcraft part of the course focused on jewelry

making, but Hale noticed a usually idle welding rig and asked about its use. He learned that it was there to be used for metal sculpture. It was a challenge he couldn’t resist. His first piece ever was a stylized male figure he calls “Warrior.” Hale had a friend help him take his own measurements and then created the sculpture to scale so that all proportions would be correct.

In 1970, he opened a shop in Topeka that specialized in art items. That same year, he saw an announcement for the exam for State Game Protector and went in to take the test. After about two years a position with Fish and Game opened. When he landed the job, it was the fulfillment of a long-standing ambition. His first assignment was to Cheney Reservoir and Reno County where he worked a few years. Then he returned to the Topeka area where he currently enforces Fish and Game laws at Pomona Lake and in parts of Osage and Shawnee counties.

Jim’s work as an artist has been shown in Hutchinson, Wichita and Topeka and at Washburn and Fort Hays State Universities. He served as a visiting artist for a metal sculpture workshop at Pratt Community College. He has exhibited in Colorado City, Colorado, Santa Fe and Taos, New Mexico and in Dallas and Wichita Falls, Texas. Hale has been a participant in the Wildlife Art Shows of Ducks Unlimited in Kansas City, Missouri and Tulsa, Oklahoma and has contributed his works to the art auctions that are a part of these shows.

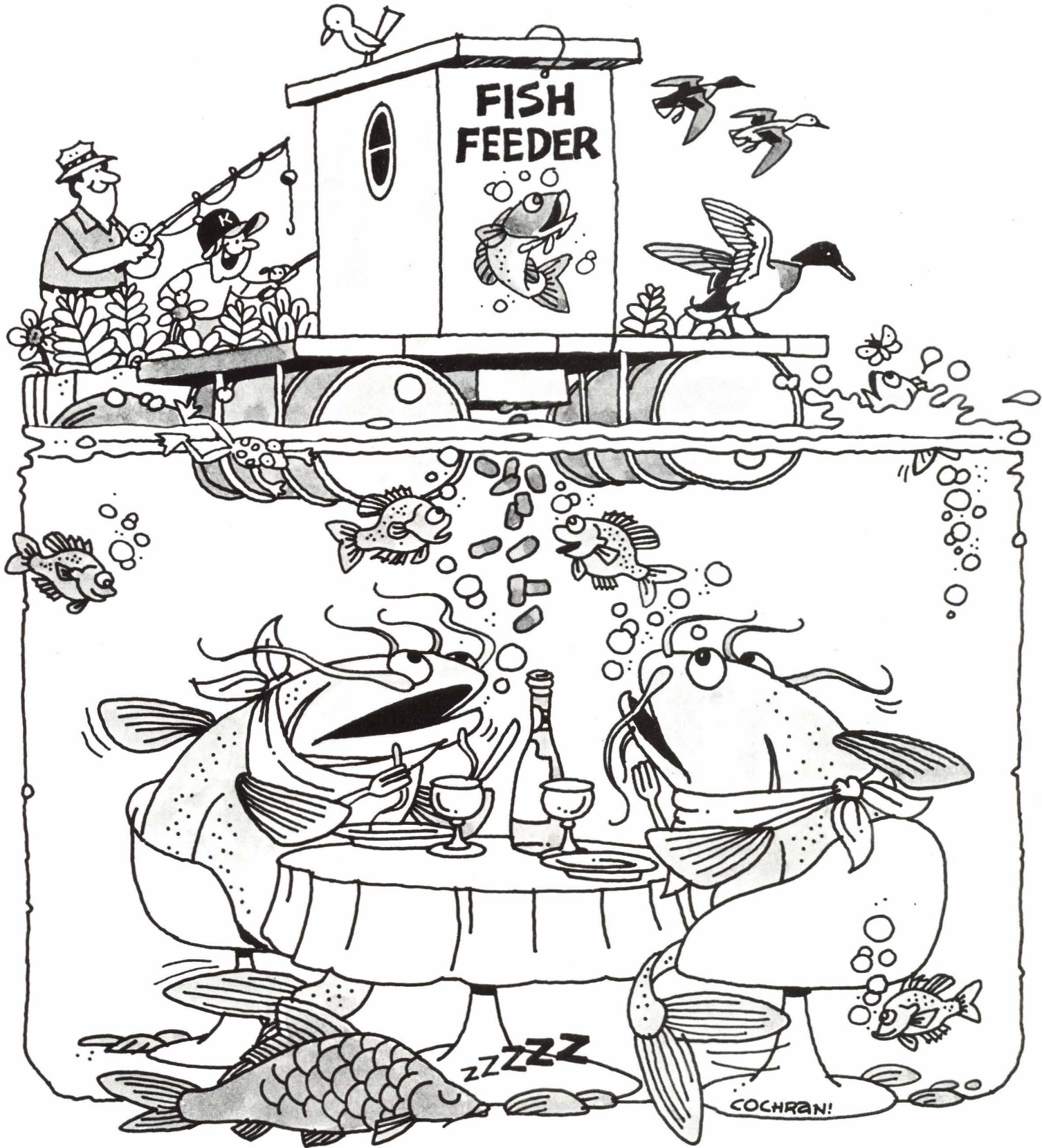
He was one of several artists asked by the city of Atlanta, Georgia to create a scale prototype of a sculpture to stand outside the sports complex in that city. The John Deere Company had Jim carry out the familiar leaping deer logo in three dimensional form and the piece is now housed in the firm’s museum in Moline, Illinois.

