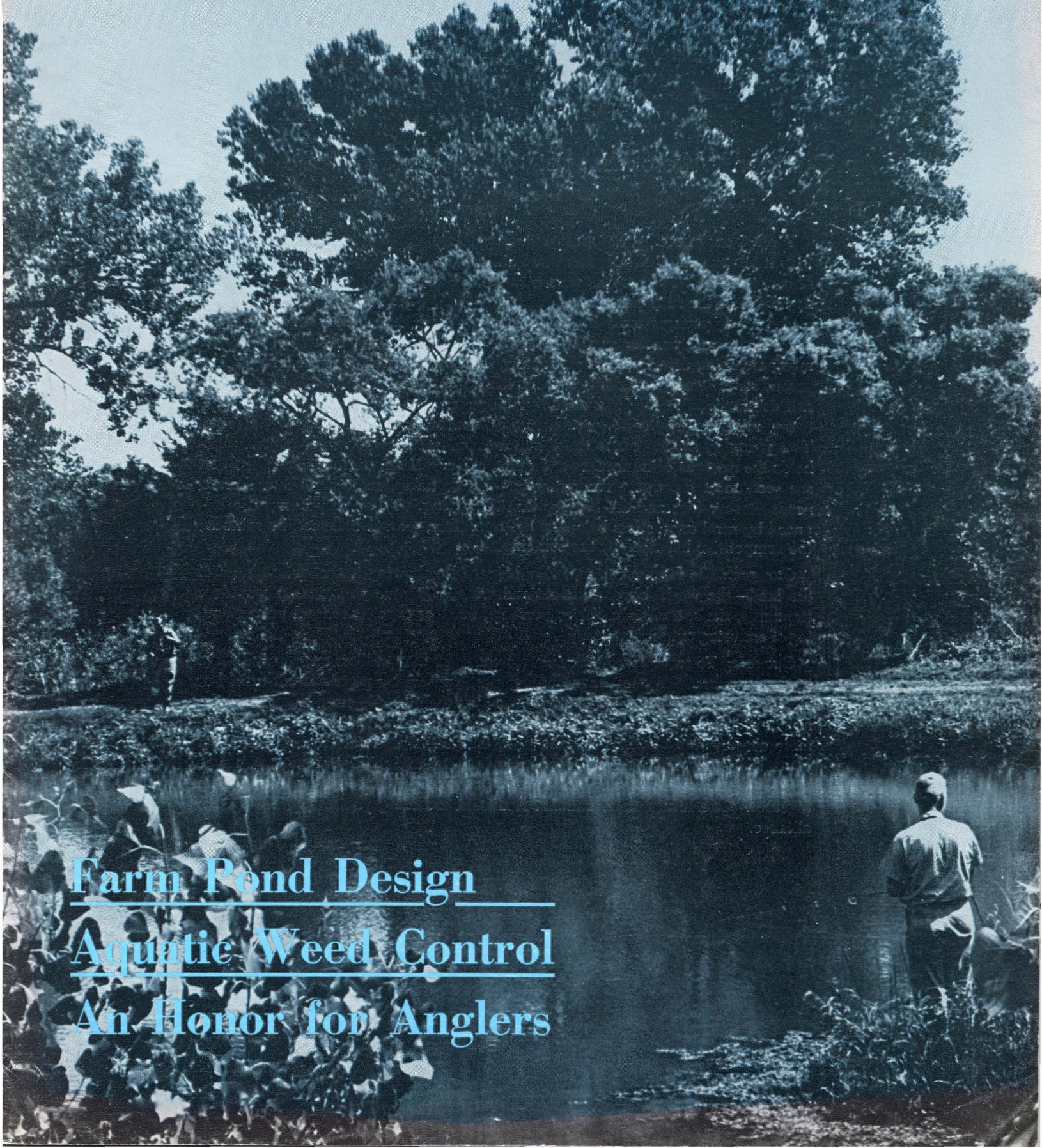


SUMMER 1969

KANSAS FISH & GAME



Farm Pond Design
Aquatic Weed Control
An Honor for Anglers

The Conservation of Youth

An Outdoor Writers Association of America Theme

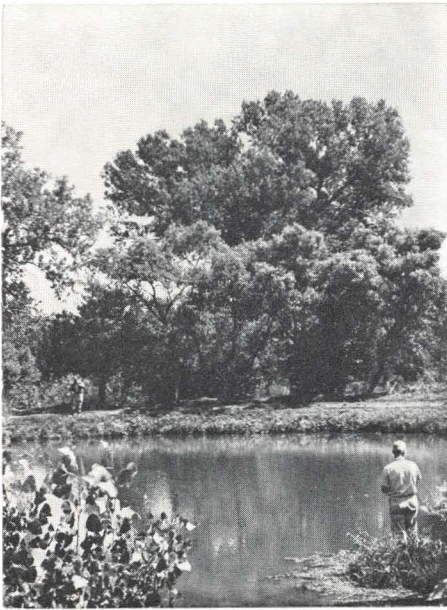
Youth is our most vital national resource.

In it lies our national strength, pride and hope. It is the resource most worthy of conservation. This implies wise use, and one of the wisest uses of youth is to dedicate it to the outdoors.

Too many young people have drawn away from the outdoor world and the wells of strength, purpose and understanding of life that can be found there. Too many are being diverted from genuine values and attracted to superficial or dangerous sensations. Youth is being courted and pressured by all the constructive and destructive forces of our shifting society: politics, the arts, consumer advertising, religion, drug traffic, commerce, subversion, hawks, doves, civil liberties. This plunging society offers many cultural and material rewards. But it withholds the rewards of tranquility and quiet, and the basic, unchanging values that are seen most clearly in the outdoors. Youth today, more than ever before, needs those values and the balance that they bring. Urban values must be balanced by rural ones; stress balanced by tranquility; crowds balanced by solitude; the competitive balanced by the contemplative.

Our goal: To help youth maintain balance by showing it the quiet places of the land—the world beyond streets and walls. To give young people outdoor standards, skills, traditions, ethics personal, outdoor experience, and understanding of enduring outdoor values.

Our role: To serve as arbiters and promoters of the outdoors and youth's place in the outdoors. To encourage outdoor participation by people of all ages, but with an accent on youth and in conjunction with youth. To emphasize, in all the media at our command, the mutual needs of youth and the outdoors. To promote conservation and outdoor education in schools, and active participation of youth in hunting, fishing, camping, boating, hiking, and natural history. We who love young people and the outdoors can do no greater service than bringing them together. The future of all national resources, including youth, depends on this alliance.



Cover Photo

Summer means only one thing to many Kansans—a time to fish. There's many other fine sports to enjoy in Summertime, of course, but there's no doubt that fishing tops the list and holds the limelight. And when it comes to fishing, there's plenty of places in Kansas to do it . . . the state now boasts 20 large federal reservoirs, 40 state-owned or state-managed lakes, several waterfowl areas which offer good angling, dozens of fine city, county and township lakes, more than 80,000 well-stocked farm ponds, and dozens of streams. Variety? You bet! There are crappie, walleye, white and black bass, Northern pike, all kinds of catfish, sunfish of many species . . . the list continues. Fishermen will tell you, too, that there's no better way to relax, and nothing more enjoyable, than just fishin' . . . like the two anglers at a pretty pond who are pictured on our cover . . . Photo by Thayne Smith.

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Summer, 1969

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Shame of the Strip Pits

By ROY MILLER

PITTSBURG—The man in the uniform beneath the brimmed hat looked up and said, "There's something you don't see very often. And that's trash in strip pit area west of Pittsburg." The man doing the talking was a state game protector.

With the sun bouncing off the water, the pits themselves presented a pretty sight. But everything was ugly if you turned your eyes to the perimeter, to the banks, to the road, to the signs or to the toilets.

Vandals have damaged signs beyond recognition. To find a sign without a bullet hole or two is a rarity. To find some signs is impossible. They're missing.

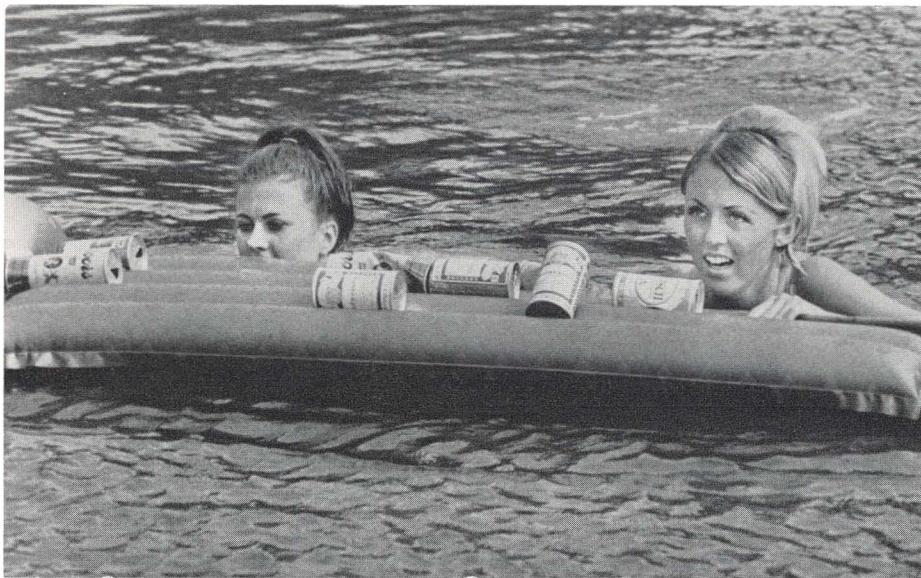
Toilets, which only cost the public \$1,100 to install, have holes in the sides big enough for a mortar shell, however big that is.

In other words, a portion of the half a million dollars the Kansas Fish and Game Commission put into the area recently is going to waste.

Game protectors bemoan the "beer



SCENIC STRIP PIT—Pit north of Frontenac is typical of solitude and beauty afforded by pits of Southeast Kansas. But, beyond the water, trash is sorely plentiful. (Photos by Hugh Tessororf.)



CLEAN SWEEP—Couple of coeds from Kansas State College, Pittsburg—Debbie Potts, left, and Judy Stutt—use ingenuity in helping clean strip pit near Pittsburg. Members of Alpha Gamma Delta sorority donned bathing suits and used inflatable raft to help clean areas.

busts” on the areas, pointing out that the areas were developed for hunting and fishing with money from fishing and hunting licenses.

Game protectors can't be everywhere at once. Three of them, however, happened to be on the scene at the right time one spring day when five persons were arrested within 10 minutes.

One was arrested for driving 50 miles an hour in a 25 m. p. h. zone. Another was charged with plinking cans and leaving them on a boat ramp. Three boys were arrested for target practicing.

Just as they are not for beer parties, the areas are not for target practice. How can a hunter or fisherman go about his pursuits with bullets flying every which way?

