

KANSAS

FISH & GAME



SPRING • 1963

Spring

1963

Published Quarterly
by the
**KANSAS FORESTRY,
FISH AND GAME
COMMISSION,**
Pratt, Kansas

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Worth the Effort?

Would you say it is "worth the effort" to save one life or at least be responsible for making a contribution to that effort? There is the possibility, as more and more Kansans take part in activities near ponds, lakes and rivers that you will be nearby when someone needs artificial respiration. If you could spend a short period of your time and be able to provide this emergency action it would be well "worth the effort."

No doubt you have heard about mouth to mouth resuscitation and how much more successful it has been than the previous methods used. The reason is dramatically explained in a film distributed by the American Red Cross. This film was viewed by employees of the Forestry, Fish and Game Commission at the Departmental Training School in March. George Whitaker, Northwest Kansas Game Protector Supervisor and a qualified instructor, answered questions concerning this method of life-saving and demonstrated the use of the resuscitator tube.

Actually the method is quite simple. Much more so than I had believed. The thought was in my mind that it was something only a doctor should attempt. After viewing the film there is no doubt in my mind that the average person could practice the method in an emergency after a short period of proper instruction.

Should you have the opportunity, it would be an interesting film to see and participation in a course of instruction in this method could mean the difference between life or death for a member of your family, your friends or neighbors. There are many more types of suffocation than drowning and most of them occur in the home.

Only a few minutes of your time could save a life. To me, it's "Worth the Effort."—John Polson

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Edited by Information-Education Division

Second Class Postage Paid at
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Fishery Restoration in Artificial Lakes

By ROY SCHOONOVER, *Chief*, Fishery Division

Angling is without question one of the most popular forms of outdoor recreation in Kansas. All members of the family derive enjoyment from fishing and with the increased leisure time available now and in the future, this sport will continue to increase in importance. To meet these needs for more angling opportunities will not only require full utilization of new public waters which will be created in Kansas through the construction of state lakes, federal reservoirs and other impoundments but will also require greater utilization of existing waters with emphasis on all-out efforts to get the most out of each

acre of public fishing water through increased harvest of the fish crop. This then, is the objective of the Forestry, Fish and Game Commission's fishery management program. The Department's goal is to have the manageable waters of the state providing the maximum amount of fishing and fish that they are capable of producing. In order to insure that these waters do produce maximum yields of fish, it is essential that intensive management practices be applied in all instances where beneficial results can be achieved. Recognized management techniques will be used whenever there is a reasonable expecta-

tion of improving fishing. New management techniques which are still considered experimental in nature will be given trial use to determine their value in increasing the yield of catchable fish per acre of water.

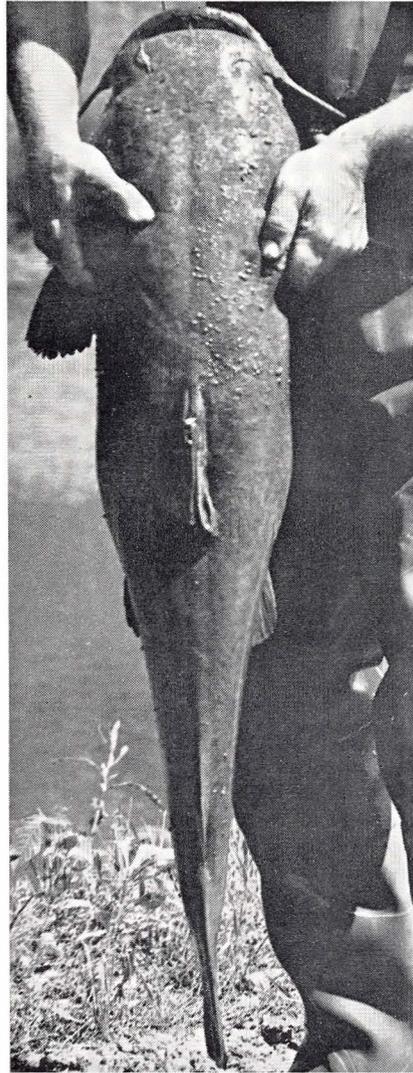
All efforts to improve fishing success and to increase the harvest from streams and certain "problem" impoundments which do not respond favorably to recognized management techniques will be specifically designated as experimental projects. It should be explained that because of the nature of environmental conditions in streams and in these problem impound-

ments, the possibilities for the application of management practices which will successfully improve fishing are greatly limited.

Although overly simplified, we can say that the principal problems which face us in our efforts to provide more and better fishing are too many fish in the lakes, and proportionally too great a number of these fish being undersized game and pan fish or coarse fish of little interest to anglers. In other words, our lakes contain large numbers of fish but only a very small percentage are largemouth bass, channel catfish and pan fish species (bluegill, crappie, drum, etc.) of satisfactory "keeping" size. In addition to too many fish and too high a proportion of undersized fish, we have the problem in many lakes and ponds of unsuitable living conditions for desirable game fish, and pan fishes, especially bass and bluegill. Thus, we can see examples of lakes where dominant populations of such species as crappie, bluegill, drum or bullhead may exist to the point that over 90% of the fish by numbers may be represented by these species but where the average size is so small that anglers not only will not fish for these fish, but will not keep them and remove them from the lake when they are caught. Unfortunately, we have far too many examples of impoundments possessing unsuitable living conditions for some of the fish species that have attained the greatest popularity with anglers. In this category can be included impoundments containing waters of excessive turbidity and impoundments which are fed by streams or for other reasons cannot be kept free of coarse fish such as carp, carpsuckers, buffalo and other species.