Hale sometimes uses copper, aluminum or brass as well to heighten contrast in a piece. One of Jim’s most recent efforts is a work in relief that highlights the entrance to Kansas Fish and Game headquarters at Pratt. It consists of separate pieces of copper, brass or aluminum affixed to a wall that together form a panorama of Kansas plains, skies, and waters.

A brilliant sun shines down on the animal inhabitants. Buffalo, antelope, deer, prairie chicken and quail are all represented. Doves, ducks and geese fly beneath billowy clouds and walleye, bass and crappie teem in the waters.

Hale is justifiably proud of this sculptured mural in which he incorporated cattails and the state flower, the sunflower. “They accent the piece. They’re special,” he says. Just as this work is unique, so is the wildlife artist who created it.

Bruce Bertwell handles Fish and Game law enforcement in the Lawrence area.



Research on supplemental feeding of bluegill and channel catfish is turning up good news for fishermen. Want to catch bigger fish and more of them? Try drifting a worm past one of those odd floating boxes at Pottawatomie State Fishing Lake II.

Feeding the Fish

Tommie Berger

Illustrated by Bruce Cochran

There are many noises that will spook fish away from you but the dinner bell is not one of them. Anyone who has observed feeding time at a fish hatchery, or tossed grasshoppers to the hungry fish inhabiting a pond, will agree. If you stand too close, you're likely to get wet as the fish splash to the surface in their eagerness to collect their fair share of dinner.

Supplemental feeding of fish has been underway in several state, city, and county lakes in Kansas for several years. Although it has been restricted to just a few lakes in the past, the idea of supplemental feeding seems to be catching on.

Kansas was the very first state to actually adopt, and experiment with, a supplemental feeding program. The results—good growth, good-sized fish, and good fishing—have spurred an expansion of the program so that more fishermen will benefit. The idea is being promoted in Fish and Game's Community Lake Assistance Program, and to owners of private lakes and ponds.

Supplemental feeding of fish has long been used by fish farmers and commercial fish growers to increase the amount of fish that they can grow in a limited amount of water. The principle is the same as that applied in large cattle feedlots scattered throughout the state or the large spreads of buildings housing a hog confinement operation. Farmers have found that close confinement and full feeding of livestock can generate faster gains per amount of feed fed. It didn't take long for people in fisheries work to try the same thing with fish.

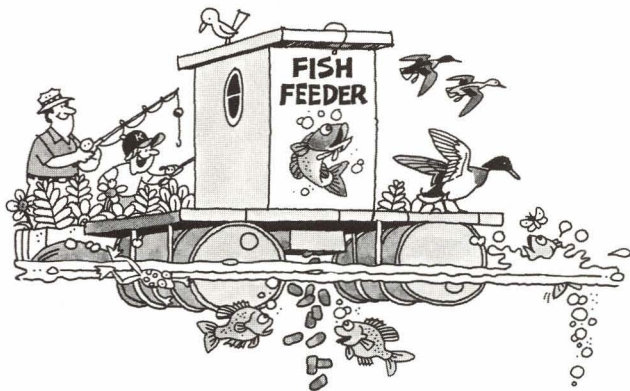
In fact, fish will gain weight faster on less amount of feed than any other critter. Sometimes a pound of feed will put a pound on a fish. The average feed/weight gain ratio for short channel catfish in Fish and Game's

hatchery system is now 1 pound of fish for every 1.3 pounds of feed, according to Verl Stevens, hatchery superintendent. These fish are raised in ponds that have a flow-through system and excellent water quality. Feed conversions like this allow us to raise from 9,000 to 17,000 pounds of catfish per acre of water. Stevens claims we can get 20,000 pounds per acre if all conditions are right. Static water systems with no flow-through and no aeration can produce up to about 1,000 pounds per acre.

Although many biologists and fish managers have thought about applying the supplemental feeding technique to wild fish populations, few really thought the idea had much merit. However, back in the early 1970's a fellow from Illinois named Leo Pachner realized the merits and began experimenting with supplemental feeding, not with catfish and trout, but with bluegill and bass in both controlled and wild environments. He began to promote and publicize his experimental results and ideas in *Farm Pond Harvest* magazine. Pachner is now the most active and vocal supporter of supplemental feeding programs throughout the Midwest.