The area is for hunting and fishing. As officials put it, what self-respecting animal is going to stay in an area where shooting is going on all the time.

“We would like to have more tourists come through Crawford County,” the officer said. “But they can't enjoy it if we have these kind of things continuing. So this robs the man downtown.

“We would like to make more improvements to these areas. But we can see no way it would be

profitable if it's going to be torn up faster than it can be put in.”

The tour had reached a swimming area. A bunch of fraternity markings defaced a concrete retaining wall. Beer bottles abounded.

Another area, another mess. A lock securing a trash can shot up. The

bottom of the can not even covered but enough litter for two cans within a few yards.

Then the officer sighted an empty boat trailer. As he suspected, a couple of youths were pleasure-boating in a big pit.

Boating, except for fishing purposes, is prohibited in the area. It's the same at all fishing lakes of the Kansas Fish and Game Commission.

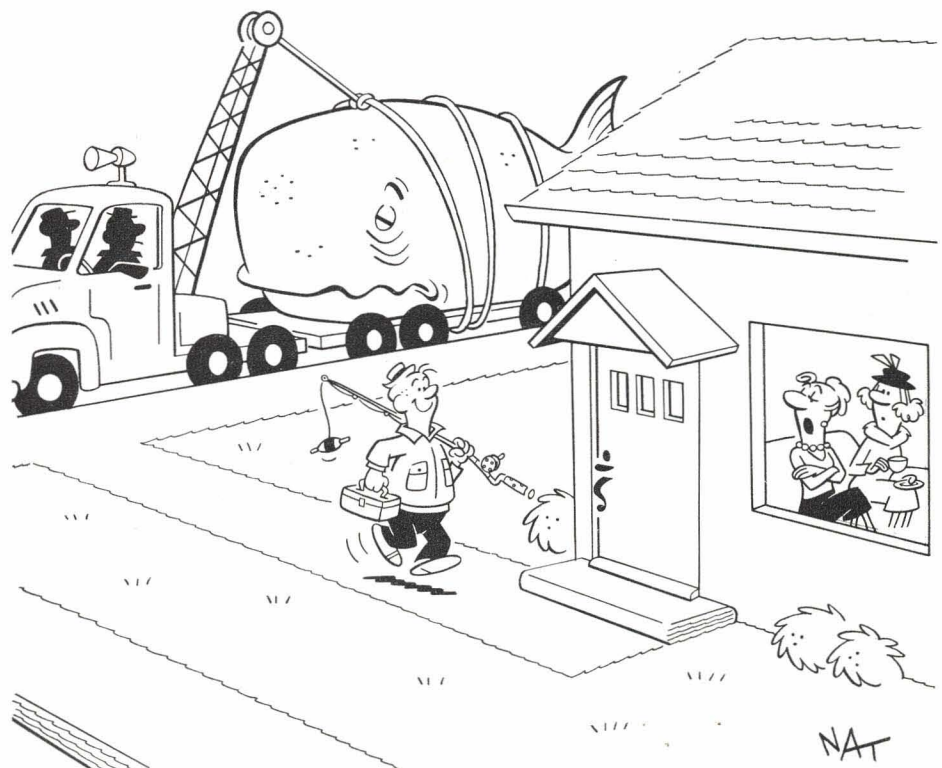
A couple of weeks after an account of the tour appeared in a newspaper, several groups volunteered to help clear up the litter. That includes a Boy Scout troop from Galena and fraternities and sororities at Kansas State College of Pittsburg.

But the clean-up sessions barely made a dent in the litter.

And the strip pits of Southeast Kansas, unless the public conscience is reached, may become the trash pits of Southeast Kansas.

A worker bee can lift 24 times its weight, a horse only half its weight.

The wandering albatross has a wing span of 11½ feet.



“Here he comes with another one of his fish stories.”

A Bird of Many Faces

By MARVIN D. SCHWILLING

Often portrayed as the symbol of peace the dove is truly a bird of many faces. Its soft mellow "coo" outside the window is pleasing to many housewives. Farm boys flush them from the salting areas down in the pasture. Outdoorsmen enjoy seeing a single frail nest in the front yard shrubbery and other nests in remote wild areas far from human habitations. Nests may be in most any kind of tree and at varying heights or even on the ground.

The hunter views them as a challenging, difficult to bag, game. Through continued wise management of the dove, all these interests can be maintained.

The gamy, erratic flying, mourning dove provided 319,284 man days of hunting recreation for Kan-

sas hunters in 1966. They bagged almost a million and a half doves. Only the Bobwhite quail provided more hunting recreation for Kansas nimrods. However, when considered nationally the dove is the number one gamebird, nesting in all of the contiguous United States.

The national dove harvest in 1967 was more than 40 million birds. Compare this to a mallard population of seven million or the blue-winged teal



Dove is truly a bird of many faces.

population of four million, and you have an insight as to their relative abundance.

Doves are migratory game birds so research and management studies must necessarily extend beyond state—even national—borders. To better correlate dove management, flyway units have been set up. They are similar to the waterfowl flyway management concept that has been used to manage waterfowl populations for many years.

Kansas geographically is located in the Central Management Unit. There are 13 states in this unit and it contains about half the breeding habitat estimated to occur in the United States and about 54 percent of the nation's mourning dove population.

The Kansas Fish and Game Commission over the years has contributed considerably to the development of sound dove management practices. Dove banding began about 50 years ago (1920). Between 1961-68, 4,277 doves were banded in Kansas by Fish and Game Commission and Fish and Wildlife Service personnel. Banding has been intensified in recent years,



Hunter waits patiently in weed patch as two doves approach feeding area nearby.



Day's bag is examined by author, following successful hunt in Cheyenne Bottoms area near Great Bend.

in 1967, 1,448 free-flying doves were banded prior to the hunting season. These number carrying birds have and are contributing much to our knowledge of the migratory patterns, homing instincts, differential kill of young and adults, percent of populations being harvested, how long they live and other valuable information. Commission personnel also cooperated in a squab nestling throat swabbing test to determine the incidence of disease. Some 215 samples were taken from 1963-66.

State and federal personnel each year census dove numbers along 26 randomized 20-mile routes, using the coo-count census technique. Average number of doves heard per route for the four-year period (1963-66) was 52 birds — 2.6 per mile.

All present studies indicate that despite the fact there are more hunters and they are harvesting more doves each year, the population is not de-

clining. In fact Kansas hunters harvest only a small percent of a dove

population which has a natural mortality of approximately 70 percent.

Thus, we are substituting hunting kill for natural mortality which would occur even if they were not hunted.

With good management, this hunting will prevail for unlimited years in the future.

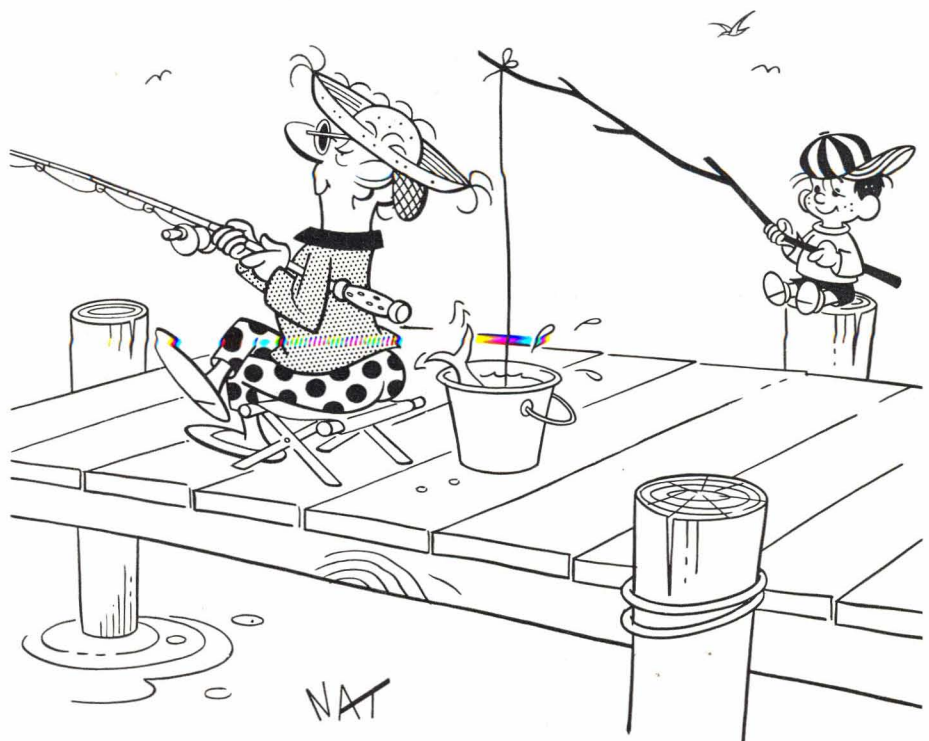
Female nighthawks do not build nests for their eggs. They lay them directly on gravel and depend upon camouflage for protection.

The only hoofed animal having its origin in North America is the pronghorn antelope.

When the jack rabbit shifts into high gear, it can travel at speeds up to 45 mph., and make 20-foot jumps.

A single egg mass from a female Gypsy moth contains from 100 to 1,000 eggs.

The fastest swimmers among fish are those with forked tails.



A Pond Is What You Make It

By LEO DOWLIN

Fisheries Biologist

Some ponds look like they're jumping with fish.

A little testing with a good rod and reel will reveal the truth.

If a good catch results, it's generally proof that a lot of foresight and planning was used in constructing the pond.

If the pond is choked with weeds, or is muddy enough to practically be shoveled instead of dipped, the fisherman might as well not waste his time. Condition of the pond not only reveals that it has little or no fishing potential, but was not constructed properly.

Many landowners in Kansas dream about having their own fishing pond or lake, and the dream comes true for some. However, just a dam across a ravine or a hole in the ground will not do the job. A manageable fish pond must be designed properly, and even before it hits the drawing board, there has to be some thought given to just what the landowner really desires from his impoundment.

Usually, a pond is built to provide livestock water or flood control. Often, the basic design does not include features which will make it easier for fishing, too. It can be incorporated, however, without interfering with the primary purpose of the pond.

A fish pond, to be used for the commercial raising of fish, must include these same features. However, harvesting the "crop" is also important in a commercial operation.

Basically, there are three types of fish ponds. The most common is the "damned ravine or ditch." It is generally built to provide flood control and protection for farm land or for watering livestock.

Another is the "dug-out," built in areas where the water table is high or the topography of the land does not provide slope enough to build a dam. Both of these must have ground

water and surface runoff for water supply.

The third is the "excavated dike" which restricts surface water from entering. It depends entirely on pumping or another pond for its water supply.

Basic design features for all types should provide for the management and raising of fish, and for either private or commercial use.