It is the Commission's desire to benefit the angler directly by making it possible for him to catch a greater number of fish, to catch fish of a more satisfactory keeping size, and to manage each lake so that it will provide satisfactory angling success for an increasingly larger number of fishermen. In order to achieve these results, it will be

necessary to use intensive fishery management practices which make it possible to control the number of fish in a lake and to encourage a more favorable balance of game species, particularly of bass and channel catfish.



Several procedures are in use or will be put in use where they are applicable as a means of correcting these problems which have been responsible for unsatisfactory fishing in the public use impoundments over the state. In some lakes, where certain species of fish have become badly overpopulated, resulting in the building up of dominant age groups of slow growing, undersized fish, the problem may be so advanced that only a

complete rehabilitation project to remove all fish from the water will restore satisfactory fishing conditions. A number of fishery restoration projects of this type have been carried out in Kansas in past years. In most instances, the lakes are drained down to a minimum water-level and fish of value for transfer are salvaged by seining. State lakes in Neosho, Ottawa and Lyon counties were the lakes most recently rehabilitated in this manner. This method does have several disadvantages which may result in it being used less often in the future. For example, experience has shown that in lakes where fishing success had deteriorated to the point where complete rehabilitation was advisable, the number of desirable fish which it was possible to transfer was generally so small that it does not justify the loss of the entire water supply from drainage, nor does it justify the cost of salvage operations.

A second method of accomplishing complete rehabilitation through the use of a chemical applied at a concentration adequate to eradicate all fishlife is being more widely used since it overcomes some of the disadvantages of complete drainage which were mentioned previously. The chemical rehabilitation of lakes will normally be no more expensive than complete drainage and salvage efforts, and in many instances will be less costly. The chemical eradication of fish as a method of lake rehabilitation will be especially valuable in the western half of Kansas where the water could be conserved by treating lakes at full waterlevel, or perhaps following only a partial draw-down. Since much of the water would be retained in these lakes, fish could be restocked within a few weeks or as soon as they were available and this would shorten considerably the time that the lake would have to be closed to fishing.

If attention can be given to a lake earlier in its cycle when the first indications of a downward trend in fishing success are observed, there may still be an op-

portunity to exert effective control over individual species in the fish population. If successful, these efforts could stave off the overproduction of pan fish and course fish which usually results in the fish population becoming out of balance. As a result, satisfactory fishing conditions could be enjoyed for a much longer period of time. This approach to the goal of better fishing involves fish population manipulation, which in practice means to reduce the number of fish of species that are too abundant in a lake, and at the same time to "help along" those species of desirable sport fish which are gradually losing out in the struggle to compete for food and space.

The practical application of this principle in our impoundments may take several forms—all with the prime objective of reducing the number of fish of species which have become dominant so that the remaining population of game fish and pan fish can grow more rapidly and so that a larger proportion of the fish in the lake will be of worthwhile keeping size.

Probably one of the earliest used methods of attempting fish population control is through the reduction in numbers of overabundant species by use of seines and nets. The success of this method is dependent on the ability to cover a proportionally large area of a lake in order to catch drum, crappie and other species which normally inhabit deeper waters away from shore. Because of obstructions and irregular basin features in our artificial impoundments, it has been impossible to carry out effective seining operations. As a result, efforts have failed to remove enough of the overabundant fish species to improve fishing, so seining as a management practice has not been considered of practical value in Kansas.

Other methods of reducing overabundant fish populations have been used in various sections of the country in recent years and it is our intention to test out these procedures, and those which are

found useful will be adopted as a part of our state-wide fishery management program. These methods of reducing numbers of fish of species which have become too numerous in our public use lakes are based on the chemical eradication of a portion of the fish population. This use of chemicals and other materials for their effect on fishlife is prohibited by law in all waters of the state, except with approval and under supervision of the Forestry, Fish and Game Department.

The exact procedure which would be followed in carrying out chemical fish population control will depend on a number of factors including lake size, shape, physical characteristics of the shoreline and the species of fish that it is necessary to control. In event that bluegill and other sunfishes are overabundant and need to be controlled, the chemical treatment is applied to large segments of the shoreline, at a time when a minimum number of bass will be inhabiting these areas. By nature, small bluegill and other sunfishes will concentrate in shallow areas around aquatic vegetation where they can be readily killed by a light application of chemical toxicant. Generally, this treatment will need to be repeated at periodic intervals during the summer, and the program carried over from one year to the next. While some mortality can be expected among small bass as a result of this type of treatment, such losses will normally be insignificant in relation to the reduction in overabundant bluegill and other sunfishes.

