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Cover: American bittern by Gene Brehm

Watt keeps his POWDR dry

After almost three years in office, Interior Secretary James Watt has drafted a major environmental bill. Watt calls his proposal POWDR, Protect Our Wetlands and Duck Resources, and hails it as a major effort to “stem the tide of destruction” that threatens marshes, swamps, and estuaries across the country. The bill has two key provisions, according to Watt—one would deny a number of federal subsidies for draining wetlands, the other would make new funds available for wetland acquisition and management.

The Secretary has laid his finger on a critical environmental issue. Few wild places can claim a larger constituency than wetlands. The continent depends on marshes and potholes for nearly all its waterfowl. Wetlands tend to stabilize groundwater levels, filter out pollutants, and, on the coast, they act as nurseries to many of our most valuable commercial fisheries. A marsh is a hive of activity from May to December, a corner of wild land far more important than its size would suggest.

For years, the federal government's left hand has been struggling to save wetlands. We have established the national wildlife refuge system, the Land and Water Conservation Fund, the duck stamp program, the section 404 program to limit stream damage, and a variety of other efforts to protect marshes. At the same time, the federal right hand has been funding drainage projects through the Corps of Engineers and the Department of Agriculture. Watt's proposal makes perfect sense—it's time to get the whole federal establishment

working in the same direction.

The question is: How sincere is Watt in his new-found affection for wetlands?

His POWDR bill really does stop some subsidies for wetland destruction, but there are exceptions. Chief among them are the Department of Agriculture's feed grain, wheat, and rice production stabilization programs, any energy exploration or development, road construction, the design, construction, and maintenance of federal water projects, and cultivation and harvest of fiber and forest products. That's a substantial list of loopholes—in fact, it covers almost every major threat to our remaining wetlands. In addition, word from Washington has it that Watt has given the Corps of Engineers the unofficial go-ahead in their effort to weaken section 404 of the Water Pollution Control Act. Under section 404 provisions, the Corps has been forced to limit dredging and stream alteration that would otherwise have devastated thousands of acres of bottomland marshes. Any weakening of those provisions is bound to do harm. If Watt is serious about reining in federal subsidies for marsh drainage, he's picked an odd way to show it.

Watt also seems a little hesitant to put his money where his rhetoric is. The POWDR bill outlines some significant funding efforts. It extends loan deadlines by another ten years, increases the cost of a duck stamp from \$7.50 to \$15.00, and proposes a new national wildlife refuge user fee for anyone who doesn't have a duck stamp. Once the Secretary raises this cash, however, he doesn't plan to give it away. He

wants to give it to states on a three-to-one cost sharing basis. States without duck stamps may have trouble raising their share of the money, and there's no guarantee that the cash will go where need is greatest. It's almost as if Mr. Watt doesn't think the states have been pulling their share of the wetland conservation load and wants this cost-share clause to jab them into action. The states, with more than five million acres of waterfowl wetlands under their protection, may take a dim view of this approach. Watt has shown this tight-fisted streak before—under the Wetland Loan Act, he has had more than \$50 million to spend on wetland conservation in the last three years and hasn't used a cent.

Another flaw in POWDR is the definition of wetlands that will be covered under the act. To be eligible, a wetland must be “environmentally significant,” provide significant wildlife, fisheries, or water purification benefits, and be larger than five acres. While nearly any wetland meets the first two criteria, many important prairie potholes are smaller than five acres.

The POWDR bill might be saved with substantial amendment, but, until changes are made, it is fatally flawed. As a National Wildlife Federation representative recently remarked: “Watt accurately described the fast-spreading disease of wetland destruction . . . and then offers us a placebo.” Surely the Department of the Interior can come up with better medicine than POWDR.

Chris Madson

Remember Henry David Thoreau, the eccentric nature nut who shuffled off to live the primitive life in a tiny cabin he built near Walden Pond? He stayed there eating beans, a few perch and an occasional woodchuck long enough to develop this famous philosophy of life: "Simplify, simplify, simplify." Obviously, Thoreau didn't care much about fishing rod performance.

To the casual user, a fishing rod is a simple enough device. It's just a narrow length of wood, steel, fiberglass or some of that new fangled graphite stuff. Put a cork handle on the fat end so it's easier to hold, install a simple clamp to hold a fishing reel in place, tie on a few metal rings for the line to run through and you've got it. What's so anti-Thoreauan about that?

Simplicity, like beauty, is only surface deep. Scratch a fishing rod and you unleash a confusion of physics and chemistry that only a science nut—or fishing nut—would care to understand. Yet anyone interested in buying the best and most useful fishing rod for his needs would be wise to learn a little about those simply complicated sticks.

A fishing rod has three jobs to do: It must throw a lure or bait where you want it thrown; it must telegraph the bit or strike of a fish to your hand; it must pressure and wear out a fighting fish. In addition, it's convenient if the rod doesn't weigh more than your boat, doesn't fall apart when wet; doesn't shatter when bumped against a tackle box, and is no bigger around than your arm.

No material yet discovered does all of these things equally well. That's why rod makers fool with glass, Kevlar, graphite and boron.

a complicated stick

Ron Spomer

Illustrations by Mark Johnson



They're searching for the right stuff for the perfect fishing rod.

To understand just what they're up against, let's compare a stick of dry spaghetti to a stick of soft licorice—the twisted kind that used to sell for a penny each, cherry or black. First we'll test their ability to cast a lure. You'll notice the spaghetti has a stiffness. You can twang it. The licorice has a soggy "give". No twang. Grasp one end of the spaghetti, place a tiny spit wad on the other end, pull back and let 'er fly. The spaghetti springs back to its original shape, catapulting the spit wad away, just like a fishing rod casts a lure. But you can't flex the spaghetti very far or it will break. Now try the spit wad catapult with the licorice. You wouldn't want to build a casting rod out of licorice, would you?

Now, let's find out how our test materials telegraph strikes. Hold one end of the spaghetti and close your eyes. Have someone drop a toothpick on the other end of the spaghetti. You felt it, didn't you? Spaghetti has excellent sensitivity. Give the licorice the same test. Not so good, eh? You practically have to tear the licorice in half before you feel what's going on. That's because it has too much stretch and absorbs vibrations.

Now let's check for fish fighting ability. Tie a thread to one end of the spaghetti. Tie an ounce weight to the other end of the thread. Now, holding the spaghetti at right angles to the weight, lift slowly. The spaghetti flexes slightly, bends throughout its length and . . . snap. Spaghetti doesn't make a good fish fighting rod. Now try the licorice. It bends, bends and bends some more. It probably bends at a 90 degree angle

where you're holding on to it, but it picks up the weight without breaking. Still, it stretches too much and exerts no pressure against the weight. Licorice would make a lousy fish fighting rod.

How about two more contests? Dunk both test rods in water for an hour. That stiff casting spaghetti is in trouble. The licorice holds up well, but it still can't cast spit. Next snap a fresh, dry stick of spaghetti against the edge of the table. Ouch. You just broke your supersensitive fishing rod. Slap the licorice up against the wall. Whip the table edge to a lather. You'd have a heck of a time getting that licorice to break so you could convince your wife you needed to buy a new rod.

Obviously, we're going to need better materials before we can build a functional fishing rod. Fortunately, commercial rod makers have done our testing for us and have put together rods that have all the benefits of licorice and spaghetti plus several that they don't have. Still, a few of these super rods have some of the same drawbacks of spaghetti and licorice. A fisherman could do worse than learn what they are before spending his money.

fiberglass

Glass rods are used by more fishermen than all other combined. When the new material first came out in the 1950s, fishermen were leary. Bamboo had served them well for decades. The new miracle fiber just didn't measure up. But continued improvement in manufacturing techniques and rod design permitted glass to be molded into some pretty versatile and effective fishing poles. Eventually the old steel and bamboo rods faded away. (Although bamboo still

is an excellent rod material and is planed and glued into some of the finest and most expensive fly rods made today.)

Glass is good for several reasons. It's cheap and tough. You can snap it against a gunwale without breaking it in half. It has incredible stretch and compressibility. That's important. The glass fibers on the top of a bending rod must stretch, but, at the same time, the fibers in the bottom of the rod must compress. Glass does that almost as well as licorice, but unlike licorice, glass has memory. It springs back to its original shape. Rod "engineers" call this bending and straightening process loading and unloading. A rod's ability to load and unload is a measurement of its power, its ability to store and release energy. It's what throws a lure and tires a fish. You can snap the tip of a glass rod backward while keeping the butt stationary. The glass fibers load or absorb that motion (kinetic energy) until it is all held as stored (potential) energy. Then the rod quickly unloads, transmitting the energy to the lure at the end of the line. Bingo, you've just made a cast.

Many fishermen fail to understand this principle. Instead of flexing their rods to use this casting power, they sweep them back as if they were fragile spaghetti sticks, then slowly sweep them forward, tossing the lure with nothing more than an extended human arm. Good casters with properly balanced rods and lures can throw farther with a flick of their wrists than poor casters can with a two-armed sweep cast that lifts them off their feet. The other extreme is putting too much bend in a rod, overpowering it. The result is actually a shorter cast—and a very sloppy one. A fisherman must learn to let his rod do the work.

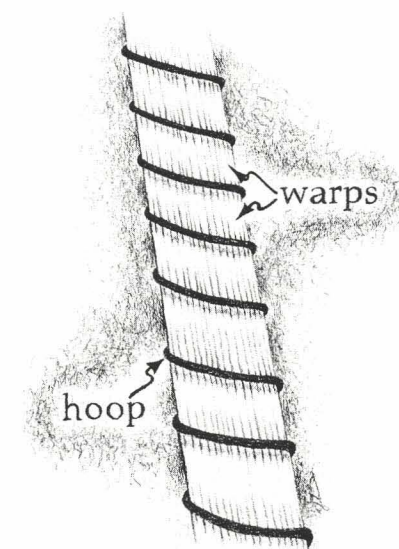


hoops and warps

A fishing rod consists of at least two layers of fibers running in opposite directions. Hoop fibers spiral around the hollow core of a rod and give it structural stability. They keep the walls from collapsing like a drinking straw as the rod is bent or banged against something. Hoop fibers contribute nothing to a rod's action. Think of them as a frame that supports the action fibers.

Action or warp fibers are the muscle of a rod. These run the length of the rod and account for its bend, power, and sensitivity. They must run the entire length of the rod or they will have little or no effect on performance. Composite rods that feature boron fibers in the butt section and glass fibers in the tip will be no more sensitive than an all-glass rod. Composite rods that feature warp fibers the entire length of the rod (one layer over another) can give the best performance if they are engineered and built properly.

No rod is one-hundred percent boron because hoop fibers aren't made of this material. A boron rod must contain hoop fibers of glass or graphite. If you want the benefits of graphite or boron action, make sure the rod you are buying has those fibers running its entire length, butt to tip.



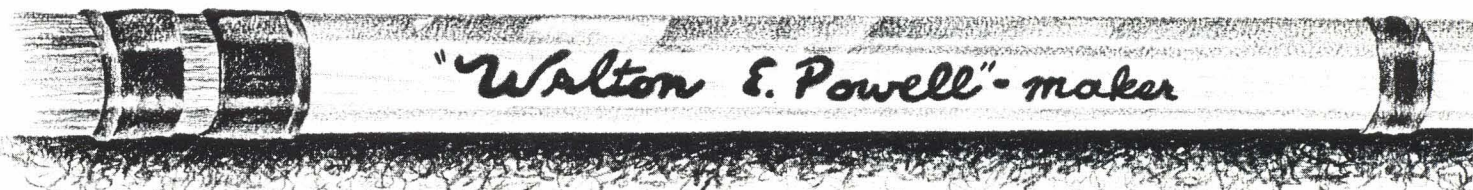
In the bent rod, warp fibers carry the load. Hoops keep the cylinder of the rod from collapsing so that it bends without breaking.

When the time comes to feel a fish bite, glass doesn't do so well. The fibers have so much mass of their own and are so stretchable that they absorb small vibrations rather than transmitting them. Rod builders say glass is insensitive when compared to the new graphite and boron fibers.

The weight of glass has other disadvantages. Once the heavy fibers are set in motion, they tend to keep moving (inertia). This sets up a vibration which is no great problem for casting bait and hardware, but does interfere with the accuracy and delicate presentation essential to dry fly fishing. A heavy rod can also be tiring to use all day.

power and action

Most anglers are confused by a rod's power and action. The two terms are not synonymous. Action is the curve the rod takes when under pressure. A fast-action rod bends sharply at its tip. A medium-action rod bends farther into its length, perhaps halfway. A slow-action rod bends evenly throughout its length. All of these actions can have the same power, which is defined as the amount of stress required to bend the rod a given distance. A one-pound weight dangled from the tip of a fast-action rod might bend just the tip of the rod a total distance of twelve inches. A medium-action rod of the same power would also bend twelve inches, but it would do so from the middle of the rod out to the tip. A slow-action rod would bend the twelve inches throughout its entire length.



Because fiberglass is so stretchy, it must be built into large diameters to make it strong enough to cast heavy weights or fight heavy fish. This large diameter shaft creates wind resistance, another force casters must fight. Again, no problem to the ultralight spin fisherman with a five-foot rod, but a bass bug enthusiast with a nine-foot fly rod pushes a lot of air in the course of a day.

Glass then, is excellent for small rods, rods designed to wrestle heavy fish and rods used to plunk a chunk of bait in the water. It's also forgiving of casting errors and fish fighting mistakes. If a fish tugs too hard or your reel's drag is too tight, a glass rod will "give" and probably prevent the line from snapping. A

less stretchy material would offer immediate resistance and pop the line.

If your type of fishing entails casting long distances repeatedly, detecting subtle strikes or casting flies, you might be better off with another material.

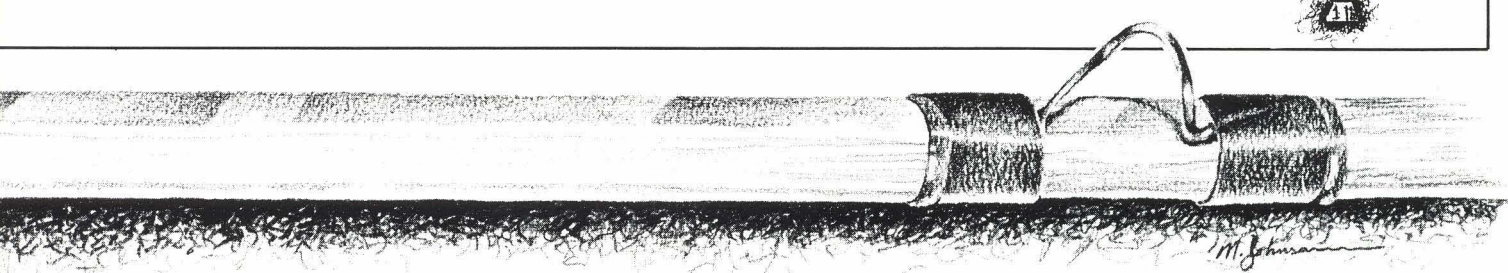
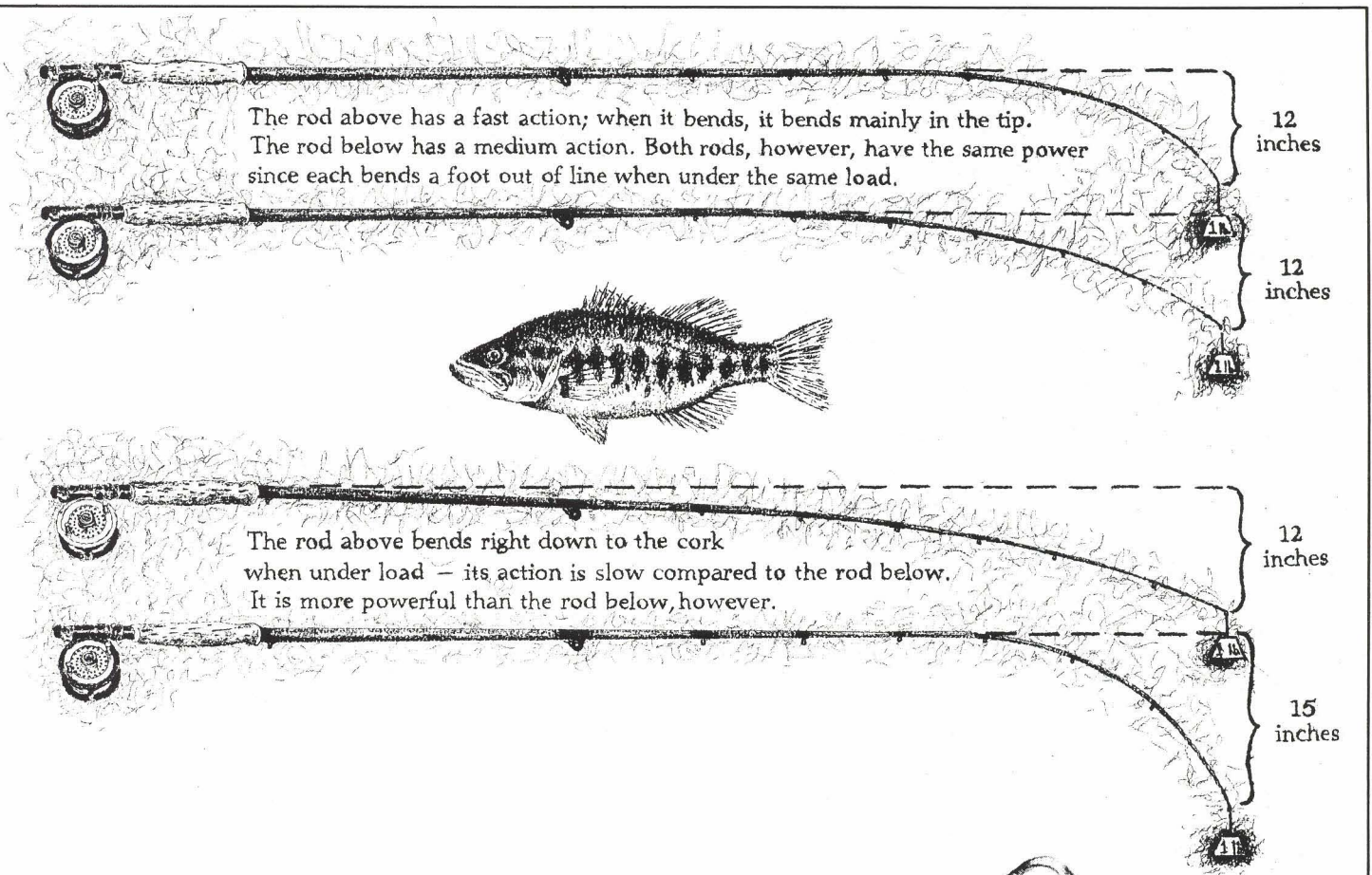
graphite

This space age substance was developed by the aerospace industry in 1966. The Fenwick rod manufacturing company introduced it in fishing rods in 1972. It quickly took the fishing world by storm because it could do several things much better than glass.

Sensitivity is perhaps its biggest claim, but it gets this by sacrificing

stretch. In other words, graphite is more like spaghetti than licorice. It resists bending because it is able to quickly store a given amount of energy—and just as quickly release it. In other words, it is fast. It does everything glass does—faster. Rod engineers like to call this responsiveness "high modulus." They say graphite has a higher modulus than fiberglass because its fibers are stiffer than glass fibers in relation to their own weight (mass). The rod sellers don't like to say stiffer because fishermen have condemned graphite for being too stiff. That's wrong.

Take a graphite rod off a store rack, whip it once or twice and it feels like a light, dry stick. Too stiff.