Any fish pond should cover at least three-fourths of an acre in surface. Smaller areas do not provide enough water to allow for normal fluctuation during drouth conditions, or enough "elbow room" except under intensive management.

Smaller ponds are also more susceptible to "winter kill," the death of fish due to oxygen depletion during long periods of severe cold and ice cover. Sunlight is required by microscopic plants in the water to produce oxygen needed for fish life.

Oxygen can be eliminated quickly by heavy covers of ice and snow.

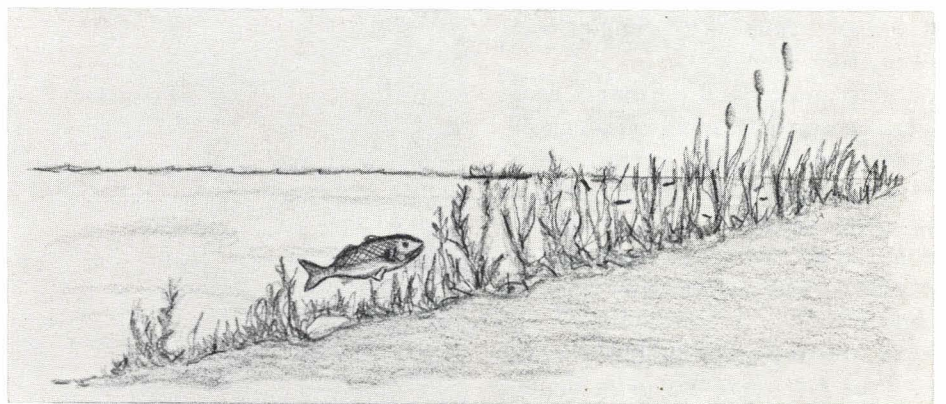
Depth is also important in helping prevent winter kill. Eight to 10 feet of water is a minimum for most areas of Kansas. Deeper water in winter provides more room for fish under severe conditions.

The design used at the pond's edge is most important, too. It should include a two-to-one foot slope to a depth of at least three feet. This will help guard against encroachment of the shallow shoreline with unwanted vegetation, and is especially important in the area where most of the fishing is going to be done.

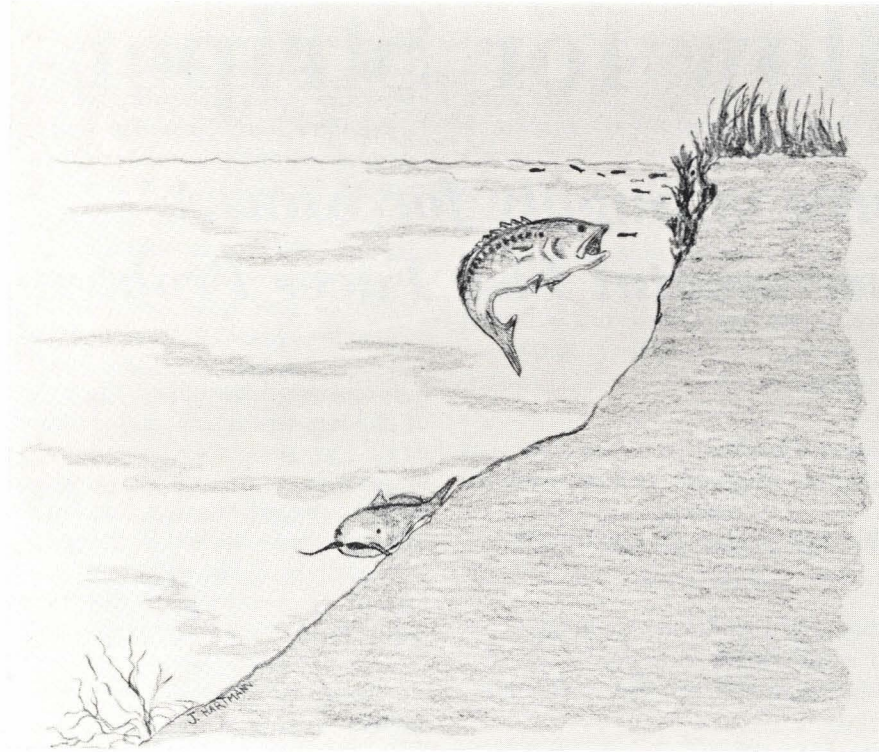
Vegetation poses problems in all fish ponds. It is especially a hindrance to fishermen, and provides too much protection to smaller sunfish from predators such as bass. Eliminating conditions which allow vegetation growth will provide a better-balanced fish population.

Taking dirt for construction from the shallow areas of the pond will cause longer hauls for equipment, but better fishing will result.

The basic construction of the dam or dike and spillway is one of the most important steps in try-



Pond with shallow edge will generally have abundance of undesirable vegetation, which offers too much hiding area for small fish and hinders fishing of pond.



Well-designed farm pond has steep slope at bank, which helps control undesirable vegetation and makes food more accessible to larger fish.

ing to build a manageable fish pond.

A pond which leaks into the ground is generally a sign of poor construction. The "core trench"—a trench dug out before the dam is started—is needed to interrupt natural layers of gravel and sand which carry ground water. The trench should be filled with clay that is relatively impermeable to restrict the flow of ground water, and should be used on both the dam and excavated-dike types of ponds. It is important that the trench be deep enough to reach a layer of shale or impermeable clay.

Dirt used to fill the core trench and build the dam should not contain gravel, sand or rock. Rock can be used, however, in the shallow areas to provide pier-like finger dikes out into the pond. They provide more edge for fish food production, and should be high enough to allow fishermen walkways when the pond is at normal level. Large rock should be placed around the edges of the dikes to protect them from wave erosion.

The core trench, dam and any fill dirt that is used should be compacted or tamped to prevent seeping of water through the dam.

Spillway construction needs much consideration, too. If the pond is near a stream or river, a concrete drop structure should be built on the emergency spillway. This helps prevent migration of unwanted fish upstream during high water. The lower end of the spillway should empty on natural grass and a gentle slope to prevent washout.

The spillway should be constructed to carry, without stress, all excess water, without damage to the dam. Technical data on construction of the spillway can be obtained from the Soil Conservation Service.

Planting the spillway, dam and dirt borrow areas is important for protection from soil and water erosion. A perennial grass adaptable to the region where the pond is being built is

recommended. A good cover grass that establishes a sound root system is best. Planting the borrow area to Reed Canary grass or Japanese millet will help protect the slope and areas that will be exposed to wave action. They will also provide waterfowl food.

Every fish pond should be built with a drain tube. This can be incorporated with a livestock watering system and an overflow pipe or trickle tube. It is important to be able to drain the pond to repair leaks or for eliminating undesirable fish.

In commercial fish operations it is also important to be able to harvest the fish produced. If the pond is going to be used for raising fish commercially it should be designed to drain completely. The overflow pipe or trickle tube is desirable to help stabilize the water level and to protect the spillway from washout during high rainfall and runoff periods.

It is important that any fish pond be fenced to protect it from livestock. If livestock water is the prime purpose of the pond, a pipe should be incorporated into the drain system to allow a watering tank to be placed below the dam and outside the fence. The spillway should be fenced, also, to keep it from being exposed to livestock use.

A fish pond should also be protected by a good conservation program of terraces and waterways, especially where the watershed contains cultivated land. This will guard the pond from siltation and help to assure clear water—good water which in turn will provide many hours of fine fishing.

Trumpeter swans are the largest American birds in terms of weight, males sometimes reaching 30 pounds.

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Strike a Blow for Stripers

Source of Supply for Kansas' Experimental Fish Faces Problems

By JOHNNY RAY

Santee-Cooper Reservoir, the pride of South Carolina, is not known as a hydro-electric facility which has the second highest single lift lock in the world at Pinopolis Dam.

Its main reputation stems from the fact that it is perhaps the first major impoundment in the world to have a significant reproduction of landlocked striped bass.

Now, situations have developed which may make the striper a non-entity in the reservoir.

On Nov. 12, 1941, water was impounded behind the Santee and Pinopolis dams to form the Santee-Cooper Reservoir. It consists of Lake Moultrie (64,000 acres) and Lake Marion (96,000 acres), which are connected by a diversion canal 6.5 miles long and 200 feet wide at the bottom. Water is supplied by the Santee River, which is formed by the confluence of the Congaree and Wateree Rivers a few miles above the reservoir.

Where does the striped bass enter the picture? For many years, the sea run or anadromous striped bass have used the Santee and Cooper rivers for natural spawning. Creation of the dams stopped the striped bass from ascending the rivers, however, a surprising and puzzling increase of stripers was noted in the reservoir in 1948-49.

A puzzle serves as a challenge to most fishery workers, and biologists of the South Carolina Wildlife Resources Commission began to investigate. Studies proved that sea run striped bass were not ascending the rivers and spawning, but those which were landlocked in the reservoir were reproducing in streams above the big lakes.

What does this mean? It revealed that Santee-Cooper had the first known landlocked striped bass fishery

in the world and that this magnificent fish could thrive and reproduce in a fresh water environment without returning to sea.

What has this meant to the people of South Carolina? Santee-Cooper has

become world famous as the epitomé of fishing reservoirs and holds the world records for black crappie, channel catfish, warmouth bass and landlocked striped bass. Consequently, fishermen have flocked to the reservoir with visions of big stripers and other fish in their minds. Many become quite extravagant when pursuing their favorite sport, and vast sums of money are spent in the state each year by anglers seeking stripers. Many other states would like to follow this foot-path.



Big and powerful! That's only way to describe freshwater striped bass in Santee-Cooper Reservoir. Spawning area of stripers is now threatened by U. S. Army Corps of Engineer projects.

In recent years, investigators with the South Carolina Wildlife Resources Commission have found that the striped bass can be spawned artificially and implanted in fresh water reservoirs far inland. A hatchery was developed by the Commission in 1961. Since that time, millions of minute striped bass fry have been produced. Many of these have been sent to other states and several foreign countries (including Russia) through cost or trade agreements. Kansas has received striped bass from South Carolina since 1965 and is currently dependent upon its hatchery to supply stripers for introductions into our state.

What is happening to Santee-Cooper to endanger the striped bass? First, water flow down the Cooper River below Pinopolis Dam may have to be seriously reduced to curb a silting problem in Charleston harbor where the Cooper empties into the ocean.

According to a study conducted by the U. S. Army Corps of Engineers, a reduction in the Cooper flow would alleviate this trouble. From previous experience and knowledge, it is known by the South Carolina Commission that such a reduction in water flow would stop striped bass traffic up the river. Brood fish used at the striper hatchery below Pinopolis are obtained from this source. If the stripers will not ascend the river and brood fish are not available, the hatchery will be out of business.