Kansas' first study program was initiated in 1975 to evaluate the effects of feeding commercial food on a bluegill population in a lake situation. The study centered on Pottawatomie State Fishing Lake #2, a 75-acre clear water lake in northeast Kansas. This lake contained a slow growing population. Nearly 70 percent of the lake's bluegill population consisted of sub-harvestable-sized fish.

Six automatic fish feeders were installed in the lake. The feeders were powered by 12-volt dry cell batteries, had automatic timers to feed at pre-selected times, and had adjustable feed outputs. Floats were constructed



from 55 gallon drums to hold the feeders above the water, and bluegill feeder screens and rings were centered below the feeders to collect and hold the feed.

Commercial fish food was fed, both in a floating and sinking form, so that all sizes of bluegill could benefit. Feeders were set to feed twice daily at 7 a.m. and 7 p.m. Fish adapted quickly to the feeders. Within a few weeks many bluegill and channel catfish were observed waiting around the feeders in advance of feeding time. As the feeder went off, feeding activity in and around the feeder became quite hectic.

The study was conducted for three years from 1975 through 1977. During that time netting surveys were conducted and data was collected. The results of these netting surveys were analyzed as to harvestability changes. In Kansas, a bluegill is not considered of harvestable quality to the angler until he reaches six inches. A comparison was made between the numbers of bluegill under and over six inches in the samples taken. Harvestable numbers continued to increase throughout the study as shown in Table 1.

Bluegill were also weighed and measured to evaluate growth and body condition. Insignificant changes in length occurred, but weight of individual fish increased, which improved the body condition of the fish. A fatter, plumper bluegill resulted.

A creel census also was conducted during the three-year study to evaluate use by fishermen and fish harvest. Results of data from creel census is presented in Table 2, showing harvest figures for both bluegill and channel catfish.

Bluegill numbers per acre harvested increased 211 percent, and weight per acre increased 310 percent.

Channel catfish harvest (an extra benefit) increased 234 percent by number and 288 percent by weight. Sizes of individual bluegill and channel catfish increased significantly. Total pounds of all species harvested per fisherman increased from .216 pound to .403 pound over the study period.

Kansas Fish and Game is interested in providing fish for the angler as economically as possible. However, the job of converting a slow growing population of bluegill into a fishable quality population is not simple. Supplemental feeding, although somewhat costly, may be the quickest and most economical method. One considering feeding must consider the cost of the feeders, maintenance costs, and food costs.

Let's look at the cost of the Kansas feeding project and its return to the angler. The feeders and all maintenance costs for the three-year period cost right at \$1,900. The 7.11 tons of feed cost \$2,700 at 1978 public sale prices. So, we have a total cost of \$4,600.

During that time, 39,500 fishermen used the lake, so on a prorated basis it cost each angler 12 cents. Only 12 cents of each fishing license was spent on the project, and it increased the catch per fisherman 180 percent.

Also, using a national standard on monetary values of fish, I figured the actual money value of the bluegill harvested in the three study years. When all the figuring was done, I arrived at a figure of \$6,492 worth of bluegill harvested above and beyond what would have been harvested without the feeding project. With an expenditure of approximately \$4,600 for feeders, food and maintenance, we returned \$1.41 worth of bluegill to the fishermen for each \$1 spent. And that is just bluegill; the channel catfish increase was not included. That is not a bad investment!

Automatic fish feeders are not necessary when implementing a feeding program. Pondowners, lake-front owners, and others who have access to fishing waters can supplementally feed fish in a number of ways. The cheapest method, of course, is daily manual feeding—scattering fish food by hand on the water. Those who feed in this manner should feed only floating fish food. Dispersal of the sinking food without a screen or tray positioned under the water will cause the food to drop to the soft bottom mud where few fish will pick it up. Wind and wave action can be a problem with floating food, so one needs to construct a ring or floating box to

CHANGE IN LENGTH OF FED BLUEGILL

	Total Bluegill Sampled	Total Over Six Inches	Percent of Sample Over Six Inches
Per Feeding	338	109	32.2%
1975 Fed ½ Season	231	71	30.7%
1976 Fed 1½ Seasons	1,693	828	48.9%
1977 Fed 2½ Seasons	1,466	959	65.4%

WEIGHT CHANGE IN FED BLUEGILL AND CATFISH

	BLUEGILL			CHANNEL CATFISH		
	1975	1976	1977	1975	1976	1977
Number/Acre	46.00	35.00	97.00	23.00	15.00	54.00
Weight/Acre (lbs.)	6.27	7.85	19.43	14.59	11.35	42.20
Size/Fish (lbs.)	0.14	0.22	0.20	0.64	0.78	0.78

retain the feed in the feeding area.