No action. Don't let that fool you. The only reason it feels stiffer than a glass rod of the same power and action is because the graphite fibers don't weigh enough to keep themselves swaying and vibrating after you've shaken the rod. Glass is so heavy it actually has a "built-in casting weight" to give it action. You must put line and lure on a graphite rod before it performs. This is good. It means you use your energy casting the bait, not the rod. And because the rod quits vibrating (dampens) quickly, there are no vibrations transferred to the fly line, which means you can throw it farther, faster, and more accurately.

Because graphite fibers are stiffer than glass fibers, it takes fewer of them to produce a given power, so shafts can be made smaller. That translates into less air resistance and more casting comfort.

Graphite enthusiasts extoll the casting power of their pet rods, which throw lures like spaghetti throws spit wads—much better than licorice or glass does.

The trade-off for all this high modulus—this resistance to bending is less "forgiveness." It's relatively easy to set a hook with a graphite rod and snap the line. The fibers store energy so fast that they "stack up." That is to say they load

and transfer all your hook setting energy to the hook instead of absorbing it themselves.

All things considered, graphite can help you cast farther with less effort if you learn how to use its built-in power. It will help you detect subtle strikes too. And it will cost more than a glass rod, so if you don't need it, save your money and buy a rod that fits your needs.

boron

This is the new star of the industry. Boron fibers (another aerospace industry invention) can make one of the toughest and best rods or one of the worst, de-

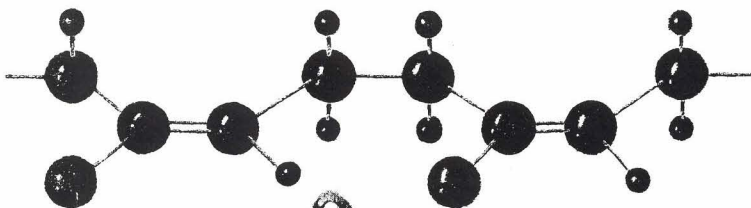
the building blocks

The rod materials that have brought us out of the age of split bamboo have at least one thing in common. They are composites, that is, combinations of extremely strong fibers and epoxy resins. The combination of the two is a little like a mixture of spaghetti and glue—the glue keeps the spaghetti from pulling apart and the strands of spaghetti themselves give strength to the mess. In today's space-age rod materials, the strands aren't pasta but extremely long, tough filaments of glass, boron, or graphite interconnected with innumerable chemical bonds. This network of molecules and bonds is known as a polymer and is what accounts for the outstanding performance of the new rods.

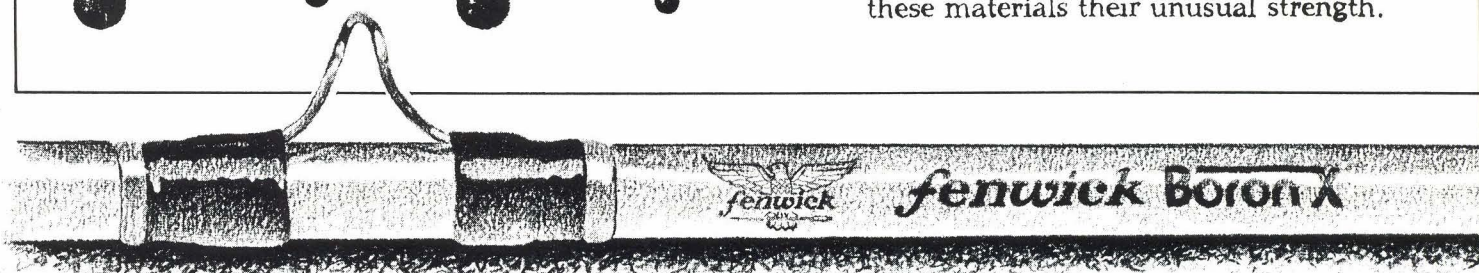
The oldest of the miracle fibers is fiberglass. In recent years, two types of fiberglass have been used in rods. Both are made of glass yarns woven into fabric and impregnated with resin. The difference is the purity of the yarn. The less expensive "E" glass has been around for years. The newer "S" glass was originally developed for the Defense Department. It is slightly

lighter, almost forty percent stronger, and fourteen percent stiffer than "E" glass because it has fewer contaminants. Fiberglass rods have also improved as technicians have found ways to weave glass fabrics that are tailored to rod construction.

Graphite is a much more exotic material than fiberglass. Take a microscopic thread of polyacrylonitrile-B (PAN-B for short), treat it to form a polymer, then carbonize it and you have made a filament of "graphite." The final product is about .00028 inches in diameter. These filaments are carefully gathered so they aren't twisted, then stuck together with resin to form a "unidirectional tape" about twelve inches wide and .005 inches thick. This is the raw material used to build graphite fishing rods. When the tape is laid on the mandrel, the graphite fibers run the entire length of the rod and are held in place with fiberglass hoop fibers. These unbroken lengthwise fibers enhance the graphite rod's sensitivity and improve its casting performance.



Fiberglass, graphite, and boron are all polymers, huge molecules made up of thousands of smaller units all chemically connected. This chemical bonding gives these materials their unusual strength.



pending on how it is used. Because it is so new (Browning came out with the first commercial models in 1978), many manufacturers don't know how to use it effectively. In fact a few boron rods have been analyzed and found to have no boron in them. Many others had very little of the material or lumped it in the wrong places. The experienced boron rod builders say boron fibers must run the entire length of a rod before they affect its action. (See Hoops and Warps side bar).

Boron is most easily described as another step up from graphite. If graphite is fast, boron is even faster. The boron is condensed on minute

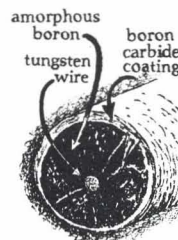
tungsten filaments, producing a thread only .004 inch in diameter. They have incredible tensile strength (resistance to pulling apart), but not much flex strength. That means they load and unload in a big hurry, throw a fast line, set a hook with a mere twitch of a wrist, and pop lines like thread if you don't use a light touch.

The benefits of boron are best realized in fly rods, where its innate quickness contributes to ease of casting, fast line speeds, and accurate, delicate presentations. The rod is practically vibration free, so lines flow unhindered. The material is so stiff in relation to its weight that it

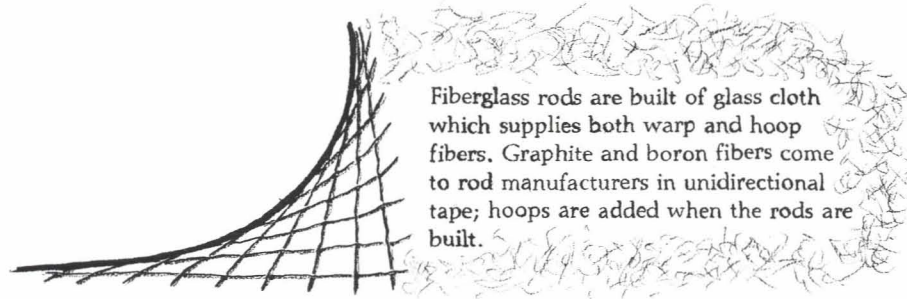
has no flex of its own. You must load it with lure or line to feel its action. Boron is even more sensitive than graphite and has incredible resistance to knocks and bruises.

It would seem that a well-designed, well-built boron rod is perfection realized—until you realize how much it costs. And how unforgiving it is. It does not make a good, soft rod for lobbing light lures at crappies. It will not stretch and keep a fish from breaking line. It absorbs and loads pressure so fast that it's almost like fishing with a two by four. Combining it with graphite warp fibers gives it much better flex stretch qualities and helps alleviate many of these shortcomings. You'll just have to try one to understand it.

The most recent addition to the list of rod materials is boron. Boron filaments are made by passing a tungsten wire through a glass cylinder filled with boron vapor. The wire is electrified and the boron coats it like zinc coats the outside of a galvanized steel garbage can. The result is an extremely fine filament of amorphous boron that can be as long as the manufacturer wants to make it. Sound complicated? It is—and that may explain the high cost of boron. As for performance—boron fibers transmit vibration twenty-three percent faster than fiberglass, are six times stiffer, and substantially stronger for their weight. In fact, boron's great stiffness and strength caused problems for rod designers for awhile because it was difficult to build a rod tip fine enough to give it proper flex. While that problem has been ironed out in the best rods, it shows that there is more to a boron rod than just boron. Bargain basement boron rods may well give bargain basement performance.



Boron filaments for fishing rods actually have three parts. Fabricating these .009-inch diam. wires is difficult . . . and expensive.



Fiberglass rods are built of glass cloth which supplies both warp and hoop fibers. Graphite and boron fibers come to rod manufacturers in unidirectional tape; hoops are added when the rods are built.

beyond boron

One thing is certain. Rod engineers are not resting on their boron. Testing and design research continue and the top manufacturers are learning to pull more performance from boron, graphite, and even glass. And there's always a brand new, untried material on the horizon that might combine all the best that licorice and spaghetti have to offer.

The technical side of rod design and manufacture leads into a host of complex technological disciplines. A number of sources contributed information for this article. Particularly helpful were: Dick Gaumer and Jim Green of Fenwick/Woodstream Corp.; Dr. Howard Smith, Materials Science, Kansas University; Thomas Prendergast, AVCO Corp.; Tom Anderson, Flameco Corp.; Steve Walling, Owens/Corning Corp.; Dave Forrest, Fiberite Corp.; and Bob Stromberg of Union Carbide Corp.

Illustrator Mark Johnson is an accomplished wildlife artist and has recently finished two posters on threatened and endangered species for the Fish and Game Commission.



the ferruginous hawk
has made a life on the
treeless shortgrass prairie

hawk of the high plains

Marvin Schwilling

The taxonomist who gave the ferruginous hawk its Latin names must have been impressed with the bird. Its broad wings and tail marked it as a buteo so he called it *Buteo regalis*—the regal hawk. And the name fits. The venerable naturalist Arthur Bent paid high tribute to the ferruginous hawk, comparing it with the golden eagle in his *Life Histories of North American Birds*: “Both species have feathered tarsi (leg shanks), both build huge nests on cliffs or trees . . . the food habits, flight, behavior, and voice of the two are much alike.” Largest of the North American buteo hawks, the ferruginous may stand twenty-five inches high and measure five feet from wing tip to wing tip, an aerial predator large enough to feed consistently on prairie dogs and other ground squirrels and even capable of taking a jackrabbit now and then.

The ferruginous’ appetite for rodents accounts for two of its local nicknames, “squirrel hawk” and “gopher hawk.” The bird’s other aliases refer to field marks that set it apart from other buteos. Some people know the ferruginous as “rusty hawk” because of the reddish cast most light-phase birds show on their shoulders and backs; others call it “chap-hawk” because the feathers of its legs are brown or rust and contrast with its white belly and tail plumage. These dark legs are probably the best field mark for the common light-phase ferruginous since they form a dark “v” near the

tail when the bird is in flight. As with most other buteo species, there is considerable variation in the plumages of individual ferruginous hawks and a dark, melanistic phase in addition to the light phase. An observer who can sort out all the color phases of all the species of buteos can consider himself an expert raptor watcher.

The ferruginous is a bird of the arid shortgrass prairie. It shows a particular taste for rock bluffs and badlands which furnish elevated hunting perches and nesting sites in country that offers very little other cover. Ferruginous nests are often spectacular in both location and size. Many of them are built just

under the crest of a chalk bluff or perched on a free-standing pinnacle where they are held in place by a jutting boulder. The nests themselves are bulky conglomerations of sagebrush, yucca, and tree branches varying in size from twigs to branches more than an inch in diameter and several feet long. They are generally lined with dried grass, cow chips, sagebrush bark, and similar litter. Birds may return to build on nest sites year after year,

The classic ferruginous hawk nest is built on a bluff or rock pinnacle in a badlands outcrop. After the young hawks have hatched, their parents often leave them alone; the task of feeding the youngsters demands the attention of both adults. (photo below by Gus Wolfe, opposite page by Stan Roth)



accumulating massive structures more than four feet wide and twelve to fifteen feet high. When such platforms are built in small trees, they may take up almost the entire center of the tree; one ferruginous nest in a mulberry near Garden City grew to be nearly five feet wide and at least eight feet high. House sparrows and magpies have been known to nest in the lower layers of some ferruginous nests without running afoul of the hawks, but they aren't nearly so tolerant of other predators. Bent reports that ferruginous hawks will drive redtails and great-horned owls away from the vicinity of the nest, and another observer has seen a ferruginous scare off a coyote.

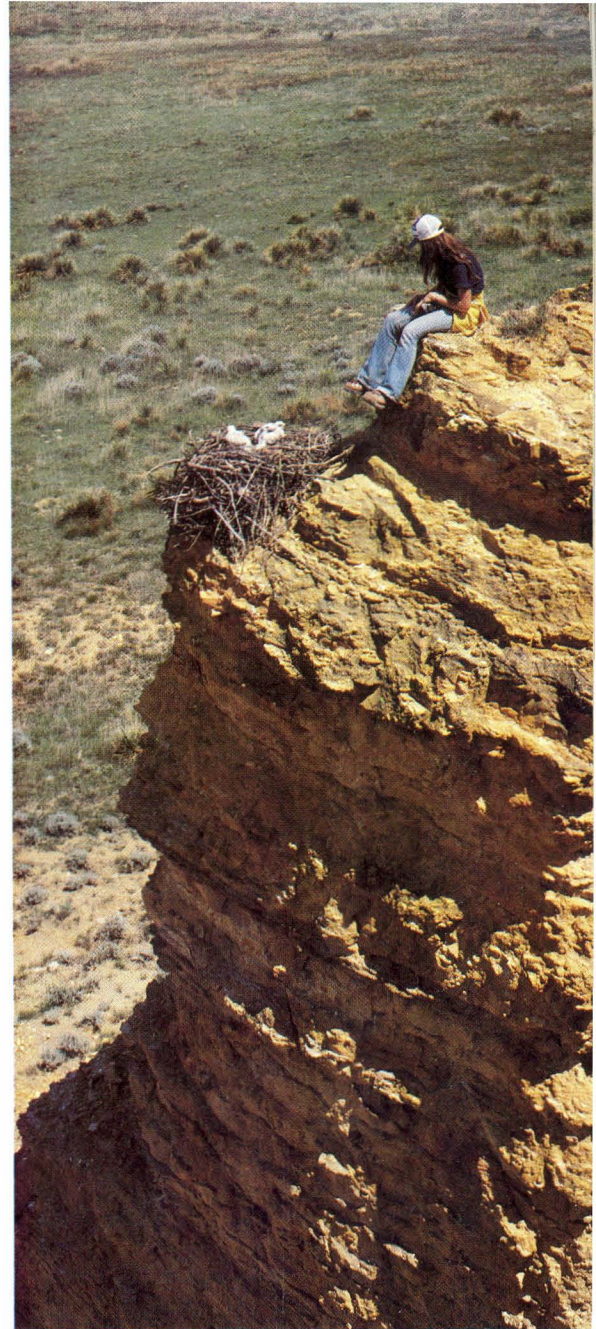
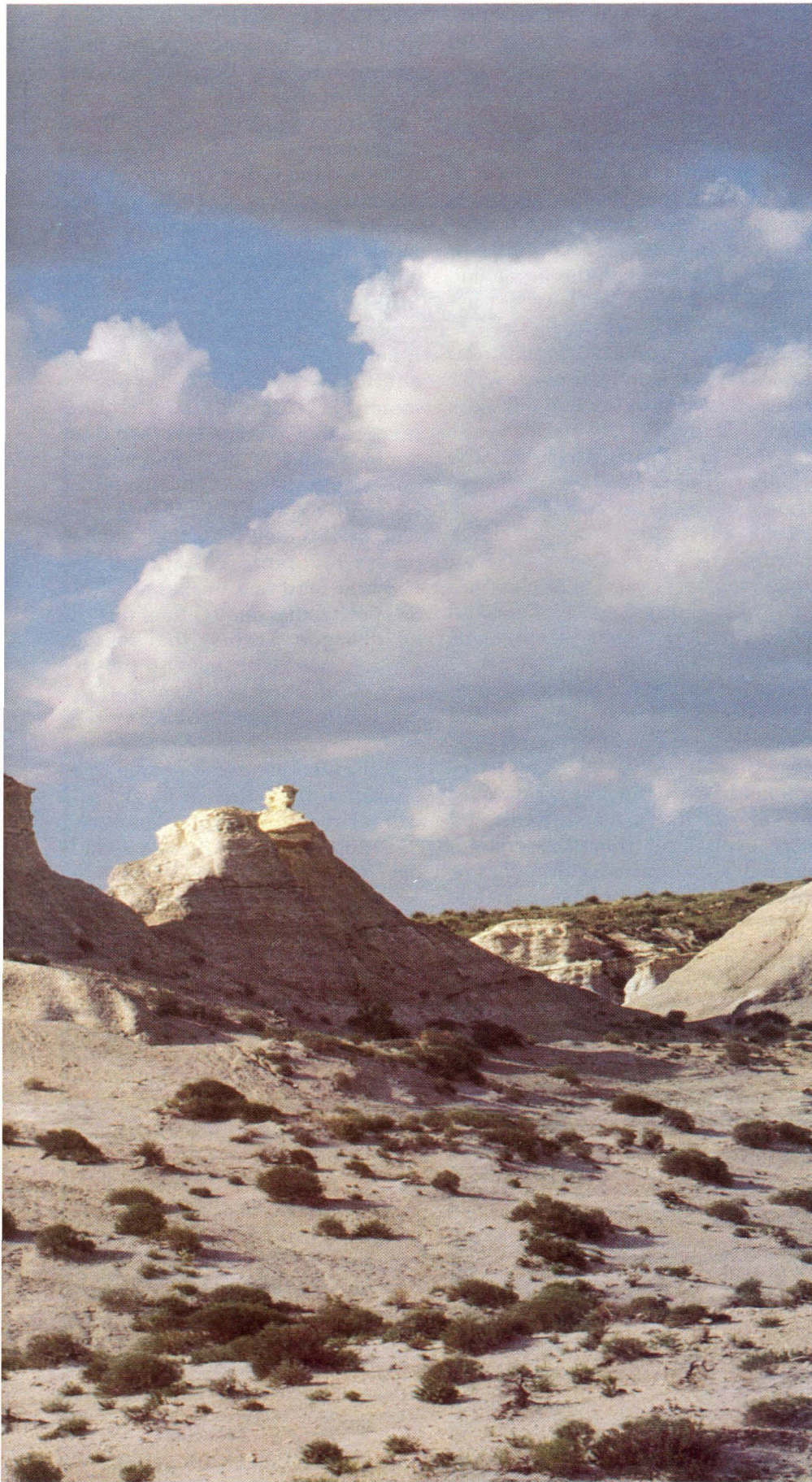
Like many other prairie natives, the ferruginous hawk has not prospered since the grasslands have been settled. It is generally regarded as rare in many parts of its range, and, until 1978, little was known about its status in Kansas. In that year, the Fish and Game Commission's nongame program funded a study of threatened and endan-

The ferruginous hawk doesn't come by its nickname "gopher hawk" idly. The young birds generally have a rodent waiting for them when they hatch (below), and their appetite is almost insatiable for the next two months. (photo below by Stan Roth, photo at right by Gus Wolfe)









Ferruginous hawks have excellent taste in country. In the wheat country and grazing land of western Kansas, chalk beds (opposite) and shale bluffs are often the only habitat isolated from human interference. (photos by Stan Roth)

gered species in northwest Kansas. The principle investigator, Stanley Roth, Jr., was also to gather information on other little known wildlife species including the ferruginous hawk.