This problem might be overcome by the construction of a canal from Lake Moultrie to the Santee River. A hydro-electric plant would be constructed on the canal and a new hatchery unit. Stripers are known to inhabit the Santee River and it is believed they would ascend the canal to feed on shad and herring passing through the millraces and turbines of the hydro-electric facility. Therefore, it is hoped that brood stripers could be obtained from this source.

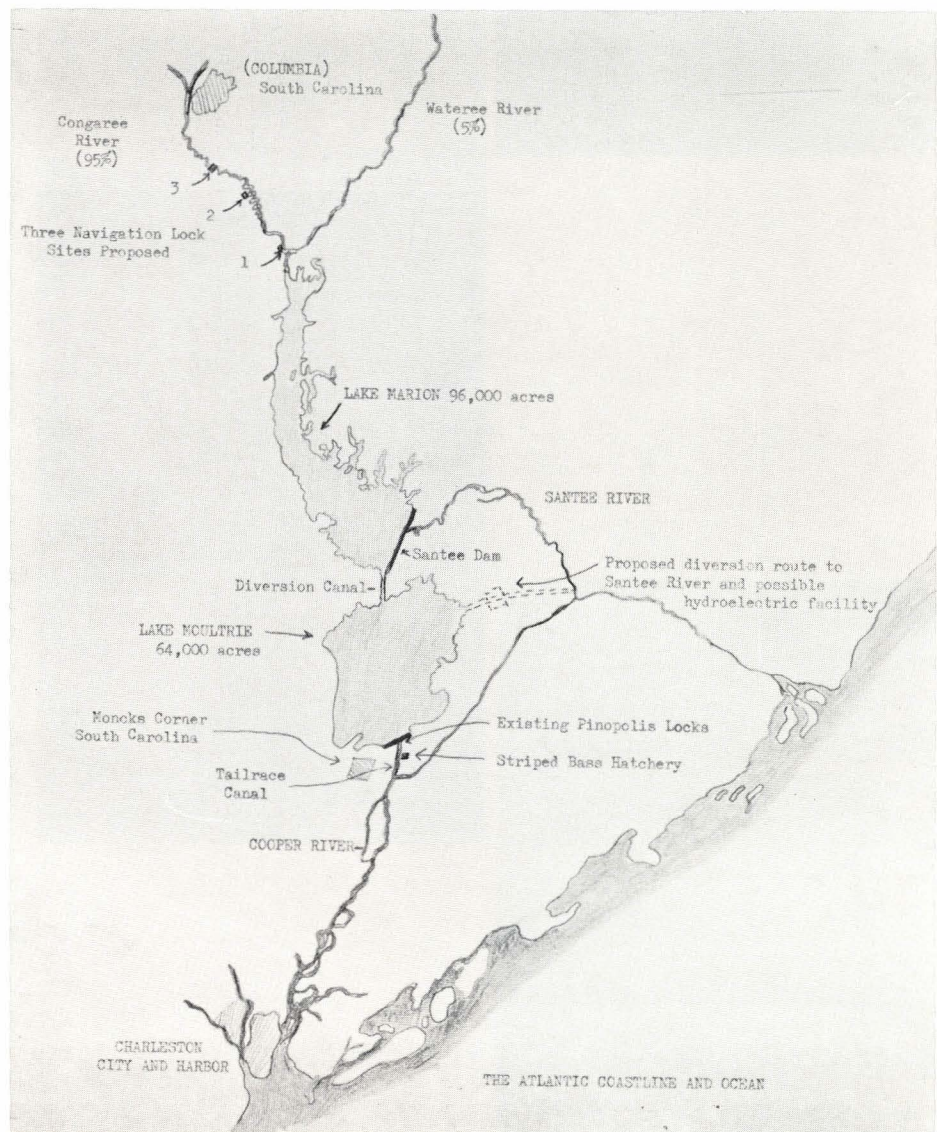
Another problem endangering the striped bass populations in Santee-Cooper is developing in a project designed to make the Congaree River navigable above the reservoir. It has been found by South Carolina fishery

experts that approximately 95 percent of the natural spawning of the land-locked striped bass occurs in this river, and without its natural nursery, significant reproduction would be eliminated. In order to make the river navigable, it would be necessary to construct three dams and three locks (not in the main course of the river, but on cutoffs). The dams would be placed in the river proper and prevent movement of striped bass upstream to spawn. Even if the fish could move around the dams, curbing of water flow down the river would prevent motion of the eggs downstream, which is essential for hatching to occur.

Why is Kansas concerned? It, like many other states, obtains

striped bass from South Carolina, and we need a source of supply. South Carolina has provided stripers from Santee-Cooper, along with invaluable information regarding the species in fresh water impoundments, to Kansas and several other states. Elimination of the striper in Santee-Cooper would not only destroy the study areas, but would eliminate the supply source and experiments by others.

It is inconceivable as to how South Carolina can benefit more from barge traffic down the Congaree River than it can from the striped bass. Studies as to monetary benefits from this great fish may prove the answer. Let's hope that the striped bass wins.



Map shows locations of proposed U. S. Army Corps of Engineers facilities at Santee-Cooper.



Who Is a

By ANDY

Who is a fisherman?

He's a freckle-faced kid using a willow stick and bent pin, or a business executive carrying \$500 worth of equipment.

He's a college professor gaining an inner feeling of contentment, or a shepherder catching a batch of trout for an evening meal.

He's Grandpa fishing from a folding chair beside a quiet pool, or "Daddy's little girl," afraid to put the first worm on a hook.

He's a deep sea enthusiast pursuing a shark or marlin, or Joe Smith sneaking on hands and knees to catch a seven-inch trout from Podunk Creek.

A fisherman's courage and endurance—or stubbornness and foolhardiness—should never be underestimated.

Only an angler dares come home after a weekend trip, smelling like the bottom of a sardine can, with a three-day growth of beard and a bag of trout for his wife to clean, saying "Hi, honey. Glad I'm home?"

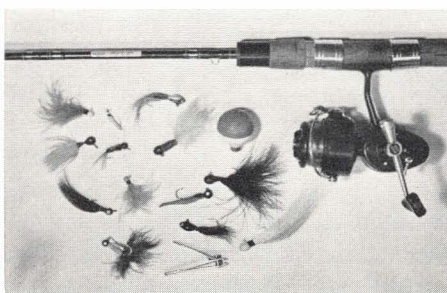
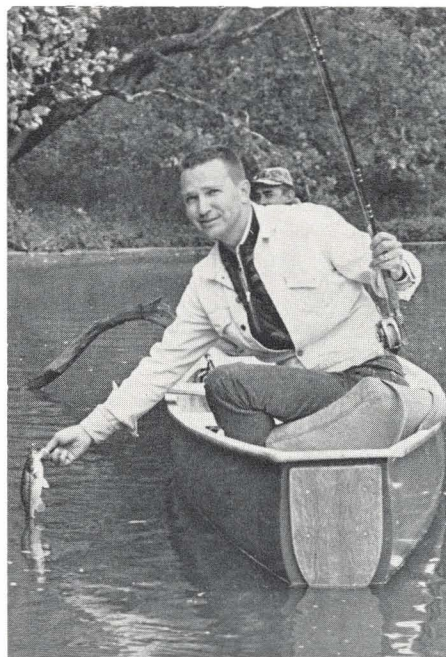
And who but a fisherman returns sunburned, thorn-scratched, mosquito-bitten, soaking wet and with a case of poison ivy to say, "Boy, what a great trip!"

A fisherman is the only guy in the world who is excused for diverting his attention from a girl in shorts while he admires a night crawler he's just uncovered.

Some people call fishing relaxing and restful. They have never watched an angler—tension etched on his face, every joint in his body taut, his brow wrinkled—as he prepares to cast a fly into a riffle where a huge rainbow awaits.

They haven't seen him lose self-control when the same trout nonchalantly turns tail and floats lazily away, even though the cast was perfectly executed.

The fisherman might be a fellow who counts his money carefully from day to day. He rarely puts a penny in a parking meter without first checking it against his monthly budget.



Fisherman?

USKANEN

The same guy thinks nothing of losing a hundred yards of tapered line to an overgrown lunker or \$5 worth of hand-tied flies in the treetops.

Anglers come in assorted shapes, sizes, age groups, and from all walks of life. Each has opinions and methods on the best way to outwit a fish. No larger body of individuals exists in the world today.

Each fisherman has one common interest—enjoyment of the sport. He enjoys his sport every season of the year. Seldom does he say, "I had a poor time today."

Fishing has aesthetic values. More than one poet, author and philosopher have expounded on the beauties found in angling.

Fishing is the great equalizer. It's the one facet of the modern world where each individual has equal opportunity to succeed.

The angler reaches the peak of frustration when a trout escapes, leaving the line dangling hopelessly in the trees. The next moment he smiles broadly as a better trout comes to net after a beautifully executed battle.

The fisherman is a study in contrasts.

Five days a week, he's the best-dressed man in town. Saturdays and Sundays he resembles a refugee from a hobo jungle.

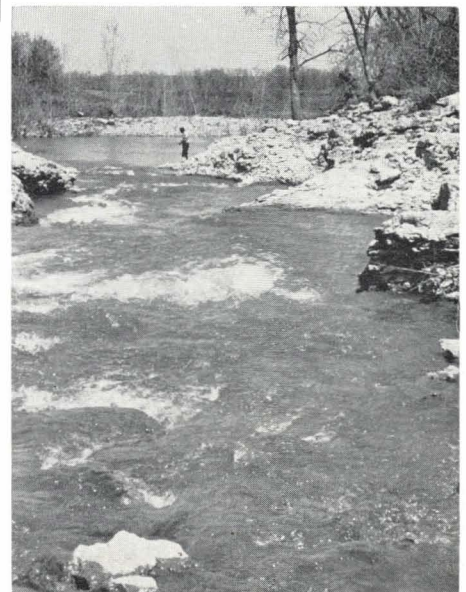
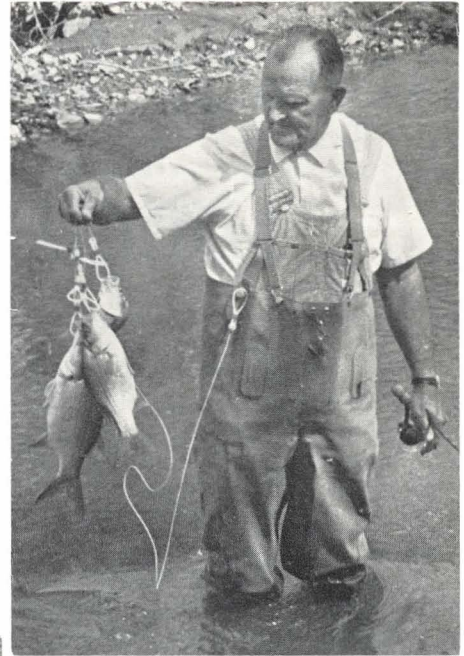
He may be a typical John Milquetoast at the downtown office. Put a rod and reel in his hand and immediately he's master of all he surveys.