The next big question: How much to feed? If cost of food is no object we have a general rule of thumb that we follow. Feed as much food as the fish will consume in 30 minutes. If your fish eat all the food you throw out in five minutes, you've got lots of fish that are going hungry.

Fish-feeding hardware can be about as sophisticated as you want to make it. There are feeders on the market that are triggered by fish movement or by weight of food on an underwater pan. As fish eat the food, the pan rises and allows more food to fall. Then there are the fully automatic feeders that work on an electronic timer. All of these feeders or methods mentioned so far utilize pelletized fish food.

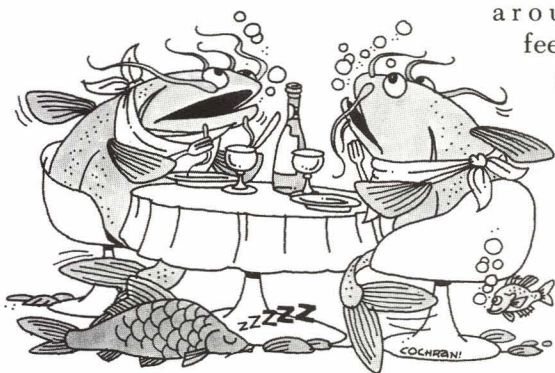
Other feeders on the market attempt to take advantage of natural foods, primarily insects. Some people simply hang a light out over the water in the summer to attract insects at night. As the bugs swarm around the light, some fall to the surface and are eaten by fish. One gadget on the market consists of an ultra-violet light to attract insects and a small, powerful fan that sucks the bugs in and blows them down onto the water. This particular feeder requires an electrical connection near the water. The one disadvantage of these feeders is that they work only at night, and therefore do not afford the convenience of attracting fish when most fishermen are fishing.

Other feeding methods include soaking and dispersing grains, such as corn, milo, or soybeans. Feeding of such grains is not recommended because they fall to the bottom and can cause bad water problems as they start to decay.

Maggot boards are used occasionally. These are small, slotted board or screen boxes placed over the water and filled with fish cleanings or other decaying material. Flies are attracted, maggots are formed, and, as they wiggle, they fall into the water and are eaten by the fish. It certainly is smelly on a hot summer day, but the bluegill sure like them!

Fatter, bigger fish is not the only benefit of supplemental feeding. It also works to attract fish. A feeding station will concentrate fish and make them more accessible to the angler. Additional advantages are seen when the lake manager includes brushpiles or other

fish attractors around the feeders. This gives the fish an opportunity for shade, cover, protection,



and food all in one place. The disadvantage of this system is a few broken lines as big fish grab your bait and dive back into the brushpile.

Fish feeding stations in a wild environment generally benefit sunfishes the most. Channel catfish quickly adapt to a free meal, especially those short channels stocked in public lakes each year by the Fish and Game Commission. These stockers are fed a commercial feed in rearing ponds all summer prior to their stocking in the fall, so they know what the pellets are. Carp will also catch on to the free and easy meal idea quickly, and they can become a problem. They tend to act just like a bunch of hungry hogs, pushing the smaller sunfish and catfish out of the way in their eagerness to feed. Some pondowners have had good success feeding bullheads, too, but they seem to be slow learners.

Some experimenting is even going on now with feeding game fish commercial pelletized food. Researchers have taught bass in a controlled environment to feed on pellets. Joe Lillie, hatchery manager at the Meade Fish Rearing Station, has had some success feeding pellets to fingerling smallmouth. The federal hatchery at Cedar Bluff reservoir has been experimenting with commercial feeding of walleye and northern pike, with some limited success. At best, the idea of feeding pelletized commercial food to game fishes used to feeding on live, natural foods is a new frontier in fish culture and management.

As is often the case in research projects, more questions were raised than were answered. Questions such as: What does feeding do for the local predator fish, namely bass? What would have resulted if we would have had more feeders or fed more feed daily? Did the harvest of big bluegill and catfish by anglers throughout the summer bias our data?

These questions and many more are unanswered now, but just waiting for someone to unlock their secrets. Kansas Fish and Game is eager to take a closer, perhaps more comprehensive look at supplemental feeding. This year, five new feeders are being purchased and installed in four state fishing lakes across the state. As stated before, some community lakes have purchased feeders, and we are evaluating their success. Private lake and pondowners are beginning to see advantages of the program. Several Kansas sportsman's clubs have taken on club projects to buy feeders and feed and install them in city lakes and kids' fishing ponds. Therefore, in the next few years, Kansas will continue to be the forerunner in feeding research, and Kansas anglers will reap the benefits.