In the summer of 1978, Stan and several of his high school biology students spent fifty-three days surveying wildlife populations in fourteen counties in northwest Kansas. They concentrated on the Smoky Hill River valley between Cedar

Bluff Reservoir and the Colorado line and found seventy-four ferruginous hawk nest sites, twenty of which were active. The study continued in 1979, but Stan reduced the area of coverage to ten counties. He and his assistants checked 191 nest sites including the seventy-four they had located in 1978. Fifty-two were active.

In 1980, the study was reduced to a June reconnaissance of the nest sites that had been occupied in 1978 or 1979. Sixty-eight of these sites were checked, but only thirty-seven of them were occupied, and four of these were lost to storms or predation. In 1981, Stan found evidence of egg laying in forty-three nests, and in 1982, forty-two showed signs of activity.

Stan's four-year study demonstrated that the ferruginous hawk is more common in Kansas than many biologists had believed. The nesting survey turned up nests in eleven counties in western Kansas, and birders have reported wintering ferruginous hawks as far east as Missouri. Stan's work also indicates that these birds may use any of sev-

eral nesting sites in their territories. Some of this shifting of nest sites may be due to year-to-year changes in local prey populations or other natural causes, but much of it is a response to human disturbance.

Of the nests that showed signs of use at some time during the study, only fifty-six percent attracted nesting pairs in 1980. In 1981, this percentage rose to sixty-three percent, and in 1982, it settled back to fifty-three percent. Whether the observed variation in ferruginous hawk nesting is normal or cause for concern is hard to say without more careful study.

After the nesting season, the young and adult hawks wander over the countryside in search of food. Food habit studies clearly show that ferruginous hawks have a taste for small mammals, particularly ground squirrels, prairie dogs, gophers, and rabbits. The Kansas ferruginous hawk typically eats a fair number of grasshoppers and crickets as well. Unlike many buteos which spend much of their time soaring in wide circles high in the air, the ferruginous hawk often hunts low over the prairie like a marsh hawk and may even hunt from the ground, pouncing on unwary prairie dogs or gophers before they have a chance to get underground. Ferruginous

hawks have actually been seen grabbing gophers out of their mounds before the rodents had even surfaced.

Biologist P. A. Taverner offered this comment on the ferruginous hawk's value to the farmer: "A conservative estimate of the requirements of a family of these large hawks is surprising in its total. Two adults, from spring arrival to the birth of young, three months, consume not less than a gopher a day, ninety in all. After the young are out, four in the brood, and for two months at least, the family requirement cannot average less than three gophers a day, or 180. Thereafter for one month, the six . . . probably will require one gopher each day, or 180 more. A single gopher, under favorable conditions, destroys at least one bushel of wheat. Supposing that one-tenth of this can be charged against the average gopher, we will have thirty-five bushels of wheat as the value of this one family of large hawk for a single season."

Unfortunately, some people don't recognize the value of hawks as a natural rodent control. Stan Roth's field notes for June 28, 1978 include the following remarks: "Nest located at Hell's Bar, south of Monument Rocks, Gove County, Kansas. Nest had two rotten eggs, one broken open. No adult birds were seen; four empty twelve gauge shotgun shells were found forty feet southeast of nest; had adults been shot?" If the pair had indeed been shot, someone had made a costly error. Banding records indicate that these birds live to be at least twenty years old. If Taverner's estimate of the hawk's gopher consumption is accurate, a pair of the birds might consume as many as 14,000 in their lifetime—and saved 14,000 bushels of wheat. Benefits of that magnitude make the ferruginous hawk an expensive target indeed.

The hawk on page 13 is slightly darker than the usual ferruginous hawk. The adult shown here has the rust-colored legs, white breast, and light back typical of the species. (photo by Gus Wolfe)



the yellow pages

edited by Ron Spomer

WRITING READERS "?!&..!"

CAREER PICTURE

Editor:

I am a student at Wichita Northwest High School and recently read *KANSAS WILDLIFE*, Jan./Feb. Your photographers impressed me very much. I enjoy photography and am planning to make a career out of it. If you would please send me some extra information on their schooling, etc., it would be greatly appreciated.

Kristy Friesen
Wichita, KS

Dear Kristy,

All three photographers reported they graduated from the school of hard knocks. They read everything they could about photography and practiced, practiced, practiced. They claim their years of hunting, fishing and nature study contributed as much to their wildlife photography as does their photographic knowledge.

HOME ON THE RANGE

Editor:

I was raised in Wakefield, Kansas, on the shores of Milford Lake where I spent most of my youth hunting and fishing. In 1980, I joined the U.S. Air Force, and since then, I've been to nearly every state in the country. I've never been to one that has as much to offer as Kansas.

Kansas has a balance of four seasons, some of the best crappie and bass fishing and the best pheasant and quail hunting. Kansas taught me to love the outdoors and be a true sportsman. I just hope the people of Kansas strive to keep Kansas beautiful and special and protect the wildlife.

Mr. Greg Smith
Myrtle Beach, SC

SOME DOCTORS...

Editor:

In regard to your article in the 1982 November/December *KANSAS WILDLIFE* entitled "Too Much of a Good Thing," I'm curious why you did not include plumbers, electricians, bankers, farmers and law enforcement agents with your 'Some doctors and lawyers'. Obviously the writer

of this article must have a vendetta towards professional people. I wonder if he is aware of the millions of dollars these 'Some doctors and lawyers' have contributed to Ducks Unlimited and to the funds of the Fish and Game Commission.

I have belonged to a goose hunting club for more than twenty years at Napier, Missouri, which is adjacent to Squaw Creek Game Refuge. My record for ten days of hunting in 1979: 10 trips, 3 geese; 1980: 10 trips, 3 geese; 1981: 4 trips, 2 geese; 1982: 8 trips, 8 geese.

Our club has no pit captains, no baiting and I have never seen a member pass up a chance of shooting any legal duck.

My friend, Mr. Robert Brennan, an insurance executive, stayed at Napier for three weeks to watch the geese fly and only shot 1 day out of the whole season. I think your article is very unfair and biased. I know the director, Mr. Bill Hanzlick, personally, as a very fine sportsman and interested in the welfare of all the hunters in the State of Kansas. I hope that this is one article that slipped by without his approval.

Dr. Kirk A. Dutton
Topeka, KS

P.S. I would appreciate this letter being published in your next issue under the yellow pages.

Dear Dr. Dutton,

Here's your letter. In my editorial "Too Much of a Good Thing," I wrote 'Some doctors, lawyers and other

professional people enjoy this hunting experience so fully that they partake of it nearly every day before or after work," because during a public hearing on steel shot regulations in the House Chambers in Pierre, SD, I heard some doctors and lawyers say they hunted the 'clubs' nearly every day before or after work. I did not hear any plumbers, electricians, farmers, bankers or law enforcement agents say this.

Sorry, no vendetta.



SHOW-OFF

Editor:

I am a transplanted Kansan and so very proud to "show off" your publication to friends as the finest of it's kind anywhere. I still return each fall to chase bobwhite quail and don't mind the out-of-state fee one bit. It's always worth it, and someday I'm going to hit one of those buggers.

Don Addy
Bloomington, MN

CHEMICAL RESISTANCE

Editor:

When I read 'Pesti-Side and Chemical Hero', (Mar./Apr.) I was really upset and still am.

I just wish I was a good writer and could express myself in a way that would wake people up to what is happening. Not only is chemical farming a serious threat to wildlife, but to every man, woman and child. We are all being poisoned every day by chemicals. Chemicals are not only killing harmful pests but all the beneficial ones as well, including bees, ladybugs, angle worms, etc. They are killing the goose that laid the golden egg — the beneficial insects used to keep the harmful ones in check.

They talk about much bigger yields since chemicals came in, but the truth is they have come up with new and better varieties, hybrids, etc. We could have those same big yields now without chemicals and I have been doing it for 50 years.

Seeding clover and rotating crops is the answer and it works. Big farms and corporations are cropping the same land in the same crops year after year and soaking the ground with dangerous chemicals that kill every living thing in the soil — year after year. If it really works, why do they have to continue using it year after year?

The truth of it is, some of those harmful pests build up resistance to the chemicals, unlike the beneficial insects and humans. In time, our children will get the benefit of those poisons when it reaches our drinking water (and some of

it already has). Our children, wildlife and beneficial insects will pay the price.

Of course big farms, corporations and chemical companies want people to keep using their products. It's a billion dollar business, and to them, money is more important than lives.

I hope people will wake up before it's too late and it already is for lots of people.

Donald C. Merchant

FRAME-UP

Editor:

In the Jan/Feb KANSAS WILDLIFE there are two excellent pictures I would like information about. We were so impressed by these pictures we would like very much to have copies to frame and display in our home. How do I go about getting copies? They are "Ducks Against Thunderstorm" and "Coyotes and Waterfowl".

Sylvia J. Osborn
Clay Center, KS

Dear Sylvia,

The Kansas Fish and Game WILDTRUST program offers our readers 11 x 14 inch color prints of any staff produced photograph published in our magazine. Send a \$20 donation (check or money order, made payable to WILDTRUST) for each print you want. Mail to Prints, I & E, Kansas Fish & Game, RR 2 Box 54A, Pratt, KS 67124. Prints of photographs contributed by freelancers may be available from them directly. We will forward all requests to them.

FUNGAL BALM

Editor:

We have taken KANSAS WILDLIFE for years and still enjoy it. We are hunters, fishermen and mushroom hunters. I love to stroll in the woods hunting mushrooms. Nothing else takes away the stress and strain of everyday living so well. I guess that's why I really enjoyed the article "Looking Down" in the March/April issue.

We spend all day in the woods, listening to the birds and looking for mushrooms. What a pity so many Americans look only at the flowing traffic and concrete streets.

Thank you for the KANSAS WILDLIFE and the beautiful photographs. Keep up the great work.

Mr. & Mrs. Art Bean
Lecompton, KS

CLEAN CUT

Editor:

In the Sept/Oct edition of KANSAS WILDLIFE, you had a story about squirrel hunting, cleaning and cooking. There's an easier way to clean them.

Pick up the squirrel by the tail. Make a 1½ inch cut across the underside of the tail next to the back legs. Cut through the tail bone, step on the tail and pull up on the back legs, peeling the skin over the carcass all the way over the front legs and head. This will leave a small

V shaped piece of fur on the tummy. Pull this back over the back legs, cut off the feet and head and you're done. It's easier and quicker.

James W. Edwards
Olathe, KS



RISKY VACATION

Editor:

I can't tell you how much we enjoy the KANSAS WILDLIFE magazine, especially while being away from home. Our vacations are taken in Kansas during November to allow my husband a chance to shoot some pheasant, stalk the deer with bow and arrow and does he truly enjoy himself!

It's nice to return in a not so busy season, when I can visit family and friends without the bustle of holidays and their demands.

Thanks again for a beautiful gift from home.

Mrs. Dan McNeil
Burke, Virginia

Dear Mrs. McNeil,

You're certainly welcomed. We're happy you two get to enjoy good old Kansas at least once a year, but we also hope your husband is a Kansas resident currently serving in the military, because that's the only way a non-resident can legally hunt deer in Kansas.

GOING TO THE DOGS

HUNTING



A prairie dog hunt is a contradiction in terms.

Prairie dogs don't have to be hunted. Any rancher who has a colony of these "barking squirrels" will quickly point you to the offended pasture. You'll immediately spot the "town" — a collection of bare, earthen mounds marking the entry to the rodent's burrows. The hunt then becomes a shoot as you try to hit the tiny rodents scampering across the short grass or peeking from burrows 50 to 300 yards away.

The shoot is a valuable exercise in marksmanship, a familiarization with rifles and ballistics, a practice that makes any shooter a better hunter of other game when accurate shooting spells the difference between a clean, humane kill and the alternative.

There is another reason to shoot prairie dogs — to save their collective lives. It is no secret that ranchers don't love these burrowing grass-eaters. They would as soon see the grass go into their cattle and the holes disappear. They'll spread poison oats through the town to facilitate that end. A poisoned town is a quiet place for a long time. Better to trim the population frequently than to wipe it out forever. So marksmen can do

prairie dogs, ranchers and themselves a favor by keeping a dog town in check.

You can use a .22 rimfire on uneducated dogs, but to be really effective and to get the best practice for big game hunting, use your "deer rifle." Reduce ammunition costs by reloading. A 4X scope will work for close targets, but beyond 100 yards you'll have trouble seeing your targets.

If you really want to "get into" long range dog

shooting, invest in a flat shooting .22 or 6mm caliber centerfire that spits out a slug at 3000 to 4000 feet per second. Put a 10X to 20X scope on it and see just how steady you are. Make several sandbags on which to rest your wavering rifle. A pair of binoculars helps to locate dogs peering over the edges of their mounds. A spotting scope is particularly effective. With a two man team, one can shoot while the other spots, watching where

the shot went wrong so the shooter can correct his mistakes.

Several hours of shooting small targets at various ranges under different light and wind conditions can teach a wealth of information about rifle and bullet performance, and keep a prairie dog village alive (but not overpopulated) for decades.

RS

PERMIT DATES SET

The Kansas Fish and Game Commission has established standard application dates for limited hunting permits. These dates will remain constant over the years.

PERMIT	APPLICATION PERIOD
Archery Deer	July 1 through Sept. 30
Firearms Deer	July 1 through July 21
Antelope	June 1 through June 23
Fall Archery Turkey	Aug. 1 through Aug. 20
Fall Firearm Turkey	Aug. 1 through Aug. 20
Spring Turkey	Jan. 11 through Feb. 2



Shangri-La

South Dakota's grain, water and weather provided a shangri-la for the Central Flyaway Canada goose flock again last winter. The mid-December aerial photographic survey revealed 327,413 Canadas on two Missouri River reservoirs, Sharp and Oahe.

South Dakota's record 1980 December count was just over 310,000. Biologists can't say for certain what caused last winter's increase. Certain populations are increasing dramatically now that young birds protected by restrictive harvest regulations during the late 1970s have reached breeding age, but flyaway migration routes have also been changing along South Dakota's Missouri. One thing is certain, every November, Kansas hunters will have to pray for nasty weather to blow the hardy geese south.

WILLIS ART ON LOAN

BEAUTY & the BEASTS



M. Wayne Willis wasn't born with a brush in his hand, but you couldn't determine that by scrutinizing his paintings. Renditions that good must have taken a lifetime of practice.

Actually, Willis did begin sketching the outdoor life he loved at an early age in Maryland and Virginia. He credits this early study with his ability to illustrate directly from nature. His

professional training included junior college where he won a scholarship to Kansas City Art Institute. Shortly after that he entered the army and WWII. He continued his art training in Germany after the war, returned to the U.S. and accepted a position with Boeing Aircraft where he worked 23 years as an illustrator and Art Editor. His wildlife painting continued as a hobby until the demand for his works convinced him to leave corporate life and paint for himself fulltime.

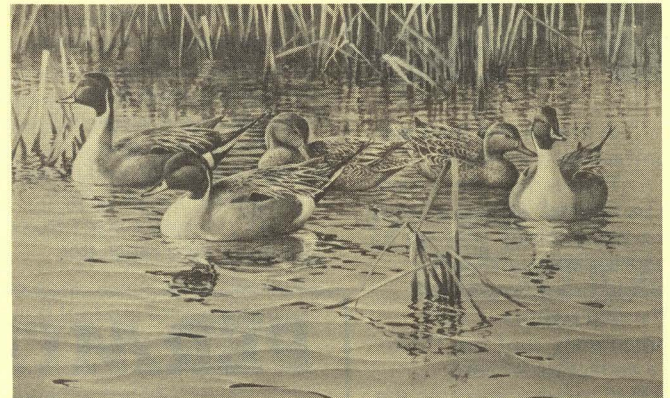
Today Willis is one of the leading wildlife artists in the U.S. Naturalists and ornithologists praise his work for its accuracy. Sportsmen appreciate his vividness and realism. Willis paintings have

been shown annually at the prestigious Waterfowl Festival at Easton, Maryland. He recently had a one-man show in Crossroads Gallery in New York City.

Willis is active in Ducks Unlimited and makes his home in Wichita with his

wife, Mona.

Willis images will be displayed in Pratt during April and May. Signed, limited edition prints are available from Jan Royston, Kansas Fish and Game Commission, RR 2 Box 54A, Pratt, KS 67124.



MASON ART, TOO

Some artists study and practice at institutes and universities. Others turn a natural talent into award winning images. Diane D. Mason does the latter.

Mason works in

scratchboard, a demanding format that doesn't allow the artist to correct mistakes. As Mason's works show, she doesn't need to. She literally scratches the white lines of her images on a white

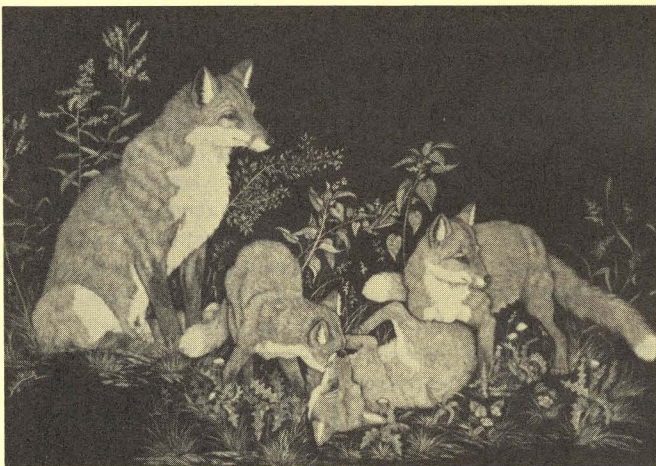
chalkboard covered with dried ink. It is a credit to her talents that the composite scratches resemble so remarkably the wild animals she knows and respects.

Mason grew up in a hunting and fishing family in northern Illinois — lots of pet dogs, cats, raccoons, squirrels, ducks and chickens. She enjoyed sketching as a child, but had no classroom instruction at any age. In 1973, she earned a Bachelor of Science degree in Ethology (Animal Behavior) from Purdue University.

Diane and her husband, Robert, moved to Kansas in 1980, and she taught scratchboard art classes in Hutchinson and McPherson for more than a year. They

now live in Rose Hill with three dogs, two gerbils, one white-footed mouse and numerous fish and turtles.

Diane's artwork is sold by the Wichita Art Museum and the Valhalla Gallery. She attends juried art shows in a six-state area, and her work is displayed in collections from Florida to California. While on loan to the Fish and Game Commission in June and July, several of her 25 originals will be displayed in the Pratt Headquarters, Pratt Medical Arts Building, Chamber of Commerce and at Pratt banks. Prints will be available from Jan Royston, Kansas Fish and Game Commission, RR 2 Box 54A, Pratt, KS 67124.



IQF STAMP



The International Quail Foundation, a non-profit organization, is proud to announce the selection of Owen J. Gromme's painting, **BOBWHITE-WINTER DAY**, as its second annual Quail Research Stamp Print. Mr. Gromme, recognized as the dean of wildlife artists, is a past winner of the Federal duck stamp contest and has also designed prints for organizations such as the American Museum of Wildlife Art and the International Crane Foundation. Gromme's colorful signed and numbered print follows David A. Maass's 1982 design, which quickly sold out and doubled in value.

The edition size of the 1983 print has been set at 3900, with only 50,000 stamps to be issued. March 15, 1983, was established as the release date for first day covers and souvenir cards.

BOBWHITE-WINTER DAY has an image size of 6½ by 9 inches and is available for \$130.00 from the Foundation. Single stamps are \$5.00 each, with \$20.00 for plate blocks and \$50.00 per sheet of 10 stamps. Souvenir cards, first day

covers, and a limited supply of 1982 Maass stamps are also available.