The fisherman might be a janitor during everyday life. Start him talking about flies and lures and he becomes the Charles Goren of the fishy set.

Thank God for fishing.

It's an activity where a man feels like a man—with his wife at his elbow.

It's one of the last outposts for individualists and free thinkers.



Aquatic Weed Control

... Tough Job

By VERL STEVENS

Aquatic weeds can be a nuisance in a lake or pond. They are of little value for fish production and can provide a hiding place for small fish (bluegill or sunfish), thereby increasing chances for overpopulation and stunting.

Water weeds utilize nutrients that would otherwise go into production of desirable microscopic plants (phytoplankton), which serve as the base for the food chain which sustains the fish population naturally. Weeds can also interfere with fishing by entangling baits and hooks and helping that big one get away.

We usually think of plants as land dwellers. Actually, many live entirely in water, using food substances in the pond bottom (or water) and sunlight to grow and reproduce, just as land plants do. Because sunlight is essential for photosynthesis, growths usually start in shallow areas where more light is available.

Vegetation found in lakes or ponds can be divided into algae or higher plants. Algae are primitive plants which do not have true roots, leaves, or flowers and reproduce by means of minute spores. The familiar green pond scums, made up of long, hairlike strands, belong to this group and are called filamentous algae. Other algae commonly found in ponds occur as millions of tiny single cells suspended in the water. When these become abundant, they give the water a brown or soupy-green color and are phytoplankton.

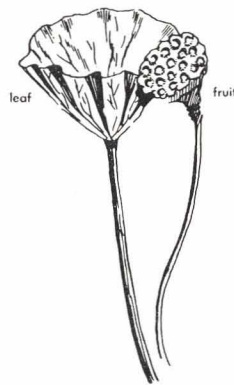
Higher plants are those which have roots, leaves, flowers and reproduce by seeds. Such plants, we may simply call "weeds" to distinguish them from the algae. Some of these live entirely

submerged or may grow to the surface (some with floating leaves), while others may be emergent.

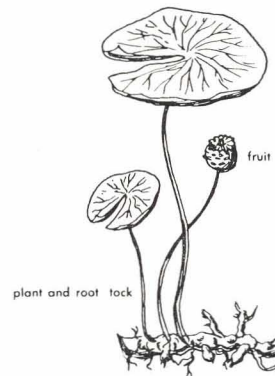
Submerged weeds can provide natural beauty as well as food and shelter for many forms of life. Dense weeds can also provide a breeding area for mosquitos and other noxious insects,

cause a decline in water front value and prevent water recreation.

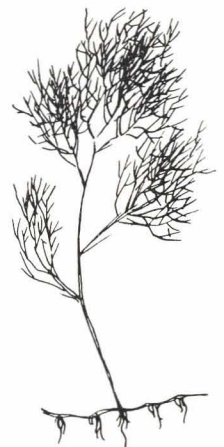
The goal of the fish pond operator interested in producing food or game fish, is to raise fish to a large or edible size within the shortest possible time. Weed control is essential to the maintenance of a



AMERICAN LOTUS (NELUMBO)
EMERGENT
FLOWER — YELLOW



WATERLILY (NYMPHAEA)
EMERGENT
FLOWER — WHITE



WATER MILFOIL
(MYRIOPHYLLUM)
SUBMERGED



ARROWHEAD (SAGITTARIA)
EMERGENT
FLOWER — WHITE



COONTAIL (CERATOPHYLLUM)
SUBMERGED

Six most common varieties of aquatic vegetation are shown in the drawings above.



Scenic Kansas pond is surrounded by heavy growth of weeds, which grow quickly when pond levels drop.

proper predator fish to forage fish balance.

Methods of aquatic vegetation control can be divided into three classes: Chemical, biological and mechanical. The method used will be determined by each individual situation and need. Some which are satisfactory in some cases are not practical in others.

Under biological control we may manipulate some form of nature to control the vegetation presenting the problem. Stimulation of phytoplankton is probably the most successful biological control. Ponds or lakes are fertilized with commercial inorganic fertilizer to stimulate their growth. These algae are usually desirable in shallow lakes because of the "shading out" effect they have on coarser weeds, thereby providing more space for fish growth.

Phytoplankton sometimes become a problem in fertile agricultural areas where the water is high in fertility and productivity. In fish ponds, they sometimes become so abundant that fish are killed during the night or on cloudy days due to exhaustion of the oxygen supply.

Mechanical control of aquatic vegetation is not usually satisfac-

tory unless at a very early stage of development. It usually employs the use of some type of mowing

machine mounted on the front of a boat. Simply pulling the plants by hand or machine, such as a rake, would also be in this group.

Many factors should be considered before application of chemical herbicides to a body of water. First, experts should always be consulted.

Fish breathe oxygen in the water; therefore, a water-oxygen ratio must be maintained. Oxygen available to fish may be used during decomposition of large weed beds. It is best to treat not more than half of the total pond area at one time. The remainder can be treated a week or two later. In many cases the hazard to fish through suffocation is greater than the chemical danger. Congregation of fish along the shore or at the surface is an early sign of oxygen depletion. Fresh water should be pumped in immediately if this occurs.

For best results treat early in the growing season when plants are young and growing vigorously and before they have reached the fruiting stage. Young plants absorb the chemicals more readily and are killed easily. This also reduces the possibility



Undesirable aquatic growth lines bank of scenic pond in central Kansas. Such vegetation, common in many Kansas impoundments, can be controlled with proper treatment.

of oxygen depletion caused by decay of large masses of vegetation.

In recent years new chemicals have appeared on the market that are specifically made for aquatic weed control. If properly used, they will normally give effective control of vegetation and will not harm fish. Pond and lake waters vary considerably in chemical composition, so it is not possible to give complete assurance that a particular herbicide will effectively control a specific plant in a given lake.

The user of herbicides is cautioned to **Follow the Directions on the Manufacturer's Label**. Some chemicals are quite toxic to man and animals. Most herbicides are toxic if taken internally, and direct contact with the chemical should be avoided. If it comes in contact with the skin, it should be washed off immediately. Rubber boots, gloves and a face mask should be used in accordance with manufacturer's recommendations. Some herbicides are highly corrosive to metals and a wooden, painted or copper-lined container may have to be used for mixing and application.

The control of emergent and floating-leafed aquatic plants is usually considered jointly because of similarity in methods. Cattail, bulrush and willows are some of the more common emergent plants in Kansas. They encroach on the fish producing areas and provide unneeded cover along the borders of ponds. Removal or sampling of fish populations is also made difficult by this group of plants. Duck weed and water lilies are among the more important floating-leafed aquatic plants found in the state.

One of the most effective, economical and safest herbicides for control of emergent and floating-leafed aquatic plants is 2,4-dichloro phenoxyacetic acid (2,4-D). 2,4-D esters are readily introduced into oil solutions, which make them effective on waxy-coated plants such as cattail, water lilies and bulrush.

Esters are combinations of the 2,4-D acid and alcohols and contain emulsifiers for introduction into water. They represent the most common contact herbicides on the market for use on farmlands. Wetting or spreading

agents are sometimes added as a means of getting the insoluble compound introduced into water. In addition they aid adhesion and penetration of the plant surfaces. Most household detergents which can be purchased at the local market are good for this purpose.

Submerged vegetation is more difficult to control due to diversity in methods of reproduction and propagation. Most of the coarse weeds are flowering plants. The seeds can be dispersed rapidly by water currents, wind or animals such as birds. Some plants have brittle stems which can break and form new plants. A common method of propagation is by means of underground stems which grow laterally into the bottom mud and produce new plants. This is why the mere draining of a pond or mechanical mowing of weeds gives only temporary results. The bottom of many ponds remain damp enough to preserve these invisible stems in a viable condition long after the top soil appears to have dried.

Once submerged plants have become established in a pond, the only certain means of eliminating them is by shading them out, although good

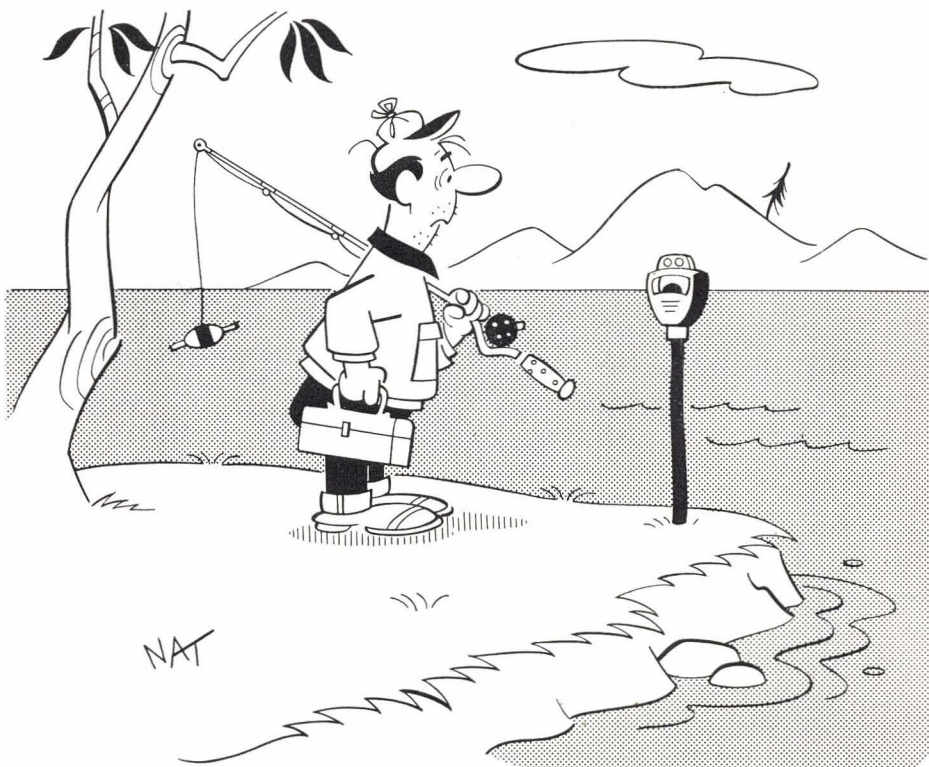
results can be obtained with the use of chemicals. "Shading out" is nature's way of elimination. This is done artificially by encouraging the growth of phytoplankton in the open water with fertilizers. As the water turns a brown to green color the rooted vegetation on the bottom will not receive enough sunlight to survive. Mechanical methods can be employed to control underwater vegetation but good results are temporary.

During the past several years, many new chemicals have been tried for control of aquatic plants. Several of these have been proven effective although the cost can be prohibitive in many cases.