So far, Kansas's fishing license dollars have been well spent for this project, and they will continue to be well spent! Heavier stringers and a more quality fishing experience will be the final results.

Bruce Cochran is based in Prairie Village. His cartoons have appeared in a number of publications, including FIELD AND STREAM.





Goodbye to the Ark

Chris Madson

Lieutenant Zebulon Pike began his survey of the Arkansas River with a disappointment. When his party first encountered the river near present day Great Bend in early October 1804, one of his subordinates described it as “twenty feet in width and no more than six or eight inches deep.” Not much of a river. But the Ark has never been a very predictable stream. Two weeks later, that same subordinate was on his way down the river with a small detachment in dugout canoes. The summer’s drought had broken, and the Arkansas, suddenly a quarter of a mile wide, rolled on down to the Mississippi with a will. When Pike returned from his reconnaissance in the Rockies a year later, he did not hesitate to report that the river could be navigated up its entire length “with proper boats constructed for the purpose.”

Pike’s Arkansas was a river no modern resident of southwestern Kansas would recognize. It was as contrary as the country it watered, a wide, sand-bottomed bull of a river that jumped out of its banks with every cloudburst and maintained a dependable flow through the worst of the plains droughts. Since the last Ice Age, it has prevailed in the semi-desert of the high grasslands, fed by two never-failing sources of water, the Rocky Mountain snowpack and the Ogallala aquifer.

Actually, the Ogallala itself is a child of the Rockies, 6,400 cubic miles of gravel washed out of the mountains roughly twenty million years ago. The spaces

between the cobbles in this immense underground rock pile were filled with water from the Miocene floods that carried them out onto the plains. The result is a reservoir of fossil water a third the size of Lake Superior lying under a region that averages twenty inches of rain a year.

Over the last few thousand years, the Ark has eroded its way down to the western edge of the Ogallala near Lakin and is in contact with the aquifer and other associated groundwater deposits almost all the way to Wichita. Movement of water in the Ogallala is slow—probably an inch a day or less in most places—so the contribution of the aquifer to the river's flow has never been overwhelming, but for thousands of years, it *was* constant. Through springs, artesian wells, and seepage directly into the river bed, it sustained the Ark when run-off was scarce.

At least, that was the situation up until the end of the Civil War. At about that time, the reports of sterile ground and ferocious weather from early explorers on the plains gave way to the fast sell of railroad real estate agents and the federal government's Homestead Act. There was a time in the late 1860's when potential settlers were told that "rain follows the plow on the plains." All you had to do to bring on moisture and assure bumper harvests was break the sod.

The drought of 1873 and locust plagues in the late

1870s dispelled any lingering belief western farmers had in advertising, but natural disasters aside, it was hard to ignore the natural fertility of the grassland. The only problem was to get water on the crops. Naturally, the farmers' eyes turned to the Ark. The earliest water right on the river in eastern Colorado carries an 1859 date, and by 1900, there were already more irrigators than there was water. Irrigation associations or "ditch companies" built storage reservoirs and diversions from the foot of the Rockies all the way to Dodge City. In western Kansas alone, there were eleven major ditches taking water from the Ark by the turn of the century.

The Kansas Geological Survey report released in 1943 estimated that the river was losing 31,600 acre-feet of water between Syracuse and Garden City. That's 10.3 billion gallons a year lost along a stretch that had once picked up water from the aquifer. The magnitude of these early water demands had to change the river. By the time today's residents of the valley were born, the Ark was already diminished a pale imitation of the river that led Pike west. Still, anyone who has grown up along the river can remember it in better times. Joe Rishel, Fish and Game Commissioner and dryland farmer near Kendall, tells of playing along the Arkansas as a boy. "You could be ankle deep in water one minute and over your head the next. We took

Center pivot systems in sand country south of Garden City

Chris Madson



six-and eight-pound channel cat out of those holes in spring and summer and the duck hunting was great in the fall.”

Lake McKinney, a shallow irrigation reservoir near Lakin, held amazing numbers of waterfowl. One count taken in 1961 listed more than 200,000 ducks and geese on the lake, mostly mallards, but substantial numbers of pintails, wigeon, and Canada geese as well. And this was only one concentration point. The Arkansas originally fed thousands of acres of fresh and brackish marshes, and even in its later days, there were pools and backwaters that were magnets for ducks, especially late in the year when many shallower marshes and ponds had frozen and the birds were looking for open water close to the waste milo in the lowland fields.

Where there are large flocks of wintering waterfowl, there are almost always bald eagles. For many years, the stretch of the Ark between Dodge City and the Colorado line attracted the largest concentration of eagles in the state. The Pierceville roost was one of the largest and best known, but there were smaller roosts strung out all along the river. The cottonwood timber that the eagles favored for perches also gave deer and Rio Grande turkeys a foothold. Both species were occasionally seen along the river by nineteenth century travelers, but there just wasn't enough timber in those

pristine lowlands to make either feel at home.