Success in controlling sunfish populations through use of this management practice as just described does not begin to solve all of our problems involving the need to thin down the numbers of fish existing in overpopulated fishing lakes. Fishery investigations in Kansas over the past fifteen years have indicated that the species of fish which most commonly become too numerous will include white and black crappie, drum, carp, and

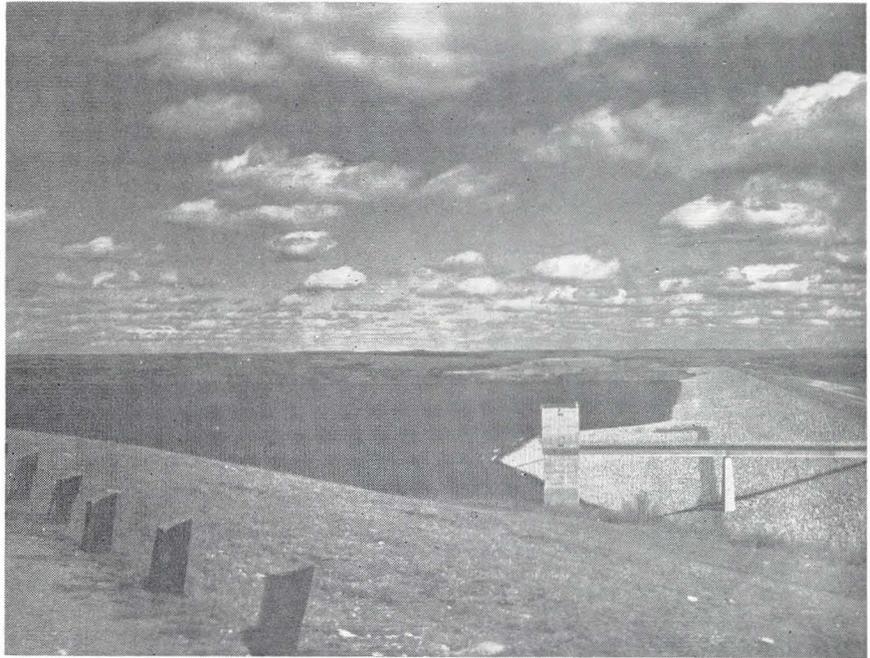
carpsuckers. Under certain conditions, some of these species may be found in large numbers in shallow shoreline areas; however, for the most part their habits make it necessary to resort to the chemical treatment of larger areas and normally deeper areas of the lake in order to bring about a significant reduction in their numbers. Of course, in treating coves and larger portions of our lakes, the loss of some game fish and "keeper sized" fish of other species is inevitable. This is a condition, however, which must be accepted if we are to proceed with these management practices under which it is possible to prolong the period of satisfactory fishing in our lakes, and to improve fishing in lakes where angling success has already begun to decline.

Once that a reduction in numbers of bluegill, crappie, drum, carp and other overabundant species has been achieved through shoreline or sectional treatment of public-use lakes, it may be found desirable and justifiable to consider corrective stocking with largemouth bass and channel catfish. Such a practice could be justified in those lakes where the need for supplemental stocking existed, and where it had been determined that the reduction in overabundant species was adequate to alleviate competition and give the newly stocked fish a reasonable opportunity for survival.

In efforts to restore balance in lakes and improve fishing, the number of fish may be reduced considerably by still another method. This management procedure requires a substantial lowering of the water level in a lake and the maintenance of this reduced size over a period of two months or longer. During the drawdown as the surface area of the lake decreases in size, all of the fish must move into the main pool of water remaining in the lake. By reducing the lake to half or less of its normal volume of water, the entire fish population is crowded into this smaller space where the smaller fish can be readily caught and eaten by the larger fish. If the water level has

been adequately lowered and is held at this lower level, a substantial reduction in the number of undersized fish of all species should occur within a period of two or three months. After the objectives of the drawdown have been accomplished and rainfall refills the lake, the flooding of vegetation which had become established on the lake basin will contribute to the fertility of the water and will often aid in increasing water clearness. With fewer fish in the lake at the end of the drawdown period and a greatly increased water area after refilling to normal level, conditions have been made favorable for a period of rapid fish growth because of the temporary decrease in competition for food and space. Assuming that the water is sufficiently clear for this species, the largemouth bass population may be built up as the result of improved hatching success and greater survival of young fish during the first year or two after the lake returns to normal water level elevation. In order to attain significant improvement in the fish population—that is, a more suitable balance with a greater proportion of game fish and fish of satisfactory catching size—it is possible that draw downs would need to be repeated at intervals over a period of years.

A program which fits in well with plans discussed in previous paragraphs for improving fishing through the use of intensive lake management practices is the channel catfish rearing pond project. Fingerling channel catfish are grown to an eight-to-ten-inch length in ponds where artificial feeding can be carried on for a period of about five months. While a limited number of such rearing ponds have been operated by the Department since the early 1950's, an expansion in the program was authorized last year by the Commission as a means of providing thousands of additional channel catfish of intermediate-size for supplemental stocking in state lakes and other public fishing lakes



The addition of Tuttle Creek Reservoir will make a total of 43,250 acres of water in federal reservoirs within the state of Kansas.

where prior surveys have indicated that the action would be justified. The channel catfish is one of the most popular sport fishes in Kansas and special efforts are made to maintain satisfactory fishing for this species in state waters. Fishery investigations have shown that the survival rate of fry and fingerling fish is normally very low when they are placed in waters which are already supporting a fish population at carrying capacity, or where predatory species are present. As a result of these findings, the Fish and Game Department a number of years ago discontinued the general practice of stocking small hatchery fish into waters where fish populations already exist.