The ground mole will die in approximately one day if deprived of its food.

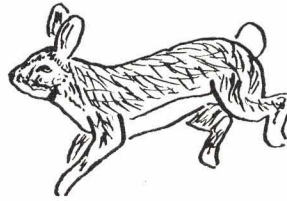
Antelope fawns are capable of running up to 25 miles an hour for short distances when only a day or two old.

The average bird requires eight times more oxygen when flying than when at rest.





By MARVIN SCHWILLING



It's Summer . . . wildlife populations are at their yearly low. The winter blizzards, heavy snow, sub-zero temperature, ice, inadequate cover, insufficient or low quality food, disease, predation, hunting, poaching and road kills have taken a heavy toll.

To be sure, only the strongest, healthiest and wariest of each species has survived. They have blossomed into peak plumage or pelage during the Spring courting period. Each in their own way courting, singing, displaying vigorously, defending territories hoping to be chosen as a mate.

Male chipmunks sing for their females. Prairie chickens dance on booming grounds. Chickadees discard their winter notes in favor of a new melodious Spring song. The mockingbird sings for hours and hours sometimes continuing most of the night.

All this foolishness is now past. The population is low and must be replenished. The serious tasks of reproduction is underway. Yes, wildlife—generally speaking—is an annual crop and cannot be stockpiled. Surpluses of fall populations of game birds which can safely be harvested by the hunter each fall depend largely on the preceding summer's production. When production is low, hunting is poor. When production is good, hunting is good. The answer, then, is simply to increase production. Simple as this may sound, factors which limit production are many, varied, and interacting. No single factor limits production . . . it may be a poor nesting habitat, dry soil with high temperatures, or wet cold soil with low temperatures, a hailstorm, heavy rain (particularly when the young are only a few days old) or pesticide residues that reduce litter or clutch size, or weaken the young and lessen their resistance. The list goes on.

Hunting as it is permitted in this age seldom—if indeed ever—is a limiting factor on any wildlife population. Few species are harvested to their known allowable level. Thus, hunting is largely a replaceable mortality, and hunters are utilizing a resource that would be lost by other population reducing factors.

Two baby screech owls in a nest box have grown rapidly. Their cotton-white down is being replaced by gray pinfeathers and they are beginning to look more like owls. They no longer huddle cowardly in the corner, but click their bills and fluff their wings trying to appear so vicious that I dare not touch them. This is my first nest. When I checked the box this afternoon it contained two full plumaged beautiful male Baltimore orioles which the adults had caught for food. I won't kick the owlets out but they're not nearly as welcome as they were, I would prefer they feed on English sparrows. I have over the years erected no less than a dozen boxes hoping screech owls would use them.

With a little time to spare, I stopped by an alfalfa field to watch for deer. The field is east of a large open mature cottonwood grove that has developed an understory of box elder. Cicadas, long-horned grasshoppers, robins, orioles, mockingbirds, and Bell's vireos all blended their voices

in outdoor song. A sassy fox squirrel scolded my invasion of his domain.

A half-hour passed before I heard the rustle of leaves and a few minutes later the first deer poked her head out into the opening. She stopped, looked around cautiously to see if all was clear, then walked gingerly onto the edge of the field. Twin fawns followed and began feeding on the alfalfa and weeds. Suddenly the doe's head snapped erect, eyes and ears focused on the timber behind them. Shortly another doe, again with twins, entered the field. The fawns were still distinctly spotted but losing their gangling look and taking on deer proportions. Twenty minutes later a buck trotted onto the field to join the group. His stubby, velvet-covered antlers were about eight inches long, clearly showing a fork and no longer buttons at the tips. Two does and a single fawn completed the field feeding party. They munched contentedly, close enough that their chewing was audible. They occasionally stomped a foot or switched at a fly.

The sun was gone, so I stepped out to leave. The barren doe caught the movement. She snapped alert with her eyes glued on me. I waited motionless and she finally turned and walked stiff-legged toward the others with tail flared and half-raised. I took one step. She saw me and whirled broadside, stared at me and stomped a front foot several times. The other deer snapped to attention. The buck headed over to see what was causing the uneasiness. But the old doe had seen enough and with a shrill snort, tail erect, she wheeled and headed for the woods. The entire group joined in and their white, waving tails disappeared into the trees.

An Honor for Anglers

A program to honor anglers who catch "bragging size" and record fish in Kansas waters has been announced by the Kansas Forestry, Fish and Game Commission.

George Moore, director of the Commission, said colorful "Master Angler Award" certificates and "Record Fish Award" certificates honoring large catches among 10 popular game fish species, will be awarded to all who qualify.

He added that the existing formula for registering record fish catches will be followed in issuing both certificates.

The angler who takes a large fish, which might qualify for either award, will have to make application with the Commission, listing the weight, length and girth of the fish, where caught, type of tackle used, bait or lure used, and other information. The weight must be registered on scales which are legal for trade, and the weighing must be witnessed by two disinterested persons.

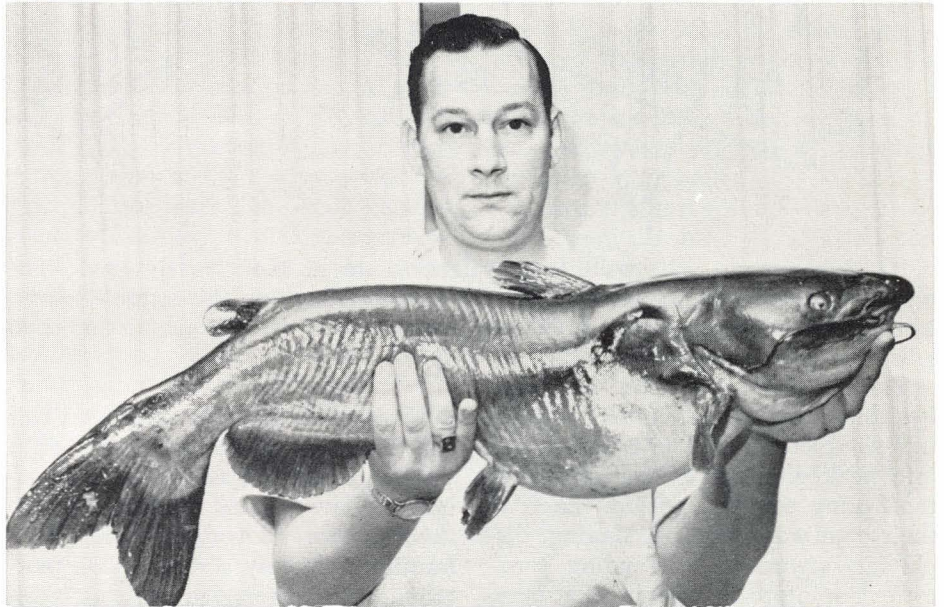
Application blanks can be secured from the Information-Education Division of the Commission at Box 1028, Pratt (67124), from Fish and Game personnel, or may be clipped from the Commission's Fish and Game Magazine (see inside of back cover).

Master Angler certificates, listing the angler's name, where his large fish was taken, its weight, lure used and other information on the catch, will be issued for the following species and weights of fish:

Largemouth black bass, seven



Happy angler is 15-year-old Mike C. Brennton, Eureka, who earned Master Angler Award with 7-pound, 10½-ounce bass from farm pond.



Big channel cat, weighing 17-2, earned Master Angler Award for William Judd, Lyndon. It was taken from farm pond near Paola. (Photo by Bob Harrington.)

pounds; Spotted (Kentucky) Bass, two pounds; Channel Catfish, 15 pounds; Flathead Catfish, 55 pounds; Northern Pike, 15 pounds; Walleye, eight pounds; Crappie, three pounds; White Bass, 4 pounds; Bullhead Catfish, two pounds, and Bluegill, 1½ pounds.

State Record awards will be is-



Martin J. Tiernan, Ft. Riley, landed this fine channel cat at Milford Reservoir, to earn Master Angler Award. It weighed 18 pounds, 14 ounces.

sued to all current record holders, Moore said, and at any time a new record is set on any species. Current record fish include Black Bass, 11-3; Spotted Bass, 3-12½; Walleye, 10-9 Channel Catfish, 32-0; Flathead Catfish, 86-3 Bullhead, 4-3½; White Bass, 5-4 (also a world record) Black Crappie, 4-10; White Crappie, 4-¼ Bluegill, 2-5; Green Sunfish, 2-2; Drum, 27-0; Carp, 27-8; Sturgeon, 4-0; Buffalo, 29-4; Paddlefish (Spoonbill), 26-0; Gar, 28-0; Northern Pike, 16-10.

"Purpose of the awards," Moore



Master Angler Award went to R. D. English, Jr., Wichita, for this 7-pound, 6-ounce largemouth bass, caught at Watson Park.

said, "is to stimulate greater interest in Kansas' excellent fishing, among non-residents as well as Kansans, and especially to recognize those anglers who catch a large fish, but one that doesn't equal the current records.

"We hope the program will also stimulate interest in our record fish

program," he said. "We often hear that fish which would have broken current records were caught, but were not submitted for a record."

The "Record Fish Award" and "Master Angler Award" certificates measure 8½ by 11 inches, and are suitable for framing.

Kansas Forestry, Fish and Game Commission

RECORD FISH AWARD

THIS IS TO CERTIFY THAT:

ON _____ DID LEGALLY CATCH THE LARGEST
_____ EVER TAKEN IN KANSAS WATERS,
AND IS HEREBY RECOGNIZED AS THE HOLDER OF THE STATE
RECORD FOR THIS SPECIES.

Where Caught

Bait or Lure Used

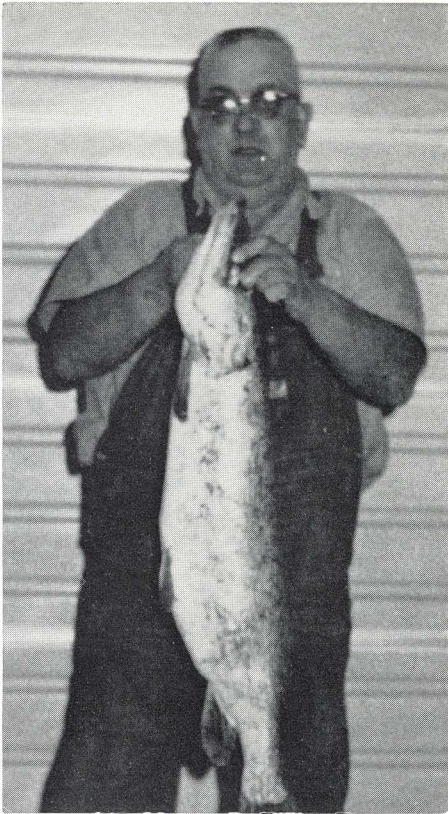
Tackle Used

Length of Fish



Director, Fish & Game Commission

Chairman, Fish & Game Commission



Clarence F. Nelson, Wilsey, and new state record Northern pike, weighing 17 pounds, 15 ounces. Fish was taken at Council Grove Reservoir.