IQF prints and stamps are being voluntarily purchased by sportsmen and collectors to help bring about a halt to the decline of America's quail populations. Because of the overwhelming success of its stamp-print program, the Foundation will provide a record of \$77,500.00 in quail research grants to colleges and universities and related services in 1983.

Send donation or request a free flyer from: IQF, P.O. Box 550, Edgefield, SC 29824-0550 (phone 803-637-3132).



**International
Quail
Foundation, Inc.**

QU STAMP

Richard Plasschaert, winner of the 1981 Federal Duck Stamp competition and designer of the first State Duck Stamp Print for North Dakota was commissioned to design the 1983 Quail Unlimited Stamp.

The 1983 national edition, just released, consists of 1,500 signed and numbered prints of the highest quality and sells for \$130 with a quail conservation stamp included. There are only 10,000 individually numbered stamps priced at \$5 each, \$20 for a block of four and \$50 for a collectors' mint sheet of 10 quail stamps.

Quail Unlimited chapters are organizing all across America with over 200 chapters in the beginning stages. A Kansas chapter was organized in Hiawatha last January. Quail Unlimited is financing programs to develop quail habitat management on public lands in immediate areas where the chapters are organizing. These projects include controlled burning and the planting of special quail and upland game food plots that not only benefit quail, but deer, wild turkey, grouse and numerous species of upland game

wildlife and songbirds all over America. The Hiawatha chapter is working with landowners to regenerate habitat on private lands. Already they have donated \$200 to the Fish and Game Wildtrust Program, built a tree planter and introduced several landowners to the Wildlife Habitat Improvement Program.

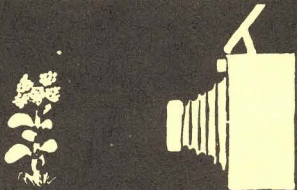
The quail stamp and print program will allow Q.U. to move rapidly into numerous areas of the nation where the quail needs additional help.

Anyone interested in assisting with a local chapter of Q.U. or obtaining information about the collectors stamp or limited edition print should write Quail Unlimited National Headquarters, P.O. Box 10041, Augusta, GA 30903 or phone 404/724-6647 today. The Hiawatha chapter president, Mike Nigus, can be reached at 913/742-7527. A donation or a Q.U. membership is tax deductible as Q.U. is a national, non-profit tax-exempt conservation organization.



HOW TO TAKE PERFECT WILDFLOWER PHOTOS

NATURE



June is a special month. School children kick off their fetters, young lovers say "I do," and prairie wildflowers show off to anyone who'll look.

Looking for nature's flowers is an easy task. They practically throw themselves at you, their bright red, yellow, violet and blue petals

demanding attention. Botanists claim this brilliant display is purely selfishness on the flower's part. It's their way of luring insects and birds to do the fertilizing chores. That sounds reasonable enough, but surely flowers could do their procreating a bit less brazenly. After all, the white flowers get pollinated just as frequently as the red ones. Even the few obscure green flowers in nature manage to reproduce their kind. No, I'm afraid there's another reason for all the rainbow in wildflowers — and it's a capitalist trick to dupe the masses of their millions.

Kodak gets the blame. You've undoubtedly heard how they paid to have Mount Rushmore and the Grand Canyon built just so tourists would shoot more film, right? Well, they did the same thing with wildflowers. I know because when I was a kid all the flowers I saw on TV were black and white until this Disney nature show came on. It was sponsored by Kodak, and it showed fields of wildflowers blowing in the wind — blowing orange and red and blue and all the colors of the rainbow. Colors that would be duplicated perfectly on Kodak film. Buy some on your next vacation.

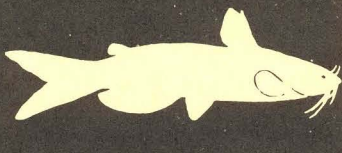
I didn't think much of it then, but now that I photograph nature, I'm worried. The Kodak people and their collusive wildflowers are retiring rich at the expense of us shutter junkies. In just ten years, I have exposed enough Kodachrome in front of flowers to cover Kodak's research and development costs on this project. Calculate what the photographer and the editor of this magazine shoot every spring and you put a boat and Mercedes in every Kodak executive's garage. The freelancers who send us their best images probably take care of all the plant workers and janitors. Everything after that is gravy.

And what have we gotten in return? Baskets of blurred flower pictures and a handful of sharp ones. The least Kodak could have done after coloring the blasted plants was stiffen them up a bit to hold steady in a breeze. But no, they were too greedy. This way we keep shooting and shooting, hoping to catch one standing still. Well, it isn't going to work on me anymore. Sorry Kodak, I'm going to leave the film out of my cameras. I'll nose along the prairie, admiring the form and hue of your flowers, composing and snapping away in the wickedest Kansas wind. And every shot will remain forever sharp in my mind.

RS

STREAM CATS

FISHING



How's this for a happy combination of facts? More than 25 percent of Kansas anglers prefer stream fishing over all other types; Kansas anglers' favorite fish is the catfish; some of the best June fishing is for catfish in streams!

What a lucky break. If you're in the majority, this is the perfect time to get fishing. If you're in the minority, it's the ideal chance to try this popular stream catfishing.

Begin by finding a river or creek. Nearly any will do, for catfish are prolific and widely stocked, but the Neosho, Verdigris and Caney Rivers are three of our more famous catfish waterways. Any stream flowing into a large reservoir will be particularly good in June because the cats will migrate up them (if the flow is deep enough) to spawn when the water temperature hits 75° to 80°F. The males select a nest site in an underwater cavity like an old barrel or tunnel in the bank. The females move in to lay their eggs, then the males guard them and the young for several weeks. If you can locate likely nesting areas, drop your bait in front of them and hang on.

Another productive method is to drift baits into

deep water holes where the whiskered leviathons hide out. At night, cast into riffles and let the current roll your bait to the nocturnal fish waiting to dine. You'll be able to do this most effectively if you're wading — no need to worry about bank tangles.

The most commonly used rig is the slip sinker ahead of a bait hook. When a fish takes, the sinker will let the line slide unimpeded so old catfish won't suspect a thing. When you're sure he's got a good grip, tie into him.

Nearly any bait from liver to minnows works. Sponges, woolly-worm flies and deeply ribbed rubber worms can be used to hold your gooey offerings.

RS

Nature's Notebook **by Joyce Harmon**

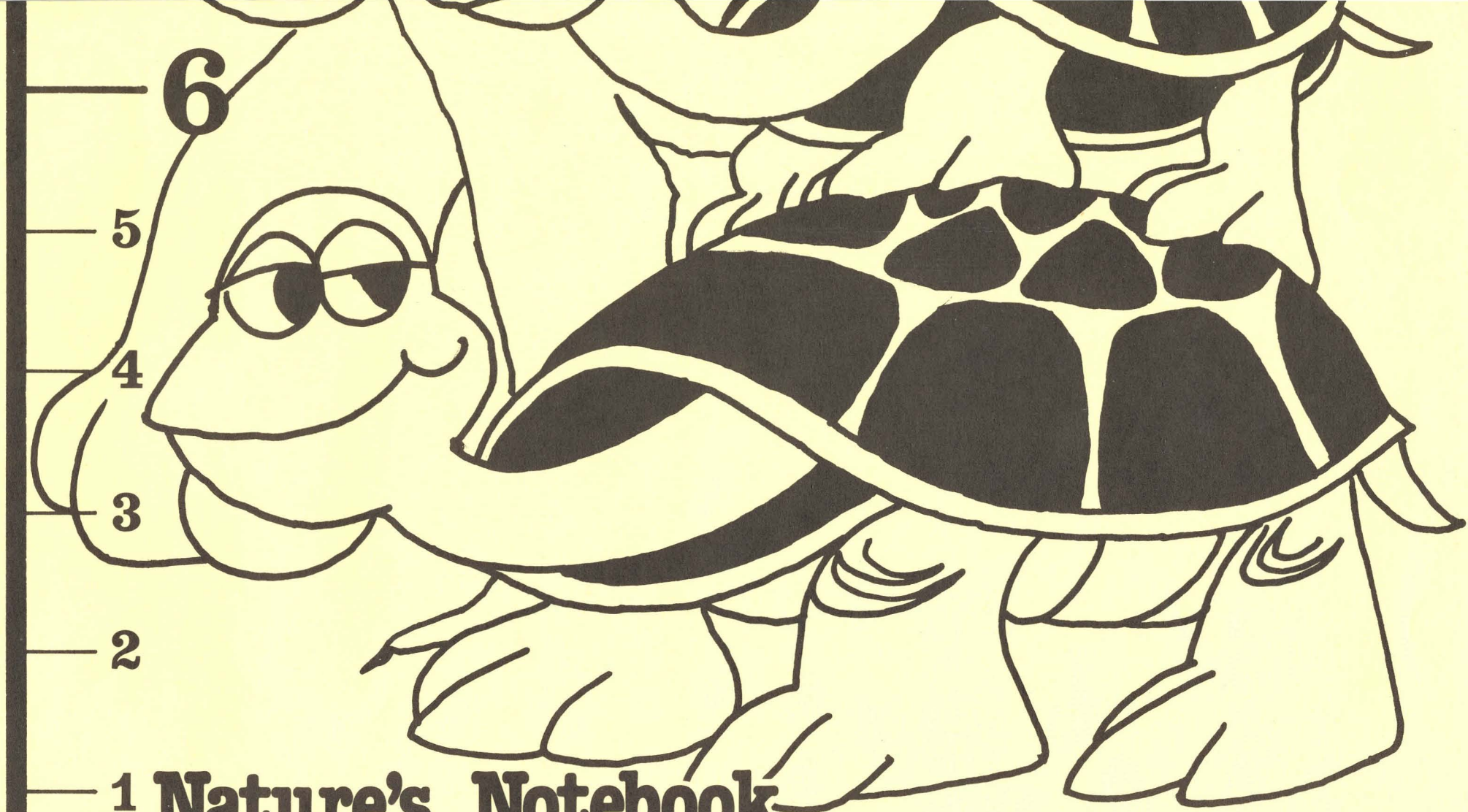
Wildlife Education Coordinator
Kansas Fish and Game Commission

Special Growth Chart

“GROWING WILD...”

***KNEE HIGH TO
A GRASSHOPPER!***

Open staple, lift out growth chart,
tape or glue together where indicated,
and see *how your youngster measures up!*