It is hoped that this discussion will leave the readers with a somewhat better understanding of the complexities of lake management procedures and the problems which must be overcome in order to maintain satisfactory fishing success and to produce maximum yields of fish,

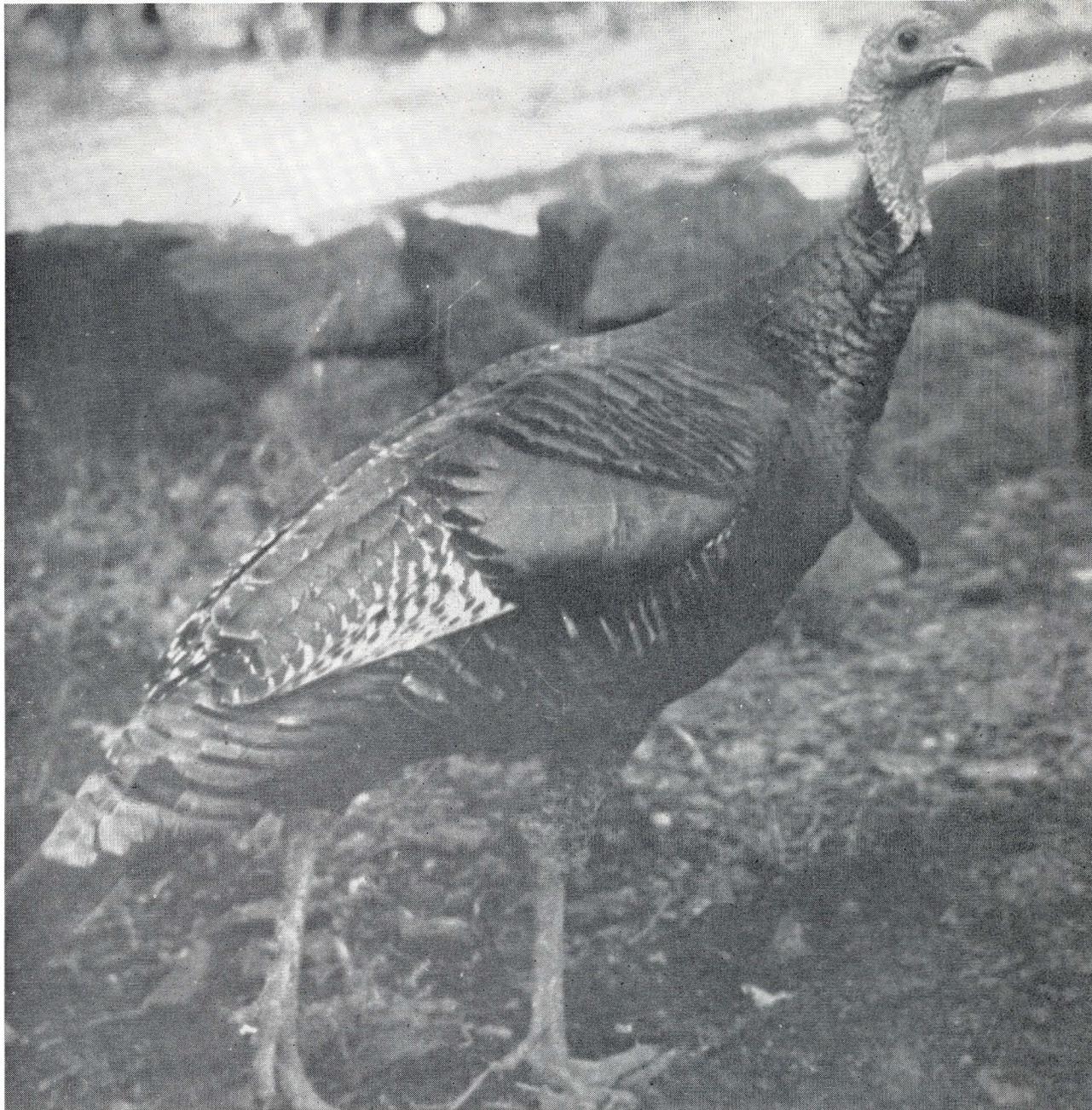
Tuttle Creek Dedication Planned

Plans are now being completed for the official dedication of the new Tuttle Creek Reservoir, north of Manhattan. The ceremonies will be held on June 1 and 2, with a host of dignitaries scheduled to be present for the occasion. Official host for the occasion will be Kansas' Gov. John Anderson, Jr.

The formal ceremonies are scheduled to be held on a plateau of land on the upstream side of the reservoir near the outlet tower on the afternoon of June 1 at 2:30. Immediately following the ceremonies, a series of water events are scheduled to be held.