Kansas Forestry, Fish and Game Commission

MASTER ANGLER AWARD

THIS IS TO CERTIFY THAT:

DID LEGALLY CATCH THE FOLLOWING DESCRIBED FISH IN
KANSAS WATERS TO QUALIFY AS A KANSAS MASTER ANGLER.

Species of Fish

Where Caught

Weight of Fish

Bait or Lure

Date of Catch



Director

Chief, Fisheries Division



Mr. and Mrs. Lester Gullion, Washington, display fine catfish (weighing 17½ pounds) caught by Mr. Gullion at Washington County State Lake. (Photo by Tom Buchanan.)

Available to lucky Kansas anglers are these two awards. At (top) is certificate issued to those who catch new record fish. Master Angler Award (below) goes to anyone catching "bragging size" fish in Kansas waters.

Crappie Are for Cookin'

By THAYNE SMITH

Largest of the panfishes, and about the best fish in the pan that you can find, is the crappie, a native of Kansas which has gained in popularity over the years.

The crappie boasts one of the widest followings among all fish, because it can be caught when most other fish are in their doldrums, and in great numbers.

Although they are not tackle-breakers or aerial artists, crappie make up for it in flavor.

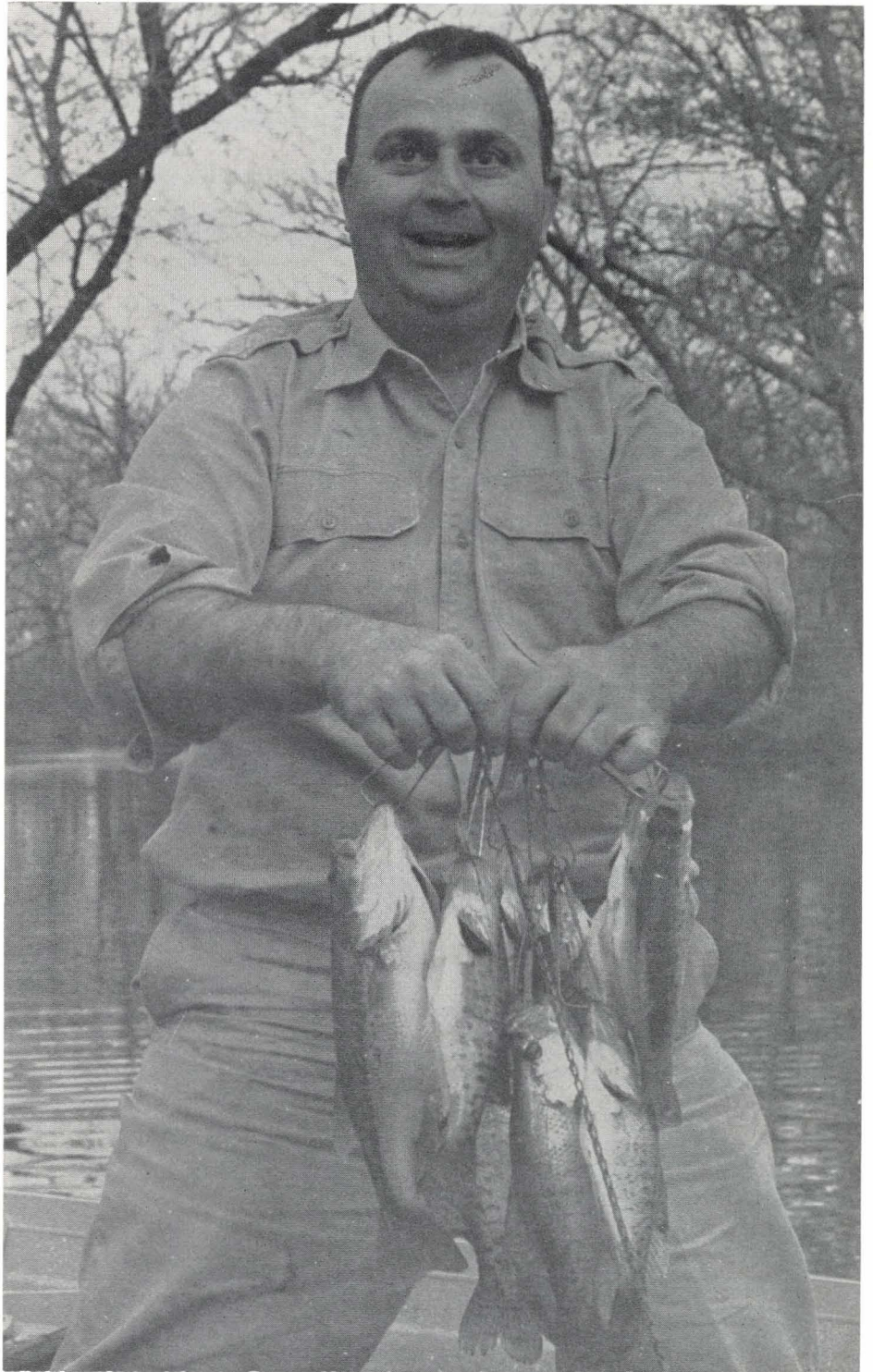
In Kansas, there are actually two kinds of crappie—the black and the white. Both are members of the sunfish family.

Crappie, and other sunfish, are distinguished by their two dorsal or top fins, and their flat, tall bodies, with white or silvery sides. Their coloration is another distinguishing mark, too, and in bright sunlight the crappie gives off a number of colors.

Identification between the two species—white and black—is not always easy. One way is appearance. In the white, black spots on the side tend to form bars, while the black has spots which are scattered haphazardly. A more reliable way is to count the number of spines in the top fin—the white generally has six, while the black has seven or eight.

Sometimes, the two species will crossbreed, resulting in hybrids with characteristics of both.

Crappie have always been found in Kansas streams, and have been stocked for many years in ponds and lakes. They seem to adjust to about any habitat, and can be caught in great numbers because they are prolific breeders. When young, they feed on insects and graduate to minnows and small aquatic animals. They stay in groups or schools, and lucky anglers often find them in the hundreds in flooded timber brushy areas, or in riffles above large reservoirs.



FINE CATCH—Ed Custenborder, Topeka, displays fine string of black bass and crappie caught on jigs from clear waters of Eagle Creek, above John Redmond Reservoir. Both species are among state's most popular fishes.

Crappies are nest-builders, and incubate when water reaches about 68 degrees. The male builds the nest and protects the eggs until they hatch. They are short-lived fish, however, with a four-year-old considered an old timer.

There are many lures which will catch crappie. The most popular in the live-bait class is minnows, of course, but they will often hit small crawfish and worms. In the artificial class, jigs far outnumber any other crappie bait used in the Sunflower State. However, they will also strike minnows, small spoons, and either wet or dry flies.

Stocking of crappie by the Fish and Game Commission is limited to larger impoundments such as federal reservoirs and state lakes. They are no longer advised for ponds, because they will soon overpopulate small bodies of water.

There is a limit in Kansas of 30 pounds of crappie per day, which is sometimes reached by many fishermen during a good "run" at one of the big reservoirs where they have become numerous.

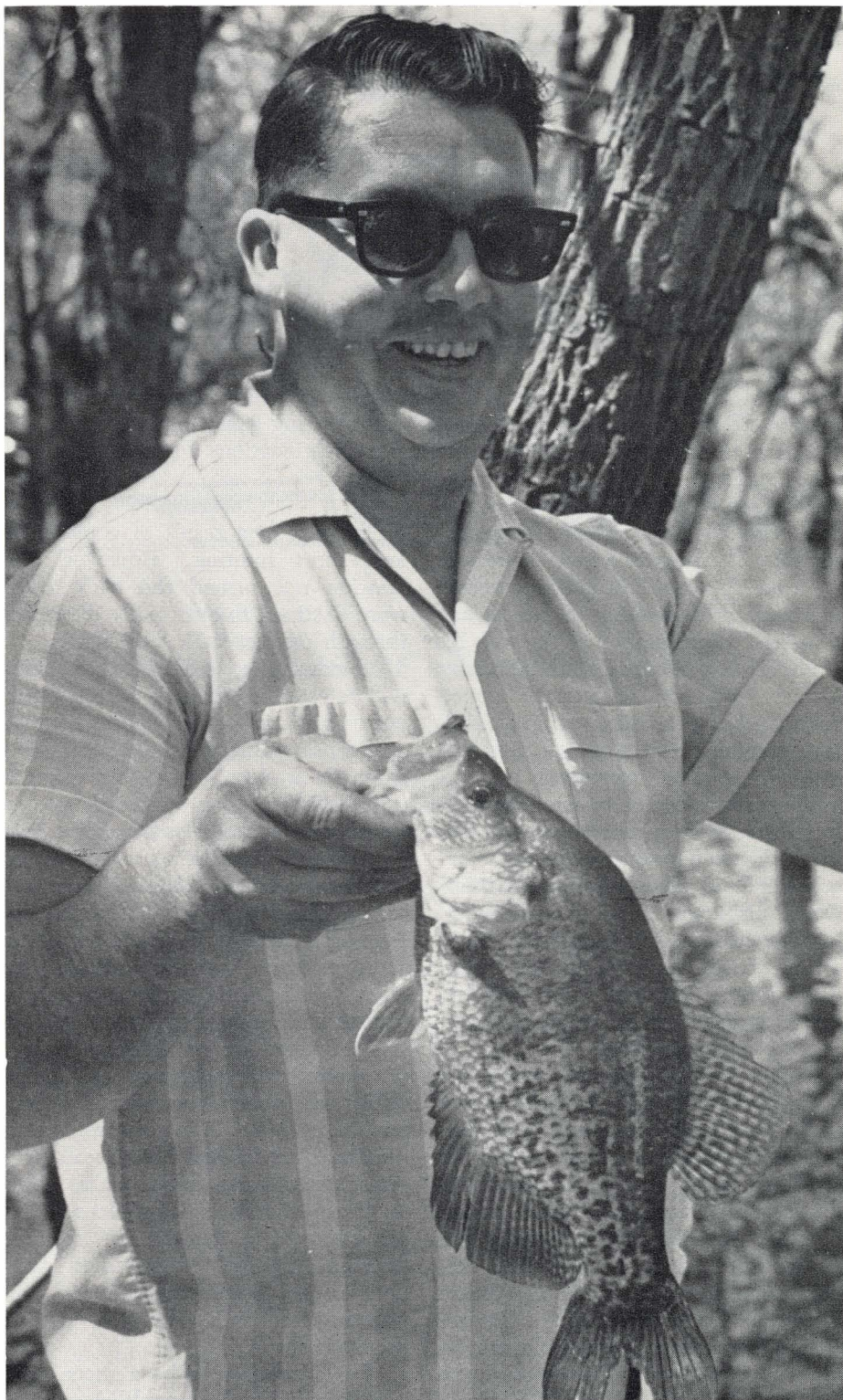
The two state records for crappie include 4 pounds, 10 ounces for the black species, taken by Hazel Fey of Toronto at Woodson County State Lake (Lake Fegan) on Oct. 21, 1967. She was using rod and reel with a live minnow for bait. The white record is held by Frank Miller, Eureka, at 4 pounds and one-quarter ounce. His winner was taken from a farm pond in Greenwood County on March 30, 1964. He too, used a minnow for bait.