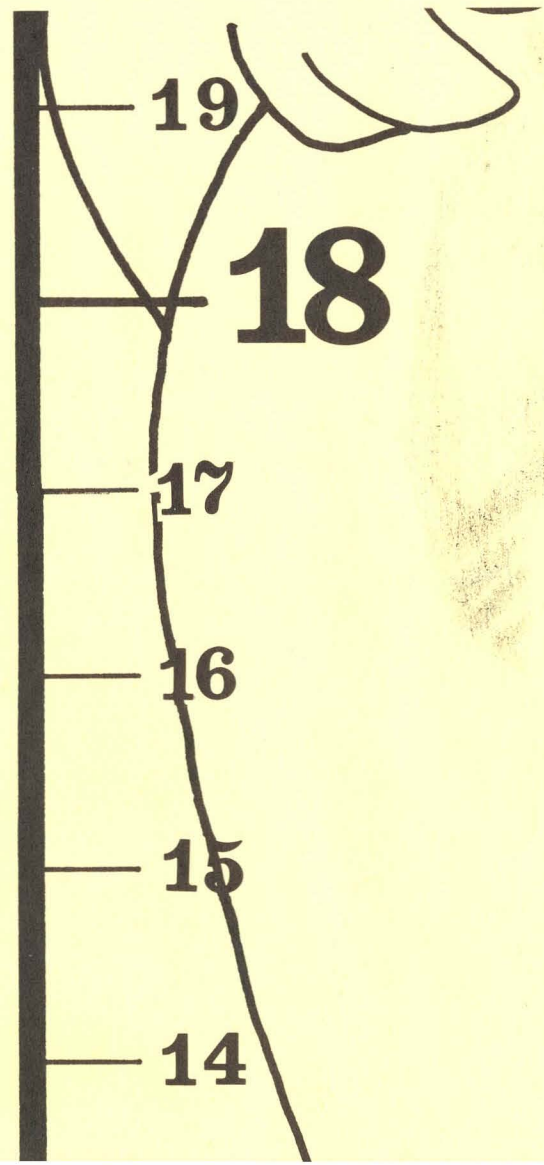


1 **Nature's Notebook**
by **Joyce Harmon**

Wildlife Education Coordinator
Kansas Fish and Game Commission

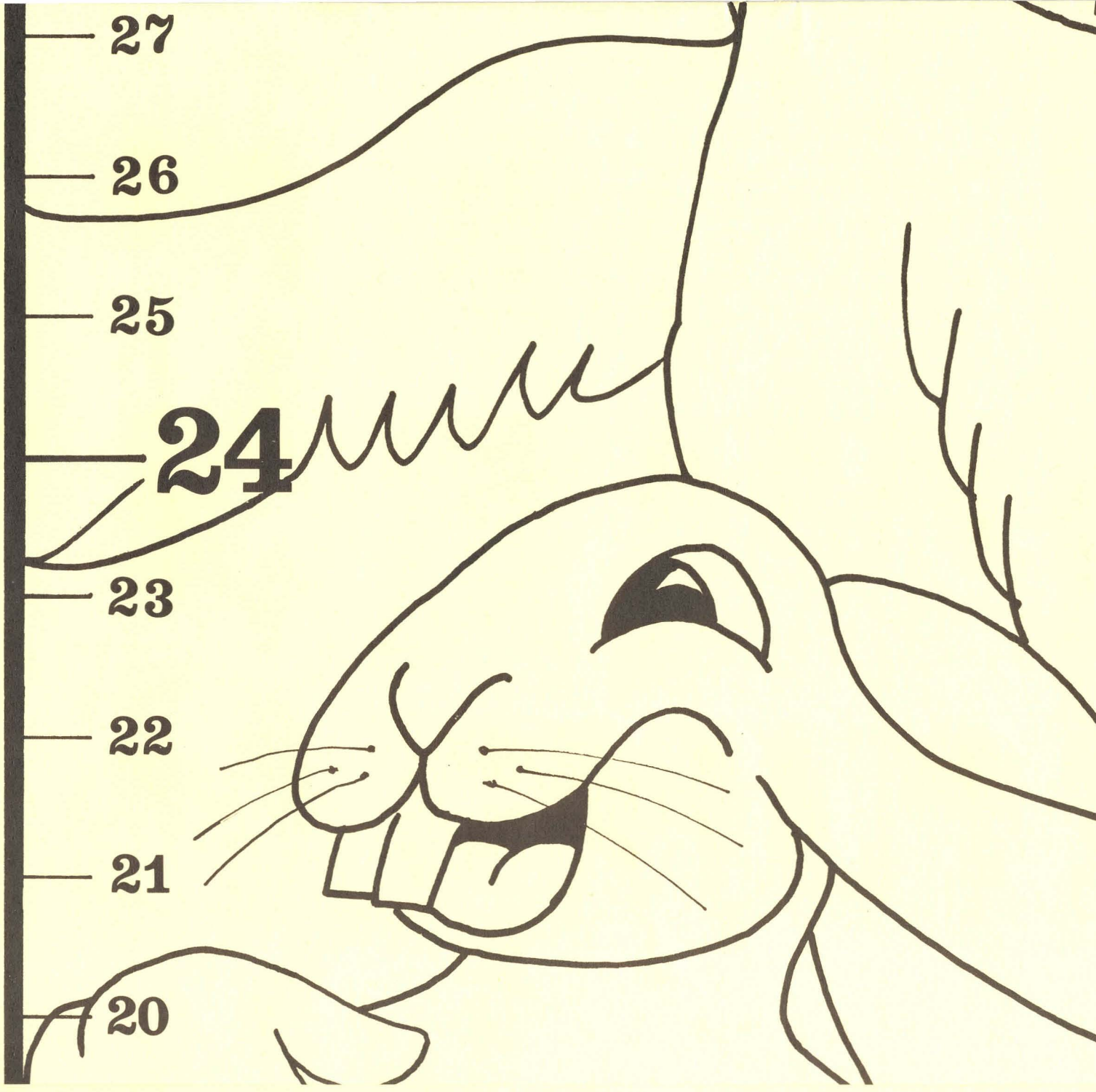


TAPE OR GLUE TOGETHER HERE



TRIPER

GRASSHOPPER



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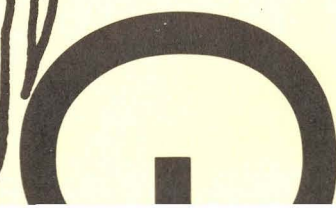
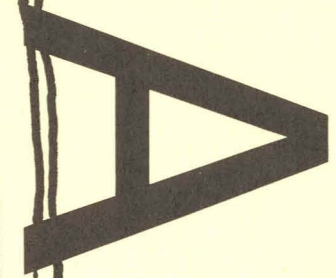
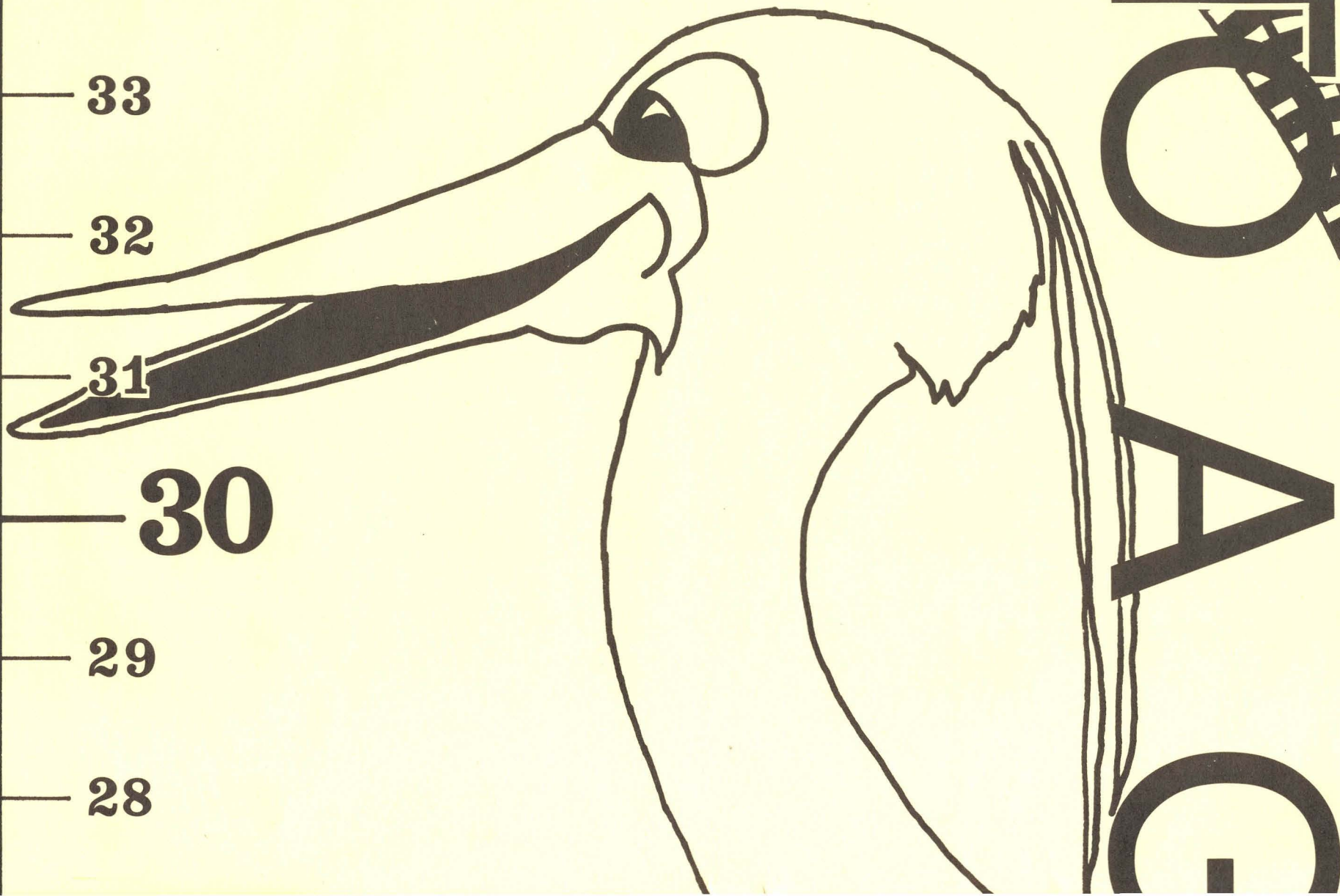
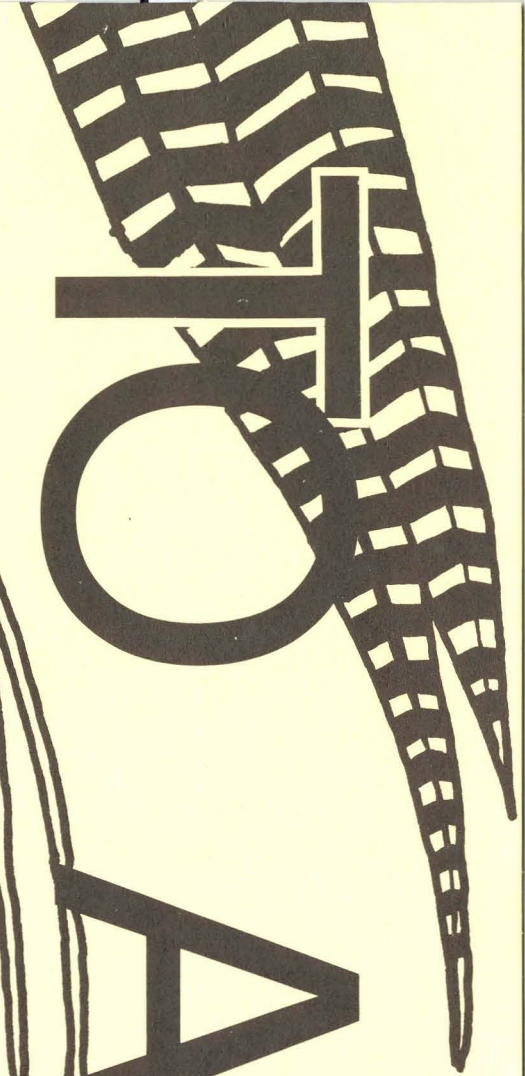
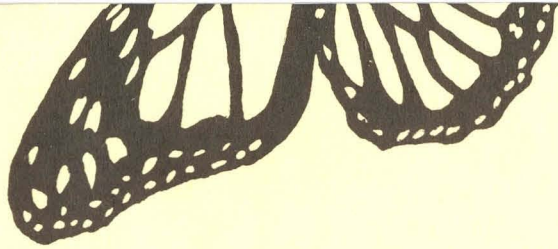
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growing

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wild



POACHED FISH

THE LAW



Fish Money

Kansas Fish and Game Commission Director, Bill Hanzlick, recently applauded Marion County Associate Judge Melvin M. Gradert for ordering nine convicted fish poachers to pay the sport fishermen of Kansas \$3,263.49 for more than 1500 pounds of fish illegally netted in Marion Reservoir.

Judge Gradert handed down the restitution in three separate cases. In the first, he found Don Nguyen, Phai Van Nguyen and Phuc Huu Nguyen guilty of taking fish illegally. They were ordered to pay \$1,748.75 restitution. In the second case, five men — Hung Van Tran, Giac Van Tran, Ioc Van Tran and Xich Van Ngo — were ordered to pay a total of \$1,150.29. In the third case, Don Van Pham was ordered to pay \$364.45. Another man arrested with Pham will be tried April 22.

In addition to the restitution monies, each man in all three cases was fined \$100, sentenced to 30 days in jail (suspended in all cases) and placed on 6 months probation. The following equipment used in the illegal gill netting was ordered confiscated: nine gill nets, two rubber life boats, two aluminum boats, an outboard motor and a .22 revolver. Don Nguyen pleaded guilty to the charge of carrying a

concealed weapon and was fined \$200, given a suspended 30 day jail sentence and an additional 6 months probation.

"Judge Gradert's action is a shining example of justice," said Hanzlick. "The licensed fishermen of Kansas pay for the production and protection of fish in our lakes and streams. It is only fair that they be repaid for any of those fish illegally taken. The restitution monies Judge Gradert ordered will produce more fish for all Kansas anglers."

The illegal gill netters were apprehended by Commission Game protectors March 9, 12 and 15 following an anonymous tip and three all-night stake-outs. More than 800 game fish were confiscated in the first arrest alone.

Fish Sale Over

A six-month undercover investigation by Federal and State wildlife law enforcement officers has exposed a massive illegal trade in game fish poached from public waters in Oklahoma and distributed throughout the Midwest. More than 40 people in Oklahoma and Texas are expected to be charged in the case, which is believed to have involved several million pounds of channel, blue and flathead catfish over the past year.

The investigation was concluded March 17 by special agents of the U.S. Fish and Wildlife Service, game rangers of the State of

Oklahoma, and state wildlife officers who executed search and seizure warrants in Oklahoma, Texas and Kansas.

Blue and channel catfish may be legally caught by sport fishermen in Oklahoma, but commercial harvest is strictly prohibited. Flatheads can be taken commercially in some areas of Oklahoma under strict regulation and license. Suspects in the case are alleged to have caught the catfish mostly at night and



often using illegal nets, shocking devices, trot lines and fish traps that caught other species as well. Once taken, the fish were dressed or filleted, frozen or sold fresh to restaurants, markets and other brokers, fetching about \$1.35 a pound wholesale. These dealers sold the fish to outlets throughout the Midwest.

The suspects may be charged with violating the Lacey Act, a Federal law that is designed to assist States in enforcing their wildlife laws. The Lacey Act makes interstate or foreign transportation of fish and wildlife taken illegally under State laws a Federal offense. Penalties range to \$20,000 in fines or 5-years imprisonment, or both, for each violation. Individuals may also face prosecution for breaking State laws by taking game and non-game fish for commercial purposes without a valid commercial license, possessing and selling game fish for commercial purposes, taking game fish by unlawful

means, taking non-game fish unlawfully and aiding and abetting in unlawful transportation and sale of game and non-game fish. The individuals involved are believed to have been operating in small separate groups and are not thought to be a part of a large, organized ring.

Big Time

In a perverted sort of way, I suppose, you've reached the big times when you get fined more than \$1,000 for poaching a deer.

Of course, Michael R. Gula didn't plan to pay for his venison. He hunted it without a license during a closed season. He even butchered it himself. That is what squealed on him. A woman found blood and a deer head in a dumpster near rental storage garages in her neighborhood. That didn't seem right in mid-January, so she phoned the police, who notified Game Protector Virgil Cox. Cox let fellow game protectors Charles Ward and Jerry Almquist in on the secret, and all three went to investigate. They didn't need Sherlock Holmes on this one.

The deer remains were in the dumpster, blood was on the handle of rental garage No. 134, and Michael Gula, Wichita, was paying the rent. They confronted him, and the facts tumbled out. He'd poached the deer and cleaned it in the garage. Sorry about that.

The judge wasn't too sympathetic: \$1,000 for possessing a deer illegally, \$50 for hunting without a current license, and \$19 in courts costs. A big fine for a big crime.

QUALITY CONTROL

NATURAL ISSUES



Life Gets Worse

With federal budget cuts threatening the enforcement of environmental laws, the nation's natural resources are struggling to hold their ground, according to the National Wildlife Federation's 1983 Environmental Quality Index.

The index, published in the National Wildlife Federation's bimonthly publication, *National Wildlife*, is an analysis of the state of the nation's natural resources. The information included in each section is based on personal interviews, news reports and the most recent scientific studies. The judgments on resources trends represent the collective thinking of the editors and resource experts on the National Wildlife Federation staff.

Details in the Environmental Quality Index include:

WILDLIFE: Conditions remained the same as in 1981. In the same year that Congress reauthorized a strong Endangered Species Act, the Army Corps of Engineers sought to weaken the laws that protect wetland habitat. Chemical contamination threatened wildlife as scientists found high levels of endrin in waterfowl and upland birds,

and PCBs and other potentially deadly substances in fish.

AIR: (Same conditions) In 23 cities, six years of pollution controls have cut by 39 percent the number of days when breathing was unhealthy. In Congress, however, no compromise on the reauthorization of the Clean Air Act has been reached, and battle lines are drawn over the cost of clean air, and whether the federal government should be the regulator. Acid rain, according to the scientists, continues to be responsible for killing fish in thousands of lakes, damaging forests and threatening human health, yet appeals to the Reagan Administration for the controls on the emissions that cause it fall on deaf ears.

WATER: (Worse conditions). Federal funds to build and upgrade sewage treatment plants have been cut, and 37 states report they won't be able to meet the Clean Water Act's goal of "fishable and swimmable" waters by 1983. The

controversy over ocean dumping continues, and the National Wildlife Federation has sued six municipalities that are dumping contaminated sludge in the Atlantic Ocean.

LIVING SPACE: (Worse conditions). With the Administration favoring land sales in an attempt to reduce the budget deficit, parkland acquisitions were curtailed drastically in 1982, and development around park boundaries continued to threaten the air and water quality inside those reserves.

MINERALS: (Same conditions). With home heating oil plentiful at prices holding with the previous year, the Interior Department staged the biggest coal leasing sale ever in the Powder River Basin of Montana and Wyoming, and announced a plan to offer oil and gas leases throughout one billion acres of the outer continental shelf.

SOIL: (Worse conditions). America is in the

midst of an erosion crisis, with fertile topsoil being washed or blown off farmland at the rate of 5.3 million tons a year. In June, however, the Farmland Protection Policy Act went into effect, directing all federal agencies to minimize development on cropland.

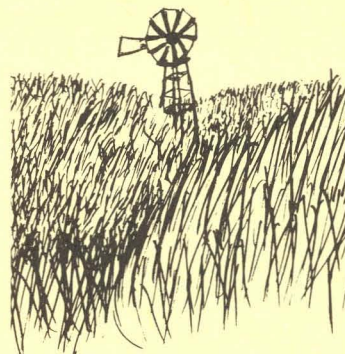
FORESTS: (Same conditions). Although the faltering economy kept demand for forest products at near record lows, the Agriculture Department argued for greater productivity from national forests and public lands.

A FREE REPRINT of the Environmental Quality Index is available from the National Wildlife Federation; additional copies, from 2 to 100, 35 cents a piece, and 25 cents a piece for more than 100 copies. Write to Educational Services, National Wildlife Federation, 1412 16th St., NW, Washington, DC 20036.

SAVE THE FARM

WANTED!! Your help to save a 300 acre prairie farm from bulldozers and to create a recreational and educational outdoor center on the edge of the Kansas City metropolitan area.

The Wagner farm at the edge of Olathe, Kansas, is a unique place. Tallgrass prairies, hardwood forests, lakes, ponds and streams — it is a priceless retreat and outdoor laboratory that the Grassland Heritage Foundation wants to save from commercial developers. The Wagner family nurtured and protected their farm for



twenty years, all the while planning to turn it over to a charitable foundation that would maintain it as a natural

area for the entire community to enjoy. But economic pressures threaten that dream.

In order to save the farm for nature research, hiking, camping, picnicking, a community meeting center and a group retreat, the Grassland Heritage Foundation must raise \$670,000 — soon.

Contributions are tax deductible. The farm is open every Sunday afternoon from 2:00 to 6:00. Drive out and see what we stand to lose. With your help, the Wagner farm can be saved. The tallgrass prairie can survive if we raise our voices and say, "This place must not be destroyed."

Critical Issues

The "environmental disaster" of acid rain and the increasing loss of wetlands are among the nation's most critical conservation issues, according to delegates attending the National Wildlife Federation's annual meeting in Albuquerque.

Air and water pollution, population, soil erosion and the loss of wildlife habitat were ranked among the major issues that the delegates to the 47th meeting of the Federation said are "among the paramount problems facing the nation."

The delegates represent affiliate organizations in 49 states and two territories.

"Acid rain is an environmental disaster," the delegates voted in a resolution. "The Federation believes that the only effective way of abating this problem is to control at their sources the emissions that form acid rain."

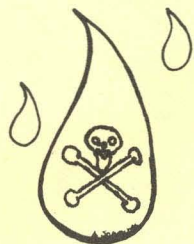
Citing the loss of about 450,000 acres of wetlands a year, the delegates voted to denounce the dismantling of the Section 404 permit program as "both unlawful and contrary to the goals and objectives of the Clean Water Act, and counter to the public interest in wetland protection."

The delegates also voted to reaffirm their support of a strong Clean Water Act and a strong Clean Air Act, and to support stronger toxic screening of hazardous materials.

The National Wildlife Federation is the nation's largest conservation education organization, with 4.2 million supporters. The resolutions adopted at the annual meeting of delegates will direct national staff activities for the next year.

Among the other

resolutions adopted were those expressing support for efforts by state governments to enact new water conservation laws aimed at attaining efficient use of water by both in-state and out-of-state users, supporting existing Congressional policy of retention of public lands, and opposing changes in existing laws to allow short-term monetary gain to override public stewardship of public resources for the long-term benefit of society and future generations; and supporting increased sport hunting in Alaska in conjunction with provisions that ensure strong protection for Alaska's valuable wildlife habitat.



Nice Try

An Administration-backed bill has been introduced in the House to help protect wetlands, according to the Wildlife Management Institute. The measure, H.R. 2268, is a step in the right direction, but it does not meet expectations.

The bill would prohibit the use of federal dollars for developments that destroy wetlands, however, the three most destructive federally funded activities — agriculture, road construction and water projects — would be exempt from the prohibition. Thus that provision is largely ineffective.

The bill would amend the Land and Water Conservation fund to authorize grants to states for wetlands protection. It would extend the Wetlands Loan Act (due to expire in

September) for 10 years and forgive repayment of advances made under that act. It would authorize the Interior Secretary to require that all visitors to certain national wildlife refuges have a valid federal duck stamp or pay an entrance fee, and it would increase the price of the duck stamp from \$7.50 to \$15.00.

Conservationists say that they can't get too excited about the financing provisions of the bill because the Administration has requested very little Land and Water Conservation Fund money in the past. It has not requested a cent of \$50 million available under the Wetlands Loan Act. Furthermore, the refuge entrance fee reportedly would raise relatively little revenue and the increased price of duck stamps would put more of the wetland protection burden on waterfowl hunters who have been carrying an inordinate share for years.

Congressional reaction to the Administration bill seems to be that H.R. 2268 is a good base from which to build truly effective legislation.

School Work

Kansas sportsmen have been issued a challenge — the glove has been thrown at the foot of every sportsman in the state!

The National Shooting Sports Foundation, Riverside, Connecticut, is challenging Kansas sportsmen to place 125 copies of the "Un-endangered Species" filmstrip in Kansas schools in 1983.

The "Un-endangered Species" traces the rescue of wildlife from the brink of extinction to relative abundance, and emphasizes

the roles sportsmen-supported wildlife management has played in the comeback. The filmstrip is a positive approach and highlights what is being done right, instead of wrong.

The NSSF suggests two ways to sponsor placement of the "Un-endangered Species" in schools. One method is for the NSSF to mail programs to sportsmen for placement in schools. Another is for sportsmen to provide NSSF with the address of one or more schools, and the programs will be sent direct.

All sportsmen and sportsmen's clubs in Kansas are urged to participate in the "Kansas Challenge". The cost is reasonable, \$7.95 plus \$1.50 postage and handling. And the benefit is an improved image for hunting, and for hunters. Order copies of "Un-endangered Species" from "Un-endangered Species," P.O. Box 1075, Riverside, CT 06878.

Channel Worse

A U.S. Geological Survey (USGS) report documenting serious ecological and economic effects of stream channelization has Tennessee taxpayers in a grouchy mood, according to the Wildlife Management Institute.

The report, which focuses on channelized streams in west Tennessee, presents conclusive evidence that such practices destroy stream systems, cause bridge failures, degrade fish and wildlife habitat, accelerate soil erosion, and contribute to other ecological and economic problems.

The Commerical Appeal in Memphis recently printed an article that stated: "The loss of human life resulting from bridge failure should be enough for the

public to demand an end to such projects. According to the State Department of Transportation, already more than \$2 million in repair work is needed on bridges discussed in the report."

The Commercial Appeal article concluded: "The USGS report should force the Engineers to reconsider plans to channelize other West Tennessee streams. More importantly, it should cause citizens to demand a moratorium on any channelization project in West Tennessee. It makes the case forcefully that channelization is an economic and environmental disaster that produces tragic loss of human life." Tennesseans and residents of other states appear to agree.

June River

When was the last time you played Huck Finn and drifted down a lazy river? Well kick off your shoes, put on your straw hat and hop aboard a raft or canoe — June is National River Month.

National Rivers Month began last year in an effort to promote awareness of this nation's remaining waterways — their beauty, fragility, recreational potential and other values. During this year's observation, the Kansas Canoe Association (KCA) is sponsoring a recreational float trip on the Smoky Hill River, June 11-12. Contact Marshall White, 901 Bloomville Road, Hutchinson, KS 67501. (phone 316-663-4277) if you'd like to participate. The KCA will take a River Clean-Up Float down the Kansas River Canoe Trail, June 25-26. Contact Terry Ball, RR 4, Manhattan, KS 66502 (phone 913-293-4439). The KCA is a statewide canoeing and

kayaking organization with 275 family memberships. It promotes river conservation and enjoyment of canoeing.

Another observation during National Rivers Month is the June 11 Great Kansas River Raft and Canoe Races sponsored by the Edwardsville Jaycees with assistance from the Kansas River Parkway Association (KRPA). The 26 mile race will start at the Eudora Boat ramp on the Wakarusa River and end at the Edwardsville boat ramp on the Kansas River. Dances, games, a Black Powder rendezvous and other events will be held in conjunction with the river race. The Jaycees are raising funds to build a community center. The KRPA is promoting the Kansas River for status as a National Recreation River from Lecompton to Turner Bridge

in Kansas City.

For more information, contact Bill Losier (913) 441-3286 or Dave Johnson (913) 441-1139.