On the program for the two-day event are such activities as water skiing demonstrations, a sailboat regatta, boat parade and racing exhibition, queen contest and scuba diving demonstration. According to Bill Colvin, editor of the *Manhattan Mercury* and chairman of the dedication committee, awards will be presented in the various classified water events. Other planned features of the program will include a huge square dance and fireworks presentation.

(Continued on page 15)



Talking Turkey *Current Status of Wild Turkeys in Kansas*

By WILLIAM C. PEABODY

"Talking turkey" may become more than just an empty figure of speech for Kansas hunters, provided that experimental work on wild turkeys by the game division is successful over the next few years. While no one in his right mind would attempt to predict definitely the outcome of these efforts, prospects for restoration of wild turkeys over at least part of their former range is brighter than at any time in the past hundred years.

The wild turkey (*Meleagris gallopavo*) was common in the eastern two-thirds of Kansas a century ago. In the west, the bird was largely confined to the timbered areas along the river banks. These were the eastern and possibly the Rio Grande subspecies. With the advance of civilization, clearing of the land, and indiscriminate hunting, the wild turkey was extirpated in Kansas. Linn County was the last recorded stronghold of the wild turkey in the state.

Rio Grande Wild Turkeys have been moving into southern Kansas from Oklahoma for several years. The birds have been using the many watercourses that connect the two states as avenues of travel. These turkeys, or their ancestors, were successfully transplanted by the Texas Game and Fish Commission in the northern panhandle of Texas and have spread into the western one-third of Oklahoma. The Oklahoma Conservation De-

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Kansas Boating Review 1963

By JOHN POLSON

The 1963 boating season in Kansas is all but underway for most people. Thousands of residents of the state and many visitors, if they have not already done so, will soon turn their thoughts to weekends of sunshine, water and relaxation on the more than 43,250 acres of water in our federal reservoirs. Many more will be using the state lake areas for fishing. Manufacturers will be encouraging the use of refinements or additional accessories being offered to the public for their boating enjoyment. The Kansas Forestry, Fish and Game Commission will be reminding boaters of their responsibilities to themselves and others in their boating activities. It would be impossible to list all the many activities which make up a boating season, but those are just a few and all of them can be summed up in one word—enjoyment.

LOOKING BACK

Boating as a recreational outlet didn't really start until after World War II but in just a few short years it has become a \$2½ billion industry. Some 27,500 boats, powered by machinery of ten horsepower or greater have been registered with the fish and game commission since the Kansas Boating Act went into effect on January 1, 1960. Those powered by machinery of less than 10 horsepower are not included in this figure. According to *Boating 1962*, a statistical report by the OBC and NAEBM, an estimated 60,000 outboard motors were in use in Kansas as of December 31, 1962.



More people, more boats and more water would describe the recreational picture for many Kansans during the summer of 1963. Regulations are necessary for the safety of all concerned.

The average horsepower of motors sold in 1947 nationwide was 4.7. In just 10 years this had reached 16.3 horsepower and by 1962 the average was rated at 30.3 horsepower. There were 1,857,000 outboard motors in use in 1947 and an estimated 6,250,000 by 1962.

WHY THE "BOOM" IN BOATING?

Why do people buy outboard motors? The Evinrude people conducted a study to find out the answer. Here's what the study revealed. It's almost a toss-up when the two most mentioned reasons—fishing and all-purpose boating—are compared. Next came water skiing. Over 20 percent of the motors sold are bought specifically for skiing use. Least important, according to the study, are motors for use in racing.

The length of time people keep outboard motors before trading them in varies, but averages about three and a half years. Few outboards are actually worn out in that time; it's just that people want new features or in many cases, larger motors.

THE BOATING ACT IN BRIEF

Water sports are a means of relaxation and healthful recreation, but we should also stop and think about the dangers as well as the pleasures involved in this form of recreation. It's easy to fool ourselves into believing it can't happen to us, but why take any chances? A few minutes to check for the necessary safety equipment are well spent if our lives depend upon them. This might very well be the case in boating and make the difference between a holiday full of enjoyment or one of tragedy or near-tragedy.

"The Kansas Boating Act is a boat-safety law and provides for a uniform numbering system. It was not designed to be a revenue measure, nor is it a cure-all for every type of problem that might exist. It was also not enacted to restrict any individual in the enjoyment of the sport but rather to protect the careful person from the dangers created by the careless." That is the description made of the act by Fred Warders, law enforcement chief of the commission. We will

try to cover the safety points of the act as well as identification procedures in the following paragraphs.

REQUIRED SAFETY EQUIPMENT

The pilot or operator of *any* boat or vessel is required to have aboard one life preserver, buoyant vest, ring buoy or buoyant cushion of the type approved by the U. S. Coast Guard, in good and serviceable condition for each person on board. It must be emphasized that the regulation pertains to all boats and all persons in those boats, not just the ones powered by machinery of 10 horsepower or greater. Canoes, rowboats or any other vessels come under this regulation, regardless of use. Most of the fatalities reported in 1962 listed insufficient life preserving equipment on board for each person. Strict enforcement of this provision of the law should be expected.