By the time the influence of the settlers in the area had allowed groves of cottonwood to take over the bottomlands, hunting pressure had eliminated both animals. Deer were late coming back throughout Kansas and didn't reoccupy the Ark valley in any numbers until the early sixties. Turkeys were reintroduced by the Fish and Game Commission in 1964 and prospered almost immediately. All in all, the wild populations along the Ark in the mid-sixties were only shadows of the hoards that had grazed the valley a century earlier, but they were more than southwestern Kansas had known for a long time. As anemic as it was from irrigation diversion, the river still flowed and managed to hold onto a scrap of wildness as it went. It wasn't until late in the decade that it ran afoul of another advance in agricultural technology, the center pivot irrigation system.

The first primitive center pivot was put together by an eastern Colorado rancher in the early 1950's, but it wasn't until the Valley Corporation got hold of the idea and began improving it that the system became attractive to High Plains farmers. The river was suddenly obsolete as a source of irrigation water. Now the farmers could economically tap the Ogallala itself, all 3.3 billion acre-feet of it. Irrigation in southwestern Kansas moved up out of the river valley onto high ground which, until the advent of center pivots, had been mainly pastureland.

There are 10,000 wells in southwestern Kansas today withdrawing 3.5 million acre-feet of water per year. The pace of irrigation development along the western reaches of the Ark has slowed in the last three years, but the wells are still going in. Banks seem willing to finance smaller operations, and there are corporations in the irrigation business that don't need help from local moneylenders. There are irrigated landholdings of more than 20,000 acres in the area. The land involved in such developments may be worth \$8 million alone, and the center pivot systems probably run another \$6 million. That's big business. One estimate puts the annual contribution of irrigation to the Kansas economy at about \$3 billion.

With so much riding on the control of irrigation water, it's no surprise that disputes arise. Arguments over water rights actually began almost as soon as there were white men in the Arkansas valley to argue about them. Kansas state government established a water watchdog, the Division of Water Resources, to referee these early challenges, and in 1945, the legislature passed a statute that requires all irrigation wells to be permitted by the Division. A 1968 law created groundwater management districts which were given the power to decide how fast water resources should be developed and to check on private water use to make sure it is legal. Groundwater Management District III, the district with jurisdiction over most of southwestern

Lesser prairie chicken

Chris Madson



Kansas decided a few years ago that forty percent of the water in the Ogallala in that part of the state could be used in the ensuing twenty-five years. On the basis of fairly complex hydrological concepts, they assess well permit applications on the basis of this rule. The Division gives substantial weight to these recommendations when making its final decision on an application.

There are some problems with the system. Perhaps the most basic is the decision to mine forty percent of all Ogallala water in the next twenty-five years. At current rates of recharge, one geologist has estimated that it would take about 7,000 years to recharge the Ogallala in Kansas once it is emptied. At current rates of water use, the last drop will be pumped out of the aquifer in less than a hundred years. There are already sizeable tracts that are more than seventy percent depleted.

As damaging as the forty percent depletion guideline is to the long-term well-being of the region, it's not too surprising that the district's leaders took the direction they did. They're all irrigators. Although the voting membership of the groundwater management district is open to irrigators and dryland farmers alike, drylanders seldom join because membership automatically commits them to a district levy on their acreage. So, when the decisions on water use are made, irrigators generally make them. If the depletion of water

could be confined to the aquifer that exists directly under the center pivot systems, the irrigation district's decisions wouldn't be too earth-shaking one way or the other, but water moves through the Ogallala. As a result, one man's depletion is likely to be his neighbor's problem sooner or later. The irrigators essentially pump a hole in the aquifer that slowly fills up when the pumps are shut off in the winter. The new water moves in from higher parts of the aquifer, often the untapped supplies under dryland farms or the sandy fill under the Ark River itself. If a farmer can prove that his neighbor's pumping is making water unavailable under his own property *and* if he has a legal water right older than his neighbor's, a court will probably direct the neighbor to pay damages or stop pumping. Unfortunately, the hydrology of such situations is hard to pin down. For every expert willing to testify in your favor, there is an expert who will testify against you. This legal tangle has allowed groundwater users to shoulder surface water users aside. Irrigation water that once ran down the Arkansas now sinks into the river bed and eventually re-emerges from center pivot sprinklers. Many former ditch irrigators switched to center pivot irrigation and really haven't been hurt by the loss of the river. There are longer-term residents in the region who haven't been so lucky. One of the most unique and most spectacular is the lesser prairie chicken.