Cross-Fire

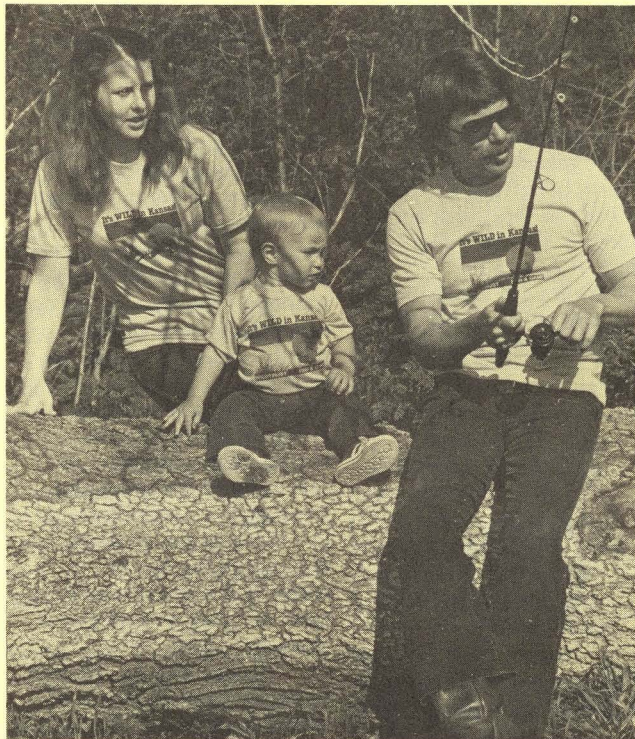
Never underestimate the federal government's ability to circumvent efficiency. While it is spending tax dollars to pay farmers to not grow grain, it is simultaneously spending more tax dollars to build irrigation projects to grow more grain.

In addition to wasting tax monies and forcing grain prices lower by feeding the nation's grain glut, the irrigation projects promise to destroy rivers, national

wildlife refuges, wetlands and already productive farmland. Just two of the current projects are: Garrison Diversion, North Dakota, would violate an international treaty with Canada, cause the greatest single loss of wetlands in North Dakota history, damage or destroy 12 National Wildlife Refuges, channelize 100 miles of rivers, take 220,000 acres of farmland and wetland out of production, and irrigate 250,000 acres of already productive farmland. Tax monies per irrigated acre will be \$3,700. Irrigators are scheduled to repay only \$77 per acre. Total project cost \$1,149,481,000. O'Neill Unit, Nebraska, will dam the Niobrara River, flood more than 30,000 acres of land (including 6,800 acres of the unique Niobrara Valley Preserve and

WILDLIFE T-SHIRTS

Don't Be Chicken — Wear One



Strut your stuff this summer in a new "It's Wild in Kansas" T-shirt. Light and cool with a message that shows the world you care about Kansas wildlife. Proceeds go to the Fish and Game Wildlife Education Service.

Make check payable to WILDTRUST (tax deductible donation) and send to Wildlife T-shirt, Kansas Fish and Game Commission, RR 2 Box 54A, Pratt, KS 67124. Regional Fish and Game offices have some T-shirts. Quantities limited in some sizes.

Adult sizes S M L XL
\$6.50

Youth sizes XS S M L
\$5.50

Rocky Ford, the state's major white water canoeing spot), eliminate channel catfish with coldwater releases below the dam and irrigate 77,000 acres at \$4,535 per acre. Total project costs are estimated at \$368,746,000.

Cook- book

If you have ever wanted to prepare pheasant tetrazzini or mix up a batch of your own deer sausage, there's a new cookbook available that tells you how.

Cooking the Sportsman's Harvest II, published by the South Dakota Department of Game, Fish and Parks, is a sequel to the out-of-print Cooking the Sportsman's Harvest, that was published eight years ago. Harvest II contains new and exciting recipes for the gourmet sportsman. It has a variety of recipes for many species of game and fish. There are recipes that are easy to fix and those that will fully test your culinary skills.

Of particular interest are sections on canning and pickling fish, smoking fish and game, making your own sausage and salami and preparing jerky.

The 120-page cookbook is available by sending \$3 to: South Dakota Department of Game, Fish and Parks, 445 East Capitol, Pierre, SD 57501.

Jackass Tax

Senator James McClure (Idaho) has introduced a bill, S. 457, to help the federal

government humanely dispose of excess feral horses and burros. Approximately \$2,500 per day of taxpayer's money currently is spent to care for about 1,500 excess feral horses and burros that the government cannot peddle through adoption centers, according to the Wildlife Management Institute.

McClure's bill would allow agencies to sell excess animals for which foster homes cannot be found. Revenue generated from the sale would be returned to the Bureau of Land Management and U.S. Forest Service for feral horse and burro research and management.

Feral horses and burros have devastated wildlife habitat in many areas of the West and agencies have had limited success in keeping the herds under control. Conservationists are hopeful that McClure's legislation will help.

Bad Water?

The Kansas Department of Health and Environment (KDHE) has alleged that uncleared timber and brush in reservoirs, plus other fisheries management practices recommended by the Kansas Fish and Game Commission, are lowering water quality in reservoirs used for municipal water supplies.

Because of these allegations, fisheries management in a number of city-owned lakes across the state has been jeopardized. Yet the Fish and Game Commission has compiled a 56 page report on the subject that shows fish attractors and standing timber do not lower water quality in new and/or existing reservoirs. The report includes a survey of activities in other states, a review of approximately 125 scientific papers, and personal opinions

of water quality experts from around the nation. The fact that KDHE has approved fisheries plans to leave standing timber in some new reservoirs while refusing to permit it in others indicates that not all of its personnel accept the lower water quality allegation. This inconsistency has confused lake planners.

The Kansas Fish and Game Commission, in light of its extensive research, maintains that man-made fish attractors and standing timber in reservoirs not only

enhance sport fish production, but also lead to improved water quality. Water quality is directly influenced by a lake's depth, flow-through rate and the nutrients entering it from the upstream drainage. KDHE has provided no scientific data supporting its claims to the contrary.

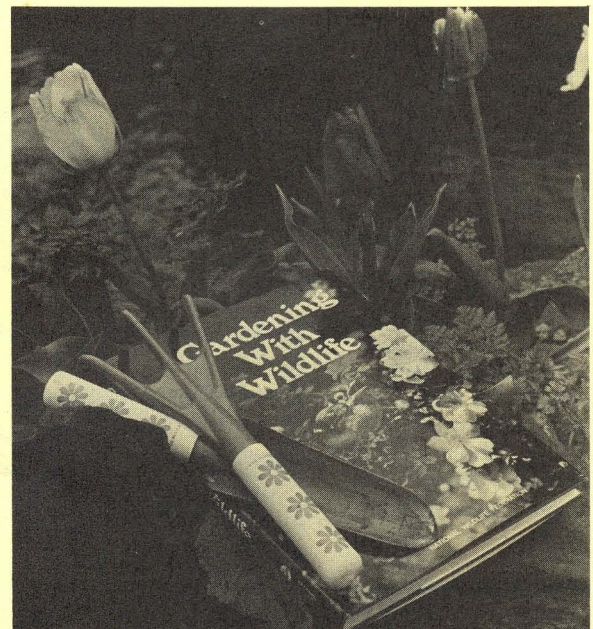
The Fish and Game Commission has brought this controversy to the attention of the Kansas public so that it can be openly discussed and quickly resolved.

GARDENING WITH WILDLIFE

Thanks to the Kansas Fish and Game Commission's "Chickadee Check-Off" tax donation program, you can now buy the National Wildlife Federation's book Gardening With Wildlife for half-price.

Gardening With Wildlife tells how to cultivate and enrich your existing garden or transform the bulldozed barren of a new development into a haven for birds and animals. Every chapter of this 190-page volume is filled with plans and hints on building feeders, shelters, pools, waterfalls and dozens of other landscaping practices that attract wildlife. The wildlife color photographs will make you anxious to get started.

To order your copy, send a check or money order payable to Kansas Fish and Game, for \$7.50 to: Gardening With Wildlife, Kansas Fish and Game, RR 2, Box 54A, Pratt, Kansas 67124.



Animal Friend



There are charges that Cleveland Amory's Fund for Animals is falsely cashing in on the publicity resulting from the Florida Everglades deer hunt, trying to solicit memberships under the banner of what it did to protect the animals.

The allegations come from one Jack Kassewitz, Jr. He ought to know. Kassewitz is the Floridian who originated and coordinated the ill-fated deer rescue team.

"The fund has put out a brochure with a deer on the front of it which says, 'Fund Stops Everglades Deer Kill,'" said Kassewitz. "It proceeds through the whole thing to tell how Cleveland Amory saved the deer. Yet he never put a hand on one deer."

Kassewitz also claims that Amory is pleading for money from the public, even though he donated only \$1,500 to help finance the rescue operation.

"This seems to be a pattern of his as a media hound: to come in here, rip off the press and leave the people who really do the work holding the bag."

Kassewitz, who heads the National Wildlife Rescue team, says a hunting club in Dade County recently donated \$2,000 to establish permanent deer habitat in southern Florida.

"One of the lessons we learned in this — as hard as it is for some of the staunch conservative conservationists to swallow — is that hunters are conservationists."

Now, who is the friend of animals? — *Reprinted from Tennessee Conservationist*

THE CONSERVATION AWARDS

The Kansas Wildlife Federation invites any organization in the state of Kansas to nominate groups and individuals for the 1983 Conservation Awards Programs. Nominees must be Kansas residents. They must have accomplished their work in Kansas, and can be either a professional or layman conservationist. Nominees need not be members of any club or of the federation. Current KWF officers and 1982 award winners are not eligible for nomination. Awards program categories include:

Governor's Award — For outstanding achievement considered to have made the most significant contribution to the cause of conservation and natural resources. This effort may be in any of the fields or any combination of them.

Wildlife Conservationist — For outstanding achievement contributing to effective management, control, restoration, or replenishment of wildlife resources.

Forest Conservationist — For achievement in forest and woodlands development, management, or use.

Water Conservationist — For achievement in pollution control, conservation and protection of wetlands and wild or natural rivers, prevention of water quality degradation, or other activity aimed at maintaining or improving water standards.

Youth Conservationist — For conservation effort by a person who has not attained the age of 21 during the contest year. Youth groups acting together in a conservation program are also eligible.

Air Conservationist — For achievement in obtaining quality air standards, reducing pollution, effecting control of pollution sources, or other action contributing to improved air standards.

Conservation Educator — For achievement in educating persons of any age level, or leadership which, by example or demonstration, aids in the education of others.

Conservation Communicator — For effectively conveying the conservation message and creating public awareness of conservation issues in the news media.

Conservation Legislator — For achievement by a legislator (state or federal) in conservation legislation or other legislative work which took place or culminated in the contest year. Members of legislative staffs also are eligible.

NOMINATION FORM

To make a nomination, send four (4) copies of this form and ALL ATTACHMENTS to
 Gerald Prosser, State C.A.P. Chairman
 2220 Park
 Great Bend, Kansas 67530
 316-792-2060

Name of Nominee _____

 street number _____
 city & state _____ zip A.C. Telephone _____
 Award Category _____
 Please specify ONE of the categories for which nomination is made. Use a separate form for each nomination and category.
 Recommended by _____

 Name and title _____
 club name _____
 street & number _____
 city & state _____ zip A.C. Telephone _____
 Date Dead Line August 15 1983

PREPARATION INSTRUCTIONS

Attach a typewritten description, NOT TO EXCEED THREE PAGES, detailing specific acts for which award is recommended. Include such other information as to past recognition, organization memberships, affiliation, past achievements, etc., as nominator feels is pertinent. If additional space is needed use supplementary sheets (8 1/2x11) and attach to this form. When a company, organization, publication, etc., is involved, include the name of the president, chief executive officer, sponsor, editor or so forth.

NOTE TO NOMINATOR: The following information is needed to assist the chairman with invitations, award engraving, etc.

INFORMATION ABOUT NOMINEE:

AGE: Over 21 () Under 21 () Specify Age. If under 21 include name and address of parent or guardian _____
 name _____
 street _____
 city and state _____
 zip _____ A.C. Telephone _____
 Sex: male () female () married () single ()

Conservation Organization — May include civic clubs, conservation groups, garden clubs, women's clubs, businesses, trade or professional organizations, corporations, and others. Organization may be local, county, or statewide in scope.

Hunter Safety Instructor — For achievement in training Kansas youth in hunter safety and ethics. Nominee must be an active instructor and must have been active for past three continuous years in hunter safety instruction.

The 1983 convention will be held in Great Bend, Kansas, October 8-9, at the Highland Manor Convention Center.

NATIONAL HUNTING & FISHING DAY[®]

Sept. 24, 1983

Big doings are in the wind for National Hunting and Fishing Day, September 24-25. The Kansas Fish and Game Commission is making plans for a wildlife art show and a host of hunting and fishing activities in Wichita that weekend.

The festivities will be held at the Cessna Activity Center from 11:00 AM to 10:00 PM, Sept. 24, and 11:00 AM to 6:00 PM, Sept.

25. More than 60 artists from 15 states will display their works. Sportsmen's clubs and sporting goods manufacturers will exhibit. There will be fishing and shooting clinics and a variety of outdoor skills instruction. If you like to eat, you'll appreciate the barbecued buffalo burgers. Keep watching for more news about the Fish and Game NHFD party in Wichita. And plan to attend.

Beginning in the late 1930's, the U.S. Army Corps of Engineers and the U.S. Bureau of Reclamation embarked on a program of constructing reservoirs for flood control and water supply. Kanopolis and Fall River were the first of these reservoirs, both completed in 1947.

The value of flood control reservoirs and the need for additional reservoirs became apparent following the devastating flooding in 1951. The increasing population and an increase in broken-ground farming necessitated additional sources of water for drinking and agriculture. In the thirty-five years since Kanopolis and Fall River were built, an additional twenty-two reservoirs have been completed in Kansas.

Although all of the federal reservoirs were built primarily for flood control and water supply, they have become major sources for recreation. Fishermen, hunters, pleasure boaters, swimmers, and campers flock to the Kansas reservoirs. In 1982, fishermen

spent around three million days testing their skill and luck on Kansas reservoirs. That amounts to over one day's worth of fishing for every man, woman, and child in the state.

Fisheries biologists and fishermen alike have long realized the value of structure and habitat in concentrating and producing fish. Structure is anything that keeps the bottom of a lake or stream from looking like a cereal bowl—a place for fish to eat, rest, and reproduce. Structure is things like trees, weeds, rocks, underwater hills, and drop-offs that break up the bottom configuration of a lake. Structure attracts fish because it is habitat, providing a place to feed, to hide, or to spawn. Since all species of fish have different habitat requirements, the more types of habitat a lake contains, the more species of fish it can sustain and the more productive it will be for fish and fishermen alike. So, when habitat is removed from a lake, the lake becomes less productive than it could be.

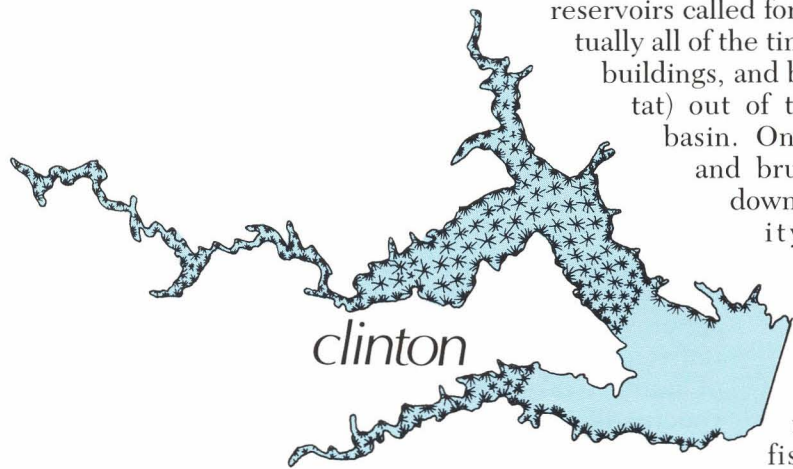
At the time most of the older re-

Phil Moore

new wave reservoirs

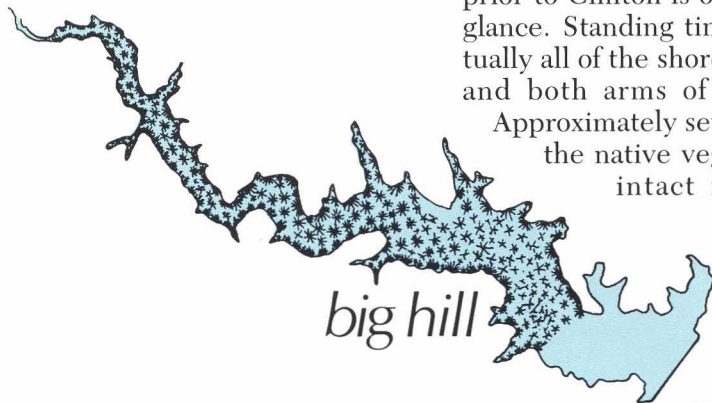


servoirs were built, the primary recreational concern of the Corps of Engineers was to provide aquatic activities other than fishing—that is, swimming and boating. Boating is obviously safer in an unobstructed area, and swimming is far safer and more enjoyable in an area without all sorts of flotsam and jetsam and things sticking out of the water. So typically, the construction plan for reservoirs called for clearing virtually all of the timber, brush, buildings, and bridges (habitat) out of the reservoir basin. Once the trees and brush were cut down, the majority of it was piled and burned, gone forever.



Fortunately for fishermen the tide is turning and a new wave is emerging in the construction of Kansas reservoirs. Clinton Reservoir, a 7000-acre impoundment near Lawrence, was completed in 1977. Clinton was the first of a new breed of reservoirs in Kansas and the difference between Clinton and any of the reservoirs built prior to Clinton is obvious at only a glance. Standing timber graces virtually all of the shoreline and coves, and both arms of the reservoir.

Approximately seventy-percent of the native vegetation was left intact in the Clinton basin, amounting to about 1500 acres of standing timber or about twenty-one percent of the lake. Of the trees that were removed, most were piled up, cabled together, and anchored to provide additional fish habitat.



Getting the brush and timber left intact in the lake was no easy feat. It involved changing long-standing practices and prejudices

of the Corps and other governmental agencies. Without the efforts of Leo Dowlin and Bob McWhorter, it is likely that Clinton would be little different from any other reservoir in terms of habitat. Leo, then the northeast regional fisheries supervisor (Leo is now the district fisheries biologist for Shawnee, Osage, and Wabaunsee Counties) and Bob, the northeast regional wildlife supervisor (Bob is now an independent businessman in the Manhattan area and a certified wildlife biologist doing wildlife consultation) got involved with the development of Clinton while it was still in the planning stage, and spoke out on behalf of the Kansas sportsmen to try to get as much fish and wildlife habitat left in and around the lake as possible. This marked the first time that Fish and Game was involved in the planning of a federal reservoir from the early stages.

Public meetings held in Lawrence during the planning stages of Clinton brought forth the fact that Fish and Game people weren't the only ones concerned with the development of the reservoir and the Corps' past track record. Special interest groups such as The Sierra Club, bass clubs, and Ducks Unlimited expressed their views in favor of the development of Clinton for maximum fish and wildlife benefits. From this, the tide began to turn.

In the end, Clinton was designed to try to accommodate all of the aquatic recreationalists. The main body of the lake was cleared to provide an unobstructed area for speed boats, sailboats, and waterskiers while most of the shoreline and the two major arms were left intact to provide fisheries habitat. For the sake of safety, the lake is zoned so that speed boating and waterskiing are only allowed in the cleared main body of the lake.

Although there are things that could have been done (or undone)

to make Clinton even better for hunting and fishing, the new wave was rolling and the reservoirs that followed—Hillsdale, Big Hill, and El Dorado, reflected the progress made with Clinton.

Big Hill is located near the town of Cherryvale in southeast Kansas. The reservoir was impounded early in 1981 and will cover 1240 acres when it is full. Cooperation between the Corps and Fish and Game in the planning of this reservoir should make this an excellent fishing lake. About 350 acres of timber were left standing in the lake, and the cleared timber was used to construct seventeen brushrows from 100 to 300 feet long and thirty feet wide. In addition a T-shaped fishing pier was built on the east side to provide additional fish habitat and improved angler access. Many of the trees that were cut down in the basin in 1980 resprouted and produced two years' growth before flooding in 1982. Also, prior to the 1979 growing season, all crop fields were taken out of production and allowed to revegetate naturally with trees and annual weeds. These areas have three or more years of go-back growth and provide excellent spawning and nursery habitat for fish.