If your boat is used for pulling water-skiers, there are two very important things to remember.

Ski-belts are not approved life-preserving equipment for a boat or vessel. If a skier is picked up from the water and has been using a belt while skiing, he should be sure there is a coast guard approved type life preserver in the boat for him.

A wide-angle rear view mirror placed to provide maximum vision of the person being towed or an observer at least 12 years of age, in addition to the operator is a must for safety and to comply with the law.

Operation of boats during the hours of darkness provides another hazard to boaters or other people enjoying the facilities of the state. A light sufficient to make the vessel's presence and location known to any and all other vessels within a reasonable distance is required.

Other requirements as to safe operation could be compared with the operation of an automobile. These pilot rules are explained in detail in the *Kansas Synopsis of Boat and Water Safety Laws*.

Carrying capacity of any vessel

will vary with weather conditions. This is something everyone should take into consideration. On a calm day more people or weight can be safely carried in a vessel. (Not more than the rated capacity, however.) With a little turbulence, this capacity is lessened sharply. Each boat, according to its size has a rated capacity. Most vessels have an OBC rating plate attached in a convenient place if you have any doubt.

WHAT ABOUT ACCIDENTS?

You have certain responsibilities under the law in case of accident. Naturally, we hope it is never necessary to have to report having an accident, but with the number of boaters increasing at a fast rate each year the chances are increasing that sooner or later you may become involved in an accident.

The first thing to remember, and probably something we would do without legislation to that effect, is that the operator of any watercraft is required to stop and render aid or assistance if involved in an accident. We don't like to think so, but there are those who would fail to stop and assist following an accident.

If you should be unfortunate enough to have an accident, collision or other casualty resulting in death or injury to a person or damage to property in excess of \$100.00 a full report must be made to the Forestry, Fish and Game Commission. If death occurs as a result of the accident the report must be made within 48 hours, otherwise the report should be made within five days of the time of the accident. Too, the report must be made on a form supplied by the Kansas enforcement agency in Pratt.

REGISTRATION AND IDENTIFICATION

Any motorboat or vessel powered by machinery of ten horsepower or greater must be registered with the Kansas Forestry, Fish and Game Commission at Pratt before being placed upon the water. Other boats may be registered if the owner desires. The registration

period is three years. At the end of three years the boat or vessel must be re-registered. This should be done prior to the expiration of the present period. The registration and re-registration fee is \$5 for the three-year period.

Owners are being notified approximately two weeks prior to the expiration by the commission. A blue card requiring only the signature of the registrant and his fee (\$5) will take care of re-registration. The white registration card should not be used if the boat is already registered.

When the boat is registered, a certificate of number will be assigned. This certificate must be in the boat at all times regardless of who is operating the vessel. If someone other than the owner is operating the boat, that person should make sure the certificate is in his possession.

The number assigned to the certificate must be displayed on each side of the bow of the vessel. Specifically, this number must be painted or secured to each side of the forward half of the vessel in such a position as to provide clear legibility for identification. The numbers shall read from left to right and shall be in block characters not less than three inches in height. Numbers shall also be of a color which will contrast with the color of the background. In other words, dark numbers on a light background or light numbers on a dark background. Make certain each series of letters and numbers is separated by a hyphen or equivalent space.

CHANGE OF OWNERSHIP OR ADDRESS

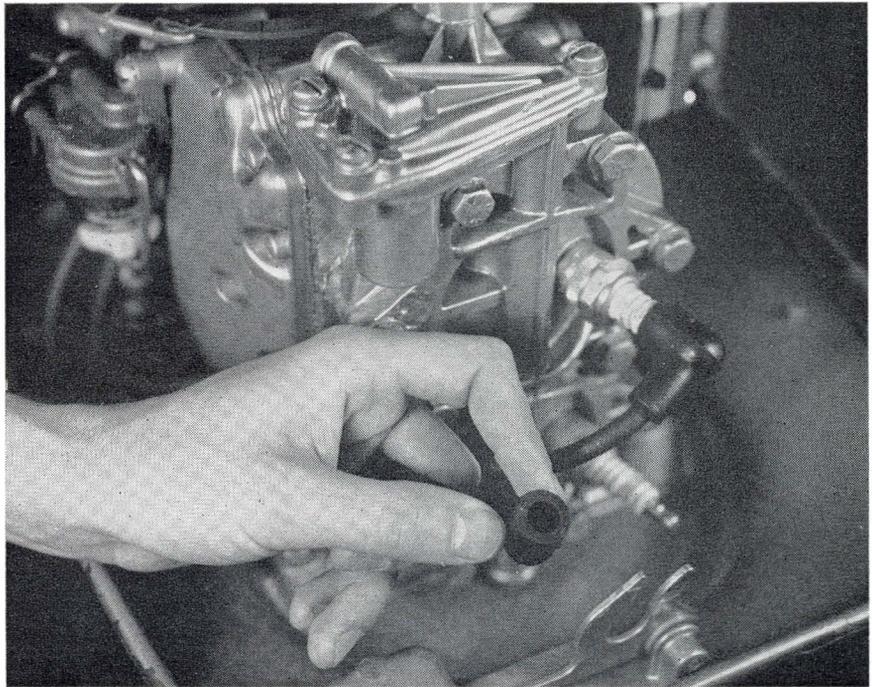
Written notice within 15 days from the date of sale of your boat is required by law. Many people have not complied with this provision of the Kansas Boating Act causing many problems in the administration of the act. Be certain that you notify the commission in writing if you sell or trade your boat.