White pelicans at Cheyenne Bottoms

Chris Madson



Lesser chickens have made a specialty of surviving in the driest parts of the southern plains. They are found in southeastern Colorado, along the eastern border of New Mexico, and in Oklahoma and Texas panhandles, but there are more of them in southwestern Kansas than anywhere else in the world. The key to their success here is the sandsage prairie, a mix of bunch grasses, drought-resistant forbs, and sagebrush that thrives on the dunes along the Arkansas and Cimarron rivers. Ironically, the agricultural practices that have left the Ark too dry have watered the sandsage prairie to death. Satellite photographs taken in 1975 and 1976 show that six percent of Kansas' sandsage prairie disappeared in just those two years. The sand prairies farther east in the big bend of the Ark were disappearing at the rate of five percent per year during the same period. The losses were almost totally the result of center pivot development.

Actually, a little grain mixed in with the sandsage suits the lesser chicken just fine, especially during the winter when native rations are hard to come by. But when native grass acreage drops to less than sixty percent of the landscape, the lesser chicken declines with it. Fish and Game researchers have estimated that there are about 25,000 lesser chickens left in the state, and as long as the center pivot explosion continues, the number will continue to drop.

Cheyenne Bottoms, Pool 3, October, 1980

Chris Madson



The river is feeling the plow along with the sandsage uplands. Low level aerial photographs of the Ark from the Colorado line to Larned show seventy-seven center pivots running out into the channel. In a recent court case, the Renick Brothers, Inc. have filed for "quiet title" to several parts of the river bed itself. Because the Ark is officially defined as a navigable stream, the ground between the mean high water lines along the banks has always belonged to the public. The Renicks argue that the river has long since ceased to be navigable. If it isn't carrying water, they say, why not make it raise corn? If they establish title to the parts of the river running across their land, farmers in southwest Kansas could use the precedent to take over 22,000 acres of public river bed.

However, the quiet revision of deeds is turning out to be a major legal confrontation. The Fish and Game Commission spearheaded a challenge to their action as soon as it was filed. The Division of Water Resources, the state agency with jurisdiction over river modifications, still hasn't taken a clearcut position in the dispute. No matter which way the decision goes in local court, there is sure to be an appeal; in fact, the question is likely to find its way to the state Supreme Court. If the worst should happen and the river bed is turned over to private interests, other battle lines will be drawn. Land leveling and plowing in the channel are major alterations of the river, alterations that require federal and state permits. The Division of Water Resources has not prosecuted violations of this kind in the past, but the Fish and Game Commission has recently prodded them to enforce existing laws. Even if the Renicks end up with a slice of the river, they'll have trouble turning it into a corn field.

The damage that has occurred in the last decade along western reaches of the river is only the most recent spasm in a long history of injury to native wildlife and habitats on the plains. A few people with a special taste for those creatures and places are sorry to see them passing, but it's understandable that they are in a minority. The Arkansas valley has always been harsh country, absolutely indifferent to the affairs of the men who have entered it, an adversary that asked for no quarter and has been given none. But the losses in western Kansas aren't the only ones threatened as the river dies. Sixty miles downstream from Dodge City, Cheyenne Bottoms is dying, too.

The natural marsh at Cheyenne Bottoms has always been one of the Central Flyway's key waterfowl staging areas. As recently as 1975, waterfowl counts on the area have gone over 600,000, and the marsh draws migrants besides ducks—whooping cranes and lesser sandhills; bald eagles; peregrine falcons; a host of shorebirds including avocets, black-necked stilts, and curlews; white pelicans; herons; and cormorants. The Bottoms bird list includes more than 300 species, making it one of the richest birding spots in the Mid-

west, and the area is unusually accessible for a big wetland. An amateur naturalist who likes to meet the marsh residents on their own terms can canoe into the back of any of the hunting pools which range in size from 2,000 to 3,000 acres, and the dike roads give back seat birders a good look at the area as well.

Before the state bought the 16,000-acre core of the Bottoms and diked it to control water levels, the marsh grew and shrank with spring and fall rains. Two unusually wet years in 1927 and 1928 left a 20,000-acre lake in the valley and brought an outcry from local farmers who wanted a drainage project. Since the completion of the dikes, excess water has been drawn off into nearby Cow Creek, and the marsh has been kept more or less on publicly owned land.

With the exception of last June's floods, however, excess water hasn't been much of a problem recently. Since the marsh isn't allowed to fill to the brim in wet years as it has throughout its history, it depends on transfusions from the Arkansas to keep from drying up altogether. The water has traditionally been diverted at Dundee three or four miles west of Great Bend, but the Ark doesn't flow very often at Dundee anymore, especially in August and September when the water is needed most. Statistics on the declining river flow over the last twenty years indicate that the river will be permanently dry at Dundee by 1985.