Hillsdale, near Paola, were impounded in the fall of 1981, and when full will be a 4580-acre lake. Hillsdale is a smaller version of Clinton with timber abundant along much of the shoreline and throughout the two major arms of the lake. Approximately seventy-five percent of the reservoir basin was left intact.

El Dorado Reservoir will cover about 8000 acres when full and will contain two previously impounded lakes. Due to the area in which this lake is located (Flint Hills) it contains less timber than the other lakes mentioned. However, a large portion of the basin was left intact and good stands of timber exist in the upper arms of the lake.

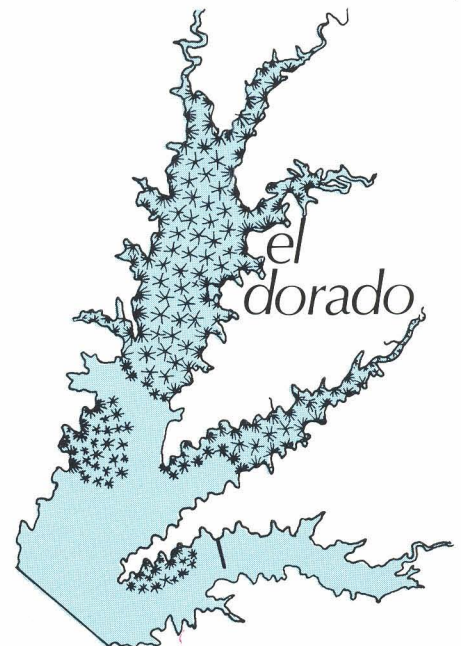
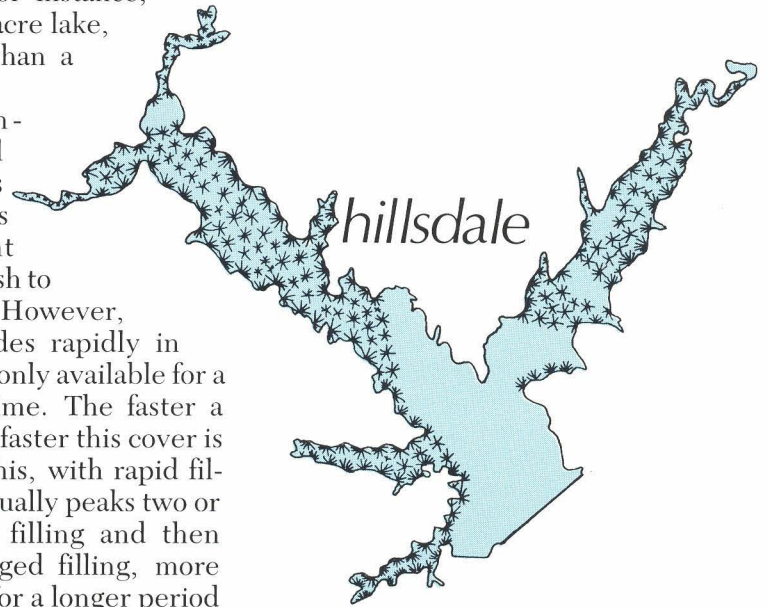
Although standing timber is the most noticeable difference between staged filling. Staged filling is a process in which a reservoir is filled slowly over a period of several years. The old reservoirs were allowed to fill up as soon as possible depending on rainfall. For instance, Milford, a 16,000 acre lake, filled up in less than a year.

Freshly inundated terrestrial vegetation such as weeds and grasses provide excellent shelter for small fish to escape predation. However, this cover degrades rapidly in water, and so it is only available for a short period of time. The faster a reservoir fills, the faster this cover is lost. Because of this, with rapid filling, the fishing usually peaks two or three years after filling and then crashes. With staged filling, more cover is available for a longer period of time, so survival of newly hatched or stocked fish is higher for a longer period of time. By filling a reservoir in stages, biologists hope that the peak fishing can be drawn out over a period of five to seven years or longer and that the decline will be a slow one rather than a crash.

Staged filling was first implemented at Melvern Reservoir which was impounded in 1972, and staged filling of Clinton was completed in 1981. Big Hill, Hillsdale, and El Dorado are all at various stages of planned stage filling. Big Hill should be full by mid-1983, Hillsdale is expected to complete staged filling in 1984, and El Dorado should be full in 1985 or 1986.

Although some of the older reservoirs provide year after year of quality fishing that's hard to beat, the new lakes could be better. Clinton, Hillsdale, Big Hills, and El Dorado could be the best reservoirs that Kansas fishermen have ever seen.

Phil Moore is the Fish and Game Commission's district fisheries biologist in Lawrence. Among his other responsibilities, he manages the fishery at Clinton Reservoir.



The Corps of Engineers has been instructed to replace some of the habitat they have destroyed along the Missouri. The question is: Will they put back enough?

to rebuild a river

Mary Kay Spanbauer

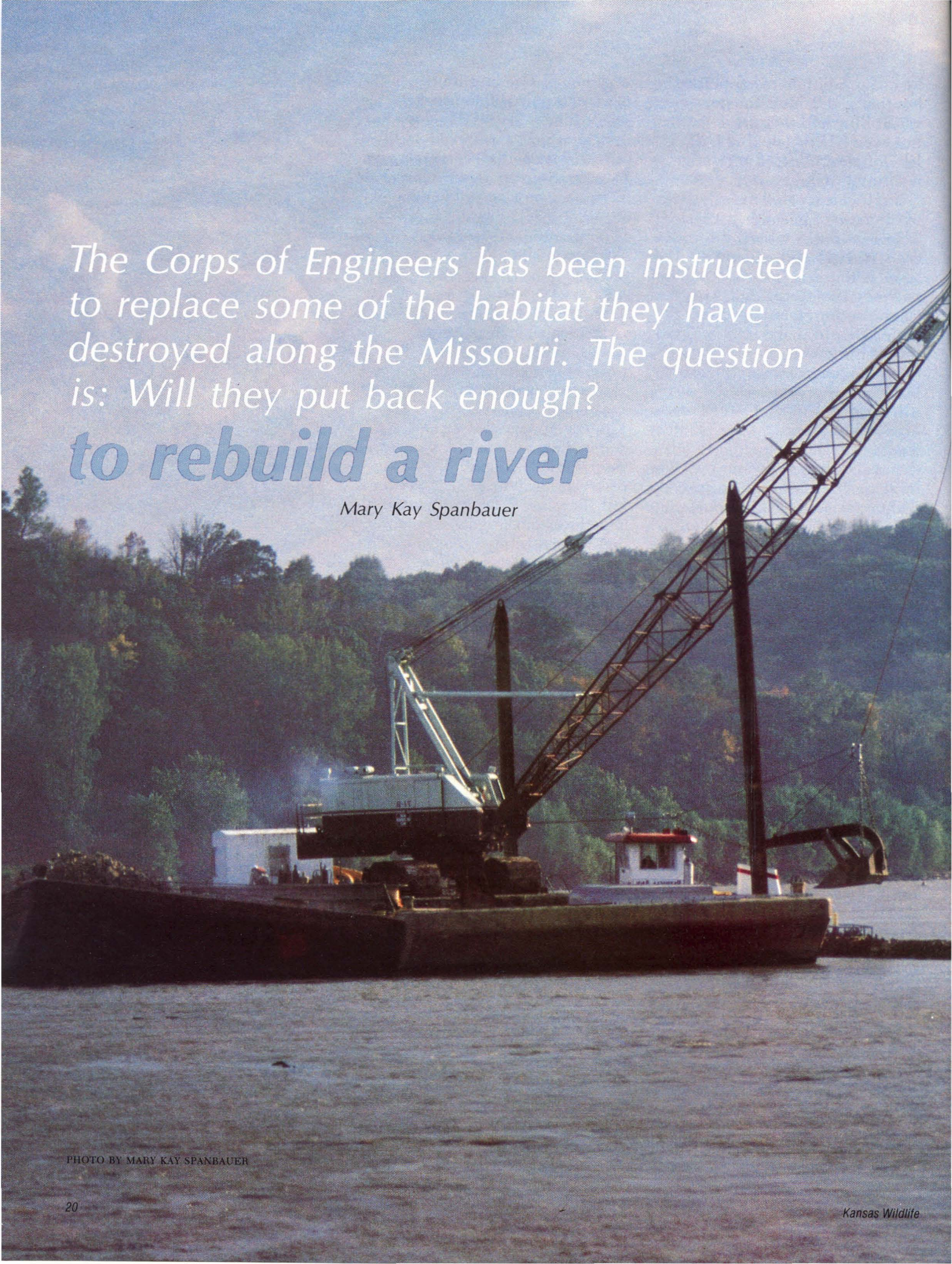


PHOTO BY MARY KAY SPANBAUER

Down from the Continental Divide, through the Rockies, and out onto the plains, it comes, the Big Muddy, the river that led us west into the wilderness and made us rich, first with furs, later with timber, minerals, and farmland. An almost mythical landmark in the American imagination, the untamed soul of half a million square miles of the American West. But, while we've raised our children on tales of the old Missouri, we've worked profound changes on the river, and few of them have been improvements on the original.

Since 1912, the Corps of Engineers has reconstructed 725 miles of the river, at a cost of \$750 million. The Corps objective: "Continuous,

progressive control of the river, contracting it where necessary, giving the channel proper direction and securely holding it in its place." Though construction was completed in 1980, it is estimated the Corps will spend \$11.4 million a year to maintain the structures used to stabilize the river. The cutting, narrowing, and stabilizing of the river banks have adversely affected wildlife, converting nearly a half a million acres of marshland, waters, and islands into productive cropland—much of it annexed free by adjacent landowners.

What exactly has been changed since the days of Lewis and Clark? To date, there has been a total loss of 100,300 acres of aquatic habitat

and 374,300 acres of terrestrial habitat on the Missouri from northern Iowa to the confluence with the Mississippi. The river lost 50,588 surface acres from 1884 to 1954 and another 10,244 acres from 1954 to 1972, bringing the overall loss to 60,832—fifty percent of the river's original surface area. Unconnected islands, rich cover for wildlife, were practically obliterated. The surface area of the islands was reduced from 24,419 acres to a scant 419—a loss of ninety-eight percent. The areas between the islands and the shore provided valuable habitat for fish as nurseries and feeding areas; now they are being farmed. A census in 1970 determined that agriculture is the predominant land use in the



forty-five county area adjacent to the river with fifty-seven percent in crops and thirteen percent in pasture.

The plentiful and desirable fishery once found in the Missouri is no longer available. The commercial fish catch declined eighty percent from 1947 to 1974. The diversity of fish populations has declined, and the fishery is now dominated by a few species that are better adapted to what is now a swift, turbid river. According to John Funk and John Robinson (Missouri Department of Conservation biologists), "Channel

Dredges, wingdams, and levees hurt more than the river itself. Huge tracts of bottomland timber, marsh, and sandbar have also disappeared. (photos by Ron Spomer)

catfish is the only major species besides the carp which seems to be increasing in abundance. The changes have paralleled the physical changes in the river . . ." Much to the dismay of sport fishermen, the Missouri has suffered drastic losses in its populations of sport fish like crappie, sunfish, black bass and sauger.

Channelization efforts on the Missouri have also had their effect on terrestrial wildlife. In the late 1800s, the floodplain was covered with timber providing prime habitat for a host of species, many of which are now rare, though some have reached huntable populations due to re-introduction in areas of suitable habitat. Waterfowl habitat has

been altered drastically due to the loss of backwater areas, sandbars, and mast producing trees. With the breeding habitat virtually destroyed on the river, most waterfowl now breed on state owned wildlife areas and national wildlife refuges.

With all that has been done to the Missouri, the time has come when an attempt is being made to rectify some of the undesirable effects of past policies. The Corps has recently determined that the Fish and Wildlife Coordination Act applies to their projects on the Missouri River. The 1958 version of this law states, "that fish and wildlife conservation shall receive equal consideration with other features of water development programs. It provides that whenever federal agencies, or private agencies operating under federal permit, propose to develop water resources, they shall consult with the U.S. Fish and Wildlife Service (USFWS) and the appropriate state fish and game departments with a view to preventing losses, and taking advantage of opportunities of fish and wildlife resources."

The Fish and Wildlife Coordination Act has had two effects on Corps water projects. It has introduced some delays into planning and construction as wildlife technicians have considered impacts and alternatives, and it has given rise to the concept of mitigation. The idea is that the Corps will buy and/or create wildlife habitat to compensate for the habitat their projects destroy.

The proposed mitigation for the Missouri project has been the subject of considerable controversy between conservationists and those who have benefitted from the channelization—the farmers and barge operators. The objectives of the mitigation according to the Corps' Fish and Wildlife Mitigation Plan are as follows:

- * mitigate losses of habitat acreage and quality, fish and wildlife populations, and recreation opportunities and prevent additional



adverse impacts from occurring;

- * enhance fish and wildlife resources;

- * provide habitat and wildlife populations similar to those which existed before project construction or to those which would be expected to exist today without the project;

- * be compatible with the authorized project;

- * be contiguous to the project area where the losses occurred;

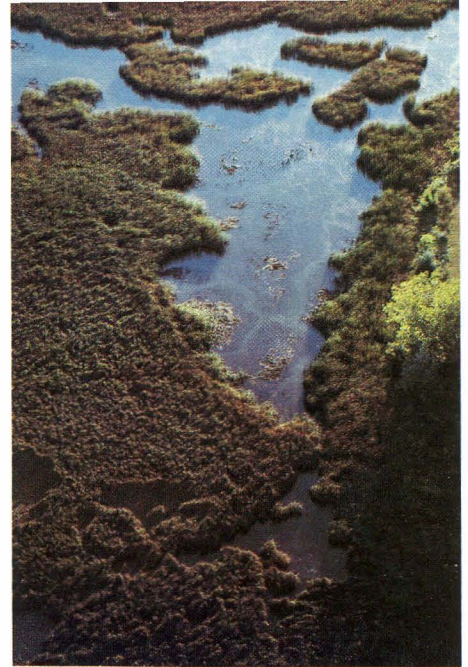
- * be publicly acceptable and environmentally feasible;

- * not adversely affect the flood carrying capacity of the existing levees.

If no mitigation were to take place, fish and wildlife habitat would continue to disappear. In a 1963 report, the USFWS reported that, "opportunities exist now and never will again, for the development and preservation of excellent fish and wildlife areas. . . . It

would be regrettable if these opportunities were permitted to pass without positive action." Some of these opportunities have already been allowed to pass, and, more will slip away quietly until the day when resources are made a priority.

The USFWS plan calls for 40,414 acres of aquatic habitat to be constructed, restored, and/or preserved. It also calls for the restoration and preservation of 149,899 acres of terrestrial habitat. The initial cost would be \$1.3 billion. The areas needing attention, according to the USFWS, are the backwaters, sloughs, midchannel sandbars, confluences of tributary streams, submerged gravel bars, mud banks, and sand dunes. These areas need to be acquired to restore the habitat vital to fish and wildlife. Large tracts of 1,000 acres are the most suitable and desirable as they provide an abundance of habitat and continuity that many wildlife species require.



With winter cover a critical limiting factor, bottomland timber interspersed with shrubs should be included in these areas to supply the needed cover. The USFWS suggests the acquisition of marginal croplands that could be converted to wetlands, and their technicians feel





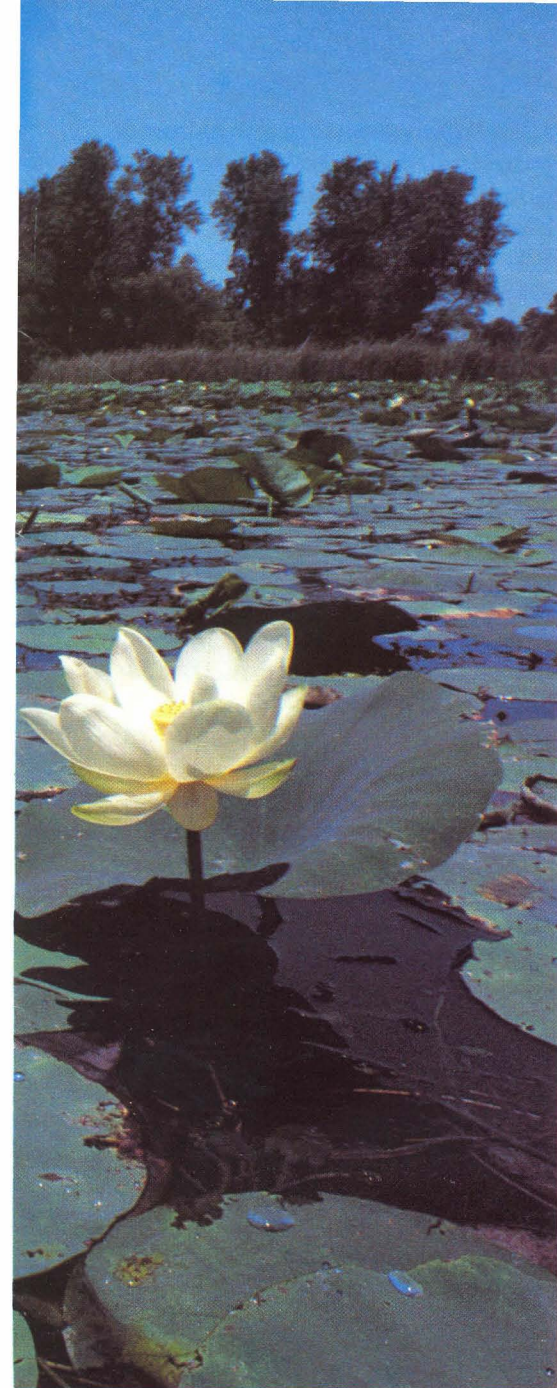
Missouri backwaters are critical spawning areas for the river's game fish, superb waterfowl habitat, and beautiful as well. (American lotus by Sylvia and Lloyd Brockus III, cormorant by Gene Brehm)

that more sloughs would be desirable even though species like paddlefish and blue sucker also need chutes during certain parts of their life cycle. Fish spawning areas should be established every twenty river miles to compensate for the loss of natural shallow water habitat. They should open into the river and contain quiet waters.

Many agricultural developers and

farmers are opposed to the mitigation in any form. Their main concern is the loss of their land by condemnation, though this land was acquired at no cost to them when the river was narrowed. One aggravated lawyer states, "given a period of time, virtually every parcel of land, whether it be marshland or otherwise, can be brought under cultivation." A farmer states, "Much of the Missouri land on either side of the Missouri River is the best farmland in the state. To take this land out of cultivation at this time (or any other time) for recreational

purposes would be criminal." Many share the view that nothing should be done because sooner or later the land will be farmable. Under the USFWS mitigation proposal, the government would only take land that was willingly sold. Mitigation efforts could even avoid outright land acquisition by buying up easements that would control mining, timber harvest, and construction in sensitive bottomland habitats. Cropland would not be necessarily eliminated as many fields could be sharecropped. The EIS prepared for the final mitigation report claims



that none of the alternatives would result in significant loss of farms because most of the potential mitigation sites lie between the agricultural levee and the river where they are often flooded.

The Corps of Engineers eliminated a proposal by the USFWS to develop borrow pits (areas in the old river bed where sand had been taken). The rationale is to leave them but not develop them because they fill quickly with sediment. Many of these borrow pits are deep and, according to the USFWS, would revert back to marsh natu-

rally, providing habitat at a lost cost.