The same is true if you change your address of residence. Notice

must be given within 15 days. Those who fail to notify the commission are not only in violation of the law but they could fail to receive their notice of expiration of their registration, causing a new number to be assigned to the vessel when the re-registration is made.

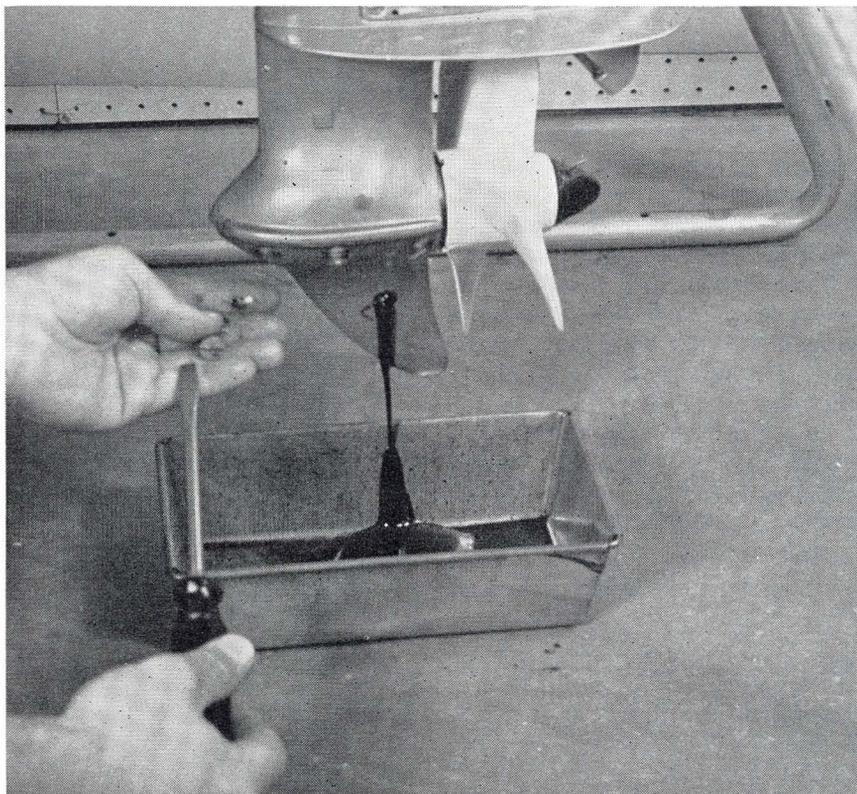
These provisions of the law are to be enforced in all instances brought to the attention of enforcement officers.

Boating in 1963 should be the best enjoyment and recreation you and your family have experienced. Certainly if you will remember the common but extremely important practices of safety and courtesy it will be a season to remember for years to come. The provisions of the Kansas Boating Act are for your protection and the protection of others in this form of recreation. If you are familiar with the act and practice the provisions set out, it will help reduce the number of deaths, injuries and accidents in 1963 and prevent it from becoming another year of increasing deaths and injuries like 1962.



Check the rubber spark plug caps for deterioration.

Getting Your Outboard Ready

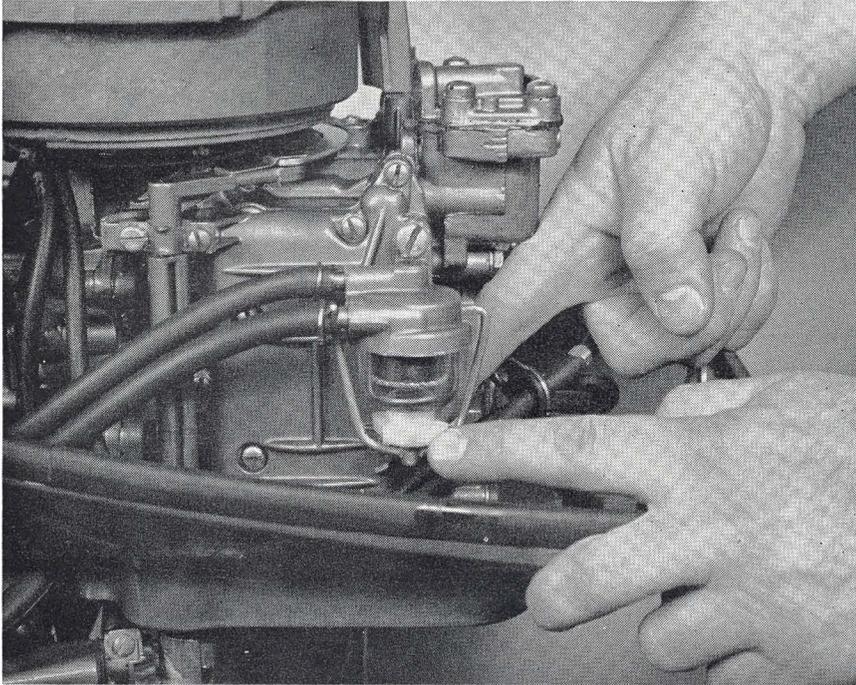


Drain and refill the lower unit housing propeller shaft and gears.