The world crappie record stands at 5 pounds, 3 ounces, and was caught in 1957 at Enid Dam, Mississippi.

Crappie are found throughout most of the nation, and most abundant in the southeast, and Great Lakes area, and the Mississippi River tributary system.

When it comes to the best tackle for crappie, every fisherman has a favorite. Many Kansans prefer ultra-light spinning rigs, with light line, allowing the fish to give them a good fight. Jigs are the most popular bait in Kansas in the $\frac{1}{16}$ and $\frac{1}{32}$ ounce size.

Just about every large body of water in Kansas, and especially the

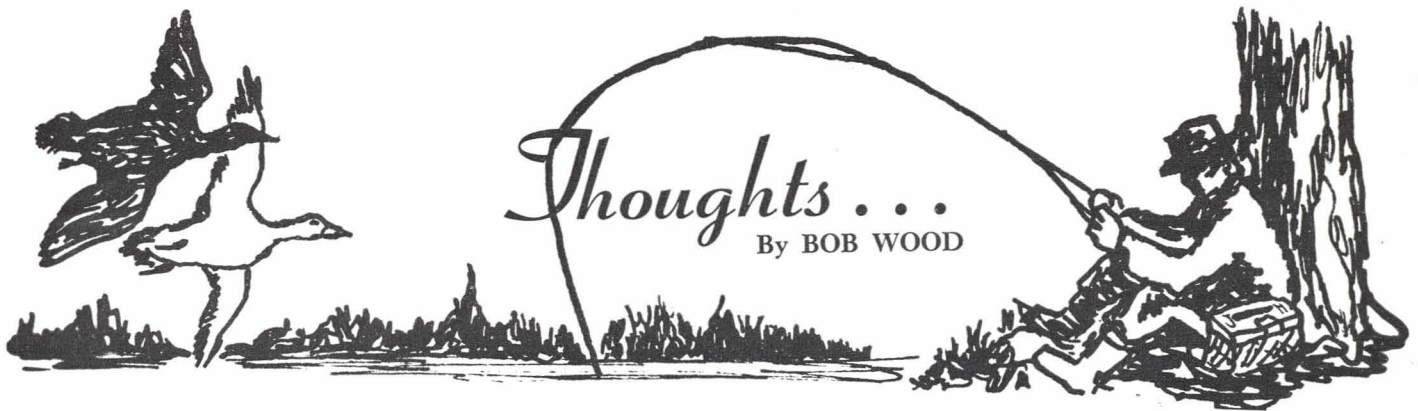


TOPS FOR THE ANGLER—Crappie, abundant in most Kansas lakes and streams, is considered a fine eating fish, and can be taken in large numbers. Kansas is one of the nation's finest crappie states. The lucky angler is Carl Pape, Topeka, with a 2-pounder from Pomona Reservoir.

big federal impoundments, have an abundance of crappie. If you'd like a mess of them, try a jig or minnow around brushy cover or in flooded

trees, and try different depths until you find them.

When you do, you'll forget any worries you might have!



Comes Spring then Summer and again we hear a hue and cry to replenish wildlife stocks by artificially propagating and releasing game into the wilds.

It is a tiring thing, listening to the many justifications for releasing pen-raised game.

Latest in a long line states the purpose of releasing such "domestic" game is, "to introduce new bloodlines to ensure the health of native species." It would be interesting to talk to any geneticist supporting that theory! An established wild population of a pure species will not deteriorate genetically. All of our native game animals have a mixing and turnover rate that precludes such a happening.

The above is not to say a particular species may not change in its behavior or population density over a period of years. A species may even disappear from a particular area or become totally extinct. But, in all cases investigated to date, such drastic changes have resulted from environmental stress, not genetical extermination.

Today, we are primarily interested in man-caused environmental stress since it is most prevalent and dramatic. Man-caused stresses can show an effect on an entire wildlife population in an amazingly short period of time. Several good examples can be documented in Kansas. For one, cultivation of native prairie in western Kansas all but eliminated the Greater Prairie Chicken as a huntable species west of a north-south line through the center of our state. During the period 1920-1935, chicken hunters travelled west to pursue their sport, while today, chicken hunting is an eastern Kansas activity.

Another example of results of man-caused stress was the total extirpation of American bison as a wild species in Kansas. Bison disappeared almost

exclusively as a result of commercial and sport hunting. However, had hunting not turned the trick, bison were destined to eventually disappear through conflict with agriculture.

Obviously, no amount of stocking will re-establish greater prairie chickens or bison in large numbers in western Kansas. But, what about stocking game in an area where it is already established? When artificially propagated species are released into a habitat already supporting a population of that species, a natural environmental stress is initiated, *competition*. Pressures through competition within a species or between species are equally relentless as those pressures resulting directly from man. Nature is established on an intricate system of checks and balances. All living things are dependent upon and supportive of other living things. Introduction of a foreign object will have either an adverse effect or no effect on those checks and balances. Very seldom will a benefit be realized through artificial intervention with nature. To better comprehend this phenomenon, let's equate it with a domestic scene.

For a rancher to be a successful cattleman, he must establish a miniature "balance of nature." He must properly manage his herd, keeping it in balance with the carrying capacity of his available rangeland.

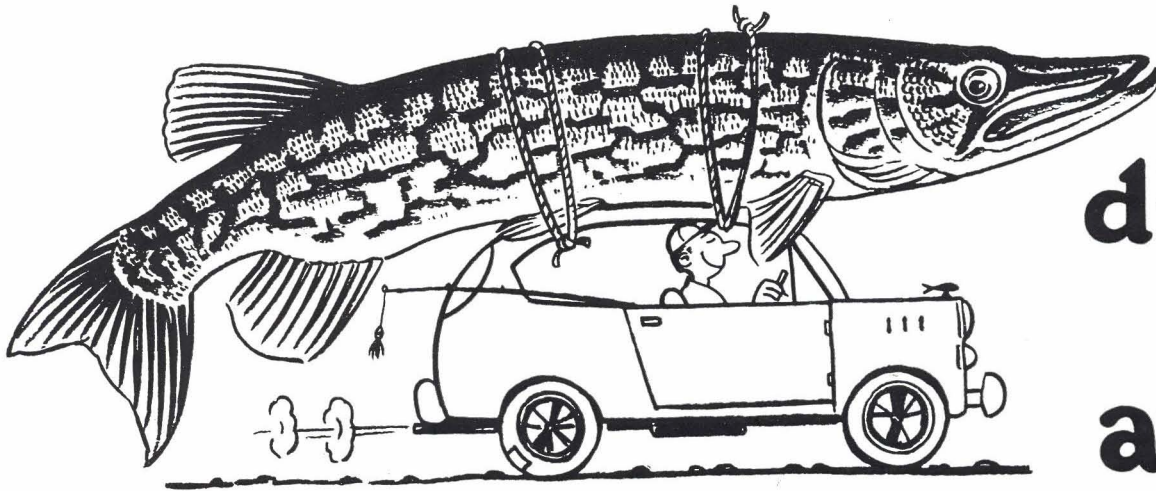
This balance is obtained by using a combination of range maintenance and improvement practices with peri-

odic herd reductions. A monetary profit is realized by each herd reduction and stress on the rangeland is released, enabling it to produce enough forage to permit herd growth which in turn permits another reduction and its subsequent profit. A balance is maintained. Introduction of more cattle without increasing available rangeland will tip that established balance adversely and will result in poor gain on the cattle, less profit on the herd reduction and subsequent destruction of the rangeland from overgrazing.

Wildlife ranges have carrying capacities, or balances, too. A given parcel of land can feed and protect only so many quail, or pheasants or deer. At any given time of year, all of Kansas' game habitat supports its current carrying capacity of wild game adaptive to that habitat.

Since quail are most often stocked as pen-raised game, they serve admirably as an illustration. What happens to pen-raised quail so released? Most will die because they are incapable of competing with wild stock. It is true, a few will survive and may even find a mate, wild or otherwise. But, habitat conditions can support only so many pairs of quail. Had pen-raised birds not been released, wild pairs would have been able to occupy available nesting cover. What happens to displaced wild birds? They must either leave the vicinity, searching for a vacant niche in carrying capacities of nearby habitats, which they are not likely to find, or they succumb to environmental stress. Have we gained anything? There has been no effective change in the balance originally established by the wild quail population.

For that BIG ONE that



didn't
get
away

ELIGIBILITY REQUIREMENTS AND SPECIES

Minimum Sizes

Largemouth (Black) Bass	7 Pounds
Spotted (Kentucky) Bass	2 Pounds
Channel Catfish	15 Pounds
Flathead Catfish	55 Pounds
Northern Pike	15 Pounds
Walleye	8 Pounds
Crappie	3 Pounds
Bullhead	2 Pounds
White Bass	4 Pounds
Bluegill	1.5 Pounds

All fish must be taken from waters of the state of Kansas as defined by the Fish and Game Commission. Fish must be caught on legal tackle, with artificial or live bait, in the presence of at least one witness.

The catch must be weighed and recorded on scales legal for trade within the state by the owner, manager, or an authorized agent of the respective establishment.

Kansas 'Master Angler Award'

This award is available without charge, to any and all fishermen in Kansas who catch any of the game fish of the prescribed species and size requirements. A certificate, showing recorded date of the catch, size, where taken and other information, will be mailed to the applicant upon receipt of the following application when properly filled out and signed. Only fishing citation applications received within 90 days from date of catch will be honored.

Application for Kansas 'Master Angler Award'

Information-Education Division
Kansas Fish and Game Commission
Box 1028
Pratt, Kansas 67124

Date _____

Please send me the Kansas 'Master Angler Award' with the inscribed data listed below:

Name (Please Print) _____

Address _____

City _____ State _____ Zip _____

Species _____ Weight _____ Length _____

Type of Tackle _____

Bait or Lure Used _____

Where Caught _____ County _____

Date Caught _____ Catch Witnessed by _____

Registered, Weighed by _____ At _____

Signature of Applicant _____

(Photo of fish and fisherman must be submitted with application.)



Boats in line await lucky fishermen at picturesque Ottawa County State Lake near Bennington. (Photo by Thayne Smith.)