Another important concept suggested by the USFWS and scrapped by the Corps is the idea of a trust fund. A trust fund would allow land to be acquired as it became available from willing sellers. It would also allow specific projects to be implemented as they became available, providing the opportunity to maximize mitigation without time-consuming bureaucratic maneuvers to free needed money. The corps, eliminated this because "it's a means of implementing a mitigation plan rather than a potential measure in itself."

The Corps has devised plans of its own (plans A, B, and C in Figure 2). Plan B, the course they ultimately adopted is a middle-of-the-road approach. It would restore 2500 acres of aquatic habitat and preserve another 700 acres. It would acquire and develop 8000 acres of terrestrial habitat associated with aquatic areas. About 20,000 acres of large timber tracts would be developed with the development of 16,900 acres on public lands. The cost of this plan is \$45.5 million. It was selected by the Corps because, "it partially satisfies all the objectives; the expected results of the plan implementation would maximize the overall project benefits; the plan is made up of justifiable fish and wildlife conservation measures."

In reality, all plan B will do is conserve and/or restore three percent of the Missouri's original aquatic habitat and only seven percent of its original terrestrial habitat. The USFWS proposal would conserve, preserve, and restore forty percent and thirty-six percent respectively. The Corps has offered a drop in the bucket that they themselves emptied. But, it is better than nothing.

Plan B was submitted to the Board of Engineers for Rivers and Harbors and was favorably passed and is now on the way to the Chief of Engineers. It will wind through the chain of command and will eventually reach Congress which

will ultimately decide its fate. One retired Corps employee expressed his view that though Congress may authorize it, it will have a rough time in appropriations as money will more likely go to food stamp programs instead of fish and wildlife.

Notched dikes have played an important role in softening the impact of the Missouri River development on aquatic habitat. The Corp's rationale for notching dikes is that the increased flows will reduce the sediment deposition, scour and transport old sediments, and maintain existing aquatic habitat.

A study was conducted to determine the effects of dike notching on fish and wildlife. Dr. Frank Cross, fisheries professor at Kansas University, was the project leader of the aquatic areas in the Kansas miles of the Missouri. Dr. Cross and his team determined that the quiet waters generated the largest yield of fish, including young of the year which indicates their importance as nur-

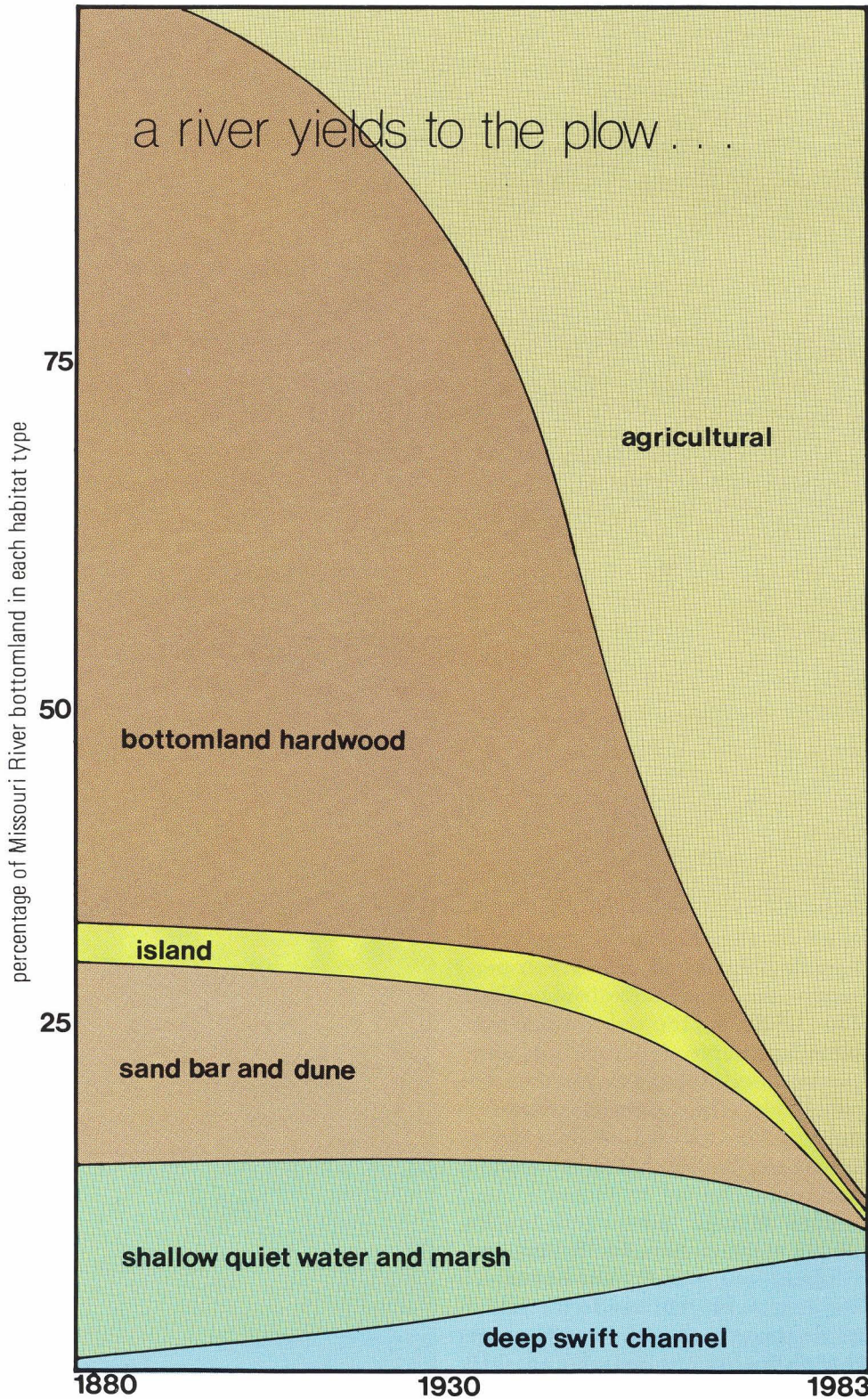


The proportion of wild country in the Missouri bottoms has declined steadily since the turn of the century. The benefits of confining the river have proved to be equivocal. While minor flooding has been eliminated, major floods now do far more damage.

series. Almost all of the species use the quiet areas for egg deposition or as a nursery. Cross feels that notched dikes have “unquestionably improved fish habitat, though the potential has not yet been reached.”

The dikes probably don't provide permanent habitat. When the river is high, quiet areas behind the dikes become part of the main stream and fish are swept from place to place. This may be the reason smelt have been found in Kansas reaches of the Missouri. Fisheries biologists suspect that they have been washed down from the Dakotas. In spite of the effect of high water, though, a continuous system of notched dikes could be engineered to protect fish most of the year, providing little pockets adjacent to the main channel which would act as refuges when high flows subside. Another important concept according to Dr. Cross is the protection of tributary mouths. These mouths provide quiet water habitat and design of the dikes can affect the rate of siltation. If kept open, these areas provide desirable quiet water adjacent to the Missouri mainstream and allow access to the tributaries for species that spawn in the smaller streams.

The impact of notched dikes on wildlife, according to Chris Peter-



Gene Brehm



son and Charles Segelquist who prepared the report, will depend upon the configuration and extent of the various terrestrial and aquatic types that will be available after the notching. Though they feel the impact will be small in terms of area and changes in population numbers, the dikes may significantly change the diversity of certain wildlife populations and enhance their abilities to maintain themselves. The major change in wildlife habitat will be the formation of sandbars in open water behind structures, the maintenance of chutes between the new sandbars and the river bank, and the maintenance of deeper pools behind certain structures. The sandbars will provide resting and loafing areas for waterfowl but will not compensate for the loss of habitat needed for other life processes. Chutes are important for certain bird species and furbearers though, according to Peterson and Segelquist, their main value is in "maintaining islands and preventing usual agricultural encroachment that follows the filling of abandoned

chutes." In short, the river is a little better off with notched dikes than without them, but a notched dike effort by itself can't even begin to compensate for the overall riparian habitat loss.

Is the Missouri for sale? One begins to wonder after South Dakota's announcement of the sale of 16.3 billion gallons (57,000 acre/feet) from Oahe Reservoir. The water will be piped 288 miles to Wyoming where it will be mixed with coal and transported to power plants in Oklahoma, Arkansas, and Louisiana. The ETSI pipeline will pay South Dakota \$1.4 billion over the fifty-year life of the contract. Jim Saylor, aide to the South Dakota governor, claims they had no choice but to sell the water; it was a matter of preserving their ground water. He points out that Wyoming would have sold groundwater to ETSI if the Oahe sale hadn't occurred, and water wells in western South Dakota would have been depleted. The ETSI water diversion is only one of a host of threats to the water of the Missouri. As of February

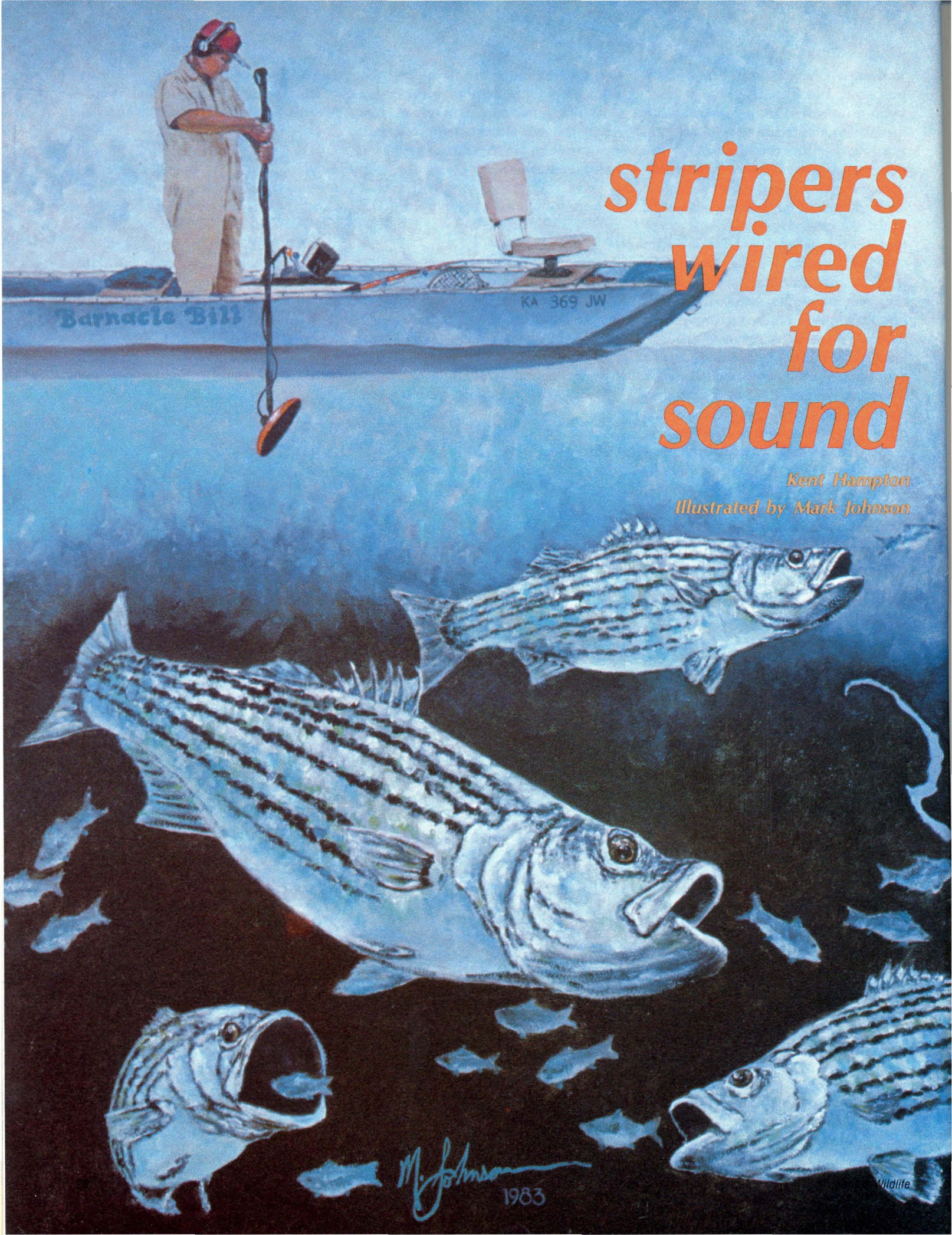
1982, there were seventy-one in-basin (water would be eventually returned to the basin) proposals, seven of them in Kansas. They range from diverting 7,000 to 1.5 million acre-feet per year and are intended primarily to provide irrigation water although some will be used in industrial and municipal situations. More alarming still is the number and quantity of out-of-basin withdrawals (water is not replaced to the basin). There are eight of these including the ETSI with the quantities of their withdrawals ranging from 20,000 acre-feet a year to over four million acre-feet per year. South Dakota's reaction to concern over the ETSI diversion is that Missouri set the precedent years ago with the construction of a pipeline near Springfield, Missouri.

The demands we have already made on the Missouri have nearly gutted the river; the demands we are planning will almost certainly finish the job. We must decide now what is more important: those plans or the river itself. Even if we side with the river, the effort to restore a part of what has been lost won't be cheap or easy. Severe damage has already been done, and the agency that has done most of that damage, the Corps of Engineers, is the logical candidate for the job of undoing it. The question is whether they have the will to undertake a meaningful mitigation program. The Corps maintains that the USFWS mitigation plan does not satisfy all project planning objectives, but the Corps' own plan fails to satisfy the objectives of many conservationists whose main concern is the wild river itself.

Oliver Wendall Holmes once said, "A river is an entity; it is a treasure. It offers a necessity of life that must be rationed among those who have power over it." Wildlife deserves a part of our ration.

Mary Kay Spanbauer is a wildlife information representative in the Fish and Game Commission's Kansas City office.





stripers wired for sound

*Kent Hampton
Illustrated by Mark Johnson*

Mark Johnson
1983

Wildlife

If you were at Wilson Reservoir any time between April 1980 and July 1981, you might have seen me and wondered what in the world I was doing. I was the idiot in the aluminum fishing boat putting back and forth across the reservoir stopping every hundred yards or so to dip a broomhandle in the water. Not the usual reservoir fishing rig, but then, I wasn't really fishing. I was trolling for sound waves.

As a graduate student at Fort Hays State University, I was involved in a project conducted by the Fish and Game Commission and the university to study the movements of striped bass at Wilson. We began the study by netting stripers and outfitting them with ultrasonic transmitters.

A handful of men from Fish and Game and a few volunteers from the university spent three chilly April nights near the dam running gill nets to catch ten four to eight-pound stripers. The transmitters, about three inches long, were sewn into the bellies of the fish. The transmitters' signals could only be detected at a distance of a few inches in air, but, thanks to the greater sound conductivity of water, they carried a mile or more in the reservoir.

I spent about twenty-four hours a week tracking fish, days and nights, good weather or bad, during the fifteen-month project. I used an underwater microphone mounted on a pole to locate each fish, then took sightings on nearby landmarks with a sextant to

pinpoint the location on a map of the reservoir. If the striper wasn't moving too fast, I tried to get over it with a fish locator to find out how deep the fish was swimming.

The patterns of striped bass movement at Wilson were similar in some ways to patterns described by two researchers who have worked on Chesapeake Bay stripers. The Chesapeake technicians broke striper movements into three seasons—the spawning season (April to June), the feeding season (July to October), and the wintering season (November to March). At Wilson, stripers stayed in the lower part of the reservoir between the dam and Minooka Park during the feeding season. During the wintering season, they



used the upper part of the reservoir between Minooka Park and the oxbow, and during the spawning season, they ranged throughout the reservoir.

Like salmon, ocean-going stripers migrate up rivers to spawn. Although stripers aren't known to spawn at Wilson, this urge to move upstream still seems to affect them; eight of the ten stripers implanted in April were located in the oxbow during the spawning season. Two of them swam more than twelve miles from the dam to the oxbow in only three days, and the movement didn't stop at the oxbow. Some fish swam much farther upriver. By the end of the spawning season, all the fish had returned to the lower reservoir and showed no further interest in the river.

The stripers remained in the lower reservoir throughout the feeding season. The maximum depth there is seventy-five feet, but the fish spent most of their time in water that averaged forty-nine feet. They were seldom detected near the surface or the bottom; instead, they swam at an average depth of twenty-five feet. Late in the feeding season, some of the stripers moved up the reservoir to the area surrounding Cooper's Point.

The transmittered fish drifted into the upper reservoir early in the wintering season and could be found in the oxbow by the end of the year. They seemed to move in and out of the oxbow but remained in the upper reservoir until the end of the wintering season when some returned to the dam.

Stripers seem to concentrate their activities in different areas at different times. I identified five of these—one near the east end of the dam, another near the Lucas Park swimming beach, a third between Lucas Point and Cooper's Point, a fourth south of Duvall Cove, and the oxbow. These areas

are all characterized by various combinations of sharp drop-offs, submerged trees, and nearby mudflats or river channel.

The areas near the dam and in the oxbow are probably more than just areas of concentrated activity. They may also be staging areas; that is, sites where fish gather temporarily before swimming upstream. Many of the transmittered stripers overwintered in the oxbow. Other overwintering areas may exist, but I wasn't inclined to risk breaking through the thin ice to find them. During March, some of the stripers staged in the lower reservoir near the dam.

In some situations, I could trail a fish long enough to estimate its swimming speed. Average speeds varied with the season—during spawning season, average speed was .98 miles per hour; through the feeding season, .29 miles per hour; and in the wintering season, .43 miles per hour. My stripers were most active during the spawning season and least active in the feeding season when water temperature exceeded seventy-four degrees. They were most active from dawn until noon and relatively inactive at dusk. Activity increased around ten or eleven o'clock at night and increased again a few hours before dawn.

What does all this information mean to the fisherman? Perhaps most important, it shows that stripers are predictable at many times of year. An angler in the know can start looking for stripers where they are most likely to be found and save himself the impossible task of prospecting all over the reservoir. And, since stripers are large fish and fond of suspending in deep water, a fisherman can identify them easily with a good fish locator.

Stripers seem to be most vulnerable during the winter; fishermen commonly take them through the ice in January and February. A few stripers are also

taken in the pre-spawning period. Fisheries biologist Bruce Zamrzla has found that they are often feeding on crayfish at this time since shad are not particularly abundant in early spring. When stripers have sex on their minds, they're tough to catch, so staging concentrations in the oxbow don't generally yield large numbers of fish. In fact, Zamrzla remarks that he has never seen a steeper caught in flowing water at Wilson. This long period of finicky eating combined with the physical demands of the spawning run leaves the steeper population with a good appetite through the summer. When most other fishing has deteriorated because of the heat, stripers can still be taken by fishermen who troll deeper water. Larger fish like bluegill or carp make good bait at this time of year. Although few locals have tried downriggers for stripers, steeper specialists from other parts of the country have used them very successfully. Whatever the technique, an angler who is after late summer stripers at Wilson should plan on fishing at twenty feet or deeper.

The results of the Wilson study are obviously most useful to fishermen who consistently fish the reservoir, but the general pattern of steeper behavior may well apply to most other steeper populations in the state—a pre-spawning concentration, a run upriver, a deep-water feeding season, and over-winter concentration areas where fishing is particularly successful. An angler who can pinpoint these seasonal concentrations has a good chance of tying into striped bass. He really needs only two other commodities to guarantee success—patience . . . and luck.

Kent Hampton is a graduate student at Fort Hays State University.

Mark Johnson is a professional wildlife artist in Independence, Kansas.

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Gene Brehm

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