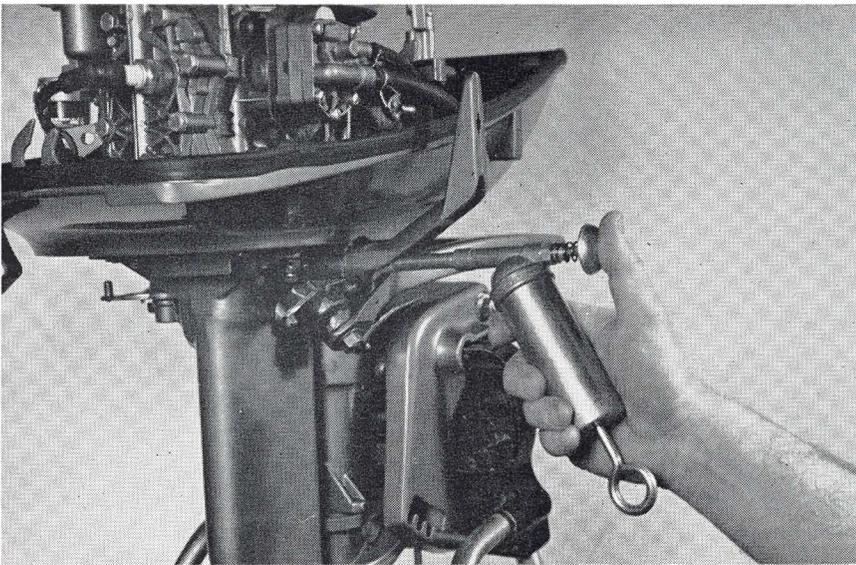
It doesn't require a lot of mechanical aptitude to get your outboard ready and in tip-top shape for the boating season. With a few basic tools, an average knowledge of what makes the motor work and an hour or so of spare time, just about anyone can do it. To help you here's a simple step-by-step procedure recommended by Bill Smale, chief engineer at Evinrude Motors.

Start by removing the spark plugs. Spark plugs may seem to be rather insignificant parts of the engine, yet they are vitally important. Rough idling, hard starting and excessive fuel consumption can all result from defective plugs.

Inspect the plugs carefully for burning, fouling or cracking. If they appear to be in good shape they can be cleaned, gapped and re-used. If they show signs of deterioration, don't take chances, replace them with the type recommended by the manufacturer. Also check the rubber spark plug caps for deterioration,



Next check step is the fuel system.



Fill the fittings with the proper lubricant.

The ignition system—breaker points, condenser, coil and wiring—can be quickly tested with a spark checker. Spark checkers are inexpensive to buy or, if you prefer, easy to make.

Next check step is the fuel system. If you ran the carburetor dry last fall, you shouldn't have any problem. It's a good idea however, to remove and clean the fuel

filter bowl. Wash the bowl and the filter with neutral spirits or clean gasoline. If the filter is badly clogged with varnish or other deposits, it should be replaced. Check all fuel lines for leaks and cracks.

See that all parts are properly lubricated. Using a grease gun, fill the fittings with the proper lubricant. Your owner's manual will list other points that require

attention. Lubrication is important. Don't overlook it.

The lower unit housing the propeller shaft and gears should be drained and refilled with the lubricant recommended by the manufacturer. If water or metal chips are detected in the drain oil, have a qualified marine dealer check the motor. If you changed the lubricant last fall before the motor was put into storage, there is no need to do it again now. It should be checked, however, to be sure it is full.

Don't make the mistake of using fuel left in the tank over the winter months, warns Smale. It has probably lost its ability to ignite properly and using it can cause hard starting, rough running and poor performance. Throw it out.

Especially on high-horsepower motors, propellers are extremely important in getting top performance. Mismatched or damaged propellers are the most common cause of problems related to speed and power losses, short spark plug life, excessive fuel consumption and vibration. A propeller that is nicked or bent should be repaired repitched or replaced. If your motor does not deliver the kind of performance that can reasonably be expected, have a marine dealer check the propeller. It may not be suited to your boat and the load you normally carry. While you're checking the propeller, lubricate its shaft and inspect the drive pin for wear.

When you have completed these steps, Smale recommends giving the motor a thorough visual inspection. Look for loose screws and trim and damaged parts. When everything is shipshape, connect the spark plug wires and put on the engine cover. Wipe down exterior metal parts with a lightly oiled cloth. Apply a coat of protective wax to fiberglass engine covers.

That's all there is to it. It doesn't take long and doing it now will mean your motor will be ready to go when you get that urge to go boating or fishing. It won't be long now.

Tuttle Creek

Fisheries Research