In order to be at its best as a waterfowling area, the marsh needs water throughout the spring and summer. Cattails have been choking more and more of the

Rattlesnake Creek at Quivira National Wildlife Refuge

Chris Madson



Bottoms in the last few years because there hasn't been enough water in the pools during mid-summer to discourage them. The cattails will drown in three or four feet of water but only if the water is kept at that depth for an entire growing season. Naturally occurring foods like smartweed and barnyard grass also depend on the proper manipulation of water levels. If a pool can be filled by stages through the summer, the entire bottom may be covered with these plants. No matter how sophisticated the art of marsh management becomes the quality of a duck hunting marsh will probably always depend on the manager's ability to put water on and take it off at will. At the Bottoms, that kind of control depends on the Ark. Technically, there is a way out of this water shortage. When the area was developed, the Commission established a legal right to 30,000 acre-feet of water per year from the Arkansas and another 20,000 acre-feet from the Walnut River. Unfortunately, the agency is one of those luckless surface water users who didn't go underground when center pivot technology invaded. A legal battle to regain the water would pit ducks against thousands of center pivot systems. Even if it were possible to identify the specific wells that are causing the problem, the ducks wouldn't stand much chance in that face-off.

There are plans on the drawing board to rebuild the Bottoms with a deeper storage pool in the center that would allow the manager to catch spring run-off and hold it until later in the year. If the bulldozers started tomorrow and there were no major snags, the project would cost about \$12 million, and when it was finished, there is still no guarantee that water would always be available when it was needed. Area Manager Stan Wood is already giving some reluctant thought to future management strategies.

"There will be years when the run-off from the high ground to the west will give us enough water to manage the whole area for ducks," says Wood. "That'll probably be the exception, though. In the heat of the summer, we lose an inch of water or more per day to evaporation. It takes a lot of rain to keep up with that, and the rain would have to come in August and early September which isn't too likely. When the dry years come, we'll hold all the water we can in one or two selected pools and manage the rest for pheasants. It's not a pleasant outlook."

Twenty miles south of the Bottoms, Quivira National Wildlife Refuge seems to have weathered the region's water shortage so far, but there are signs that it may not remain immune for long. Quivira is a good complement to the Bottoms, a brackish marsh that stays open after most other local shallow water including the Bottoms has frozen over. Mallards pack into the salt marsh in early December, stay until the ice finally closes in, then move up into spring holes on creeks or fly over the Cheney Reservoir to wait out the winter. Like the Bottoms, Quivira is an invaluable

nongame sanctuary and critical habitat for the Wood Buffalo whooping crane flock.

Center pivot development in the Great Bend Groundwater Management District has been almost as rapid as it has been farther west. Because there is more rain in this area and more recharge, the management district has been able to approach groundwater allocation on a "safe yield" basis in which water withdrawals are theoretically not allowed to exceed recharge. Compared to the water mining that has been allowed on the Ogallala aquifer, this conservation-oriented allotment of well permits is encouraging, but there is still a nagging question—what happened to the "surplus" water before it was used for irrigation? Chances are it kept local streams alive. Quivira takes its water from Rattlesnake Creek, a spring-fed river that drains a substantial part of the sand country south of Great Bend. The river level has always fluctuated widely but there has generally been a dependable base flow thanks to groundwater seeps. At least, that was the situation until a year or two ago. A dryland farmer with fields along the Rattlesnake a few miles upstream from Quivira watched the river dry up last spring.

"It's unusual for the Rattlesnake to go dry that early in the year," he said, "but we didn't think much about it until early fall. The circles in the area had been going twenty-four hours a day and still hadn't kept up with the evapotranspiration from the fields. When they shut the irrigation off to dry out for harvest, the creek started flowing again almost overnight. I don't think there's much doubt about where the creek had been most of the summer. It was running through those center pivots."

Charles Darling, manager at Quivira refuge, doesn't feel that local irrigation affects the Rattlesnake's flow, although he does concede that pumping farther west may have some impact. As far as he can tell, rain or the lack of it determines whether he has water for his marshes or not. Still, it's hard to be very optimistic about the future of the refuge. With the Ark lying slack in its bed just to the north, the Rattlesnake is a fragile thread to hand any hope on.

It's taken a hundred years or more, but we've finally accomplished what our great-great grandparents set out to do. We've tamed the high plains. It was rugged country, as unyielding as any on the continent, set apart not by high peaks or big timber but by its wildlife. We have channeled the native fertility of the grasslands and in the process, we've stripped away the most awe inspiring of that living scenery. Only a few hangers-on remain. And the river.

The Ark is the soul of the plains. When it goes, the last of a great, wild spectacle will go with it, and the western Kansas grasslands will take their place with the other blank, spiritless flatlands we have built for ourselves. In spite of great-great Granddad's zeal for breaking the sod, I wonder if he would have approved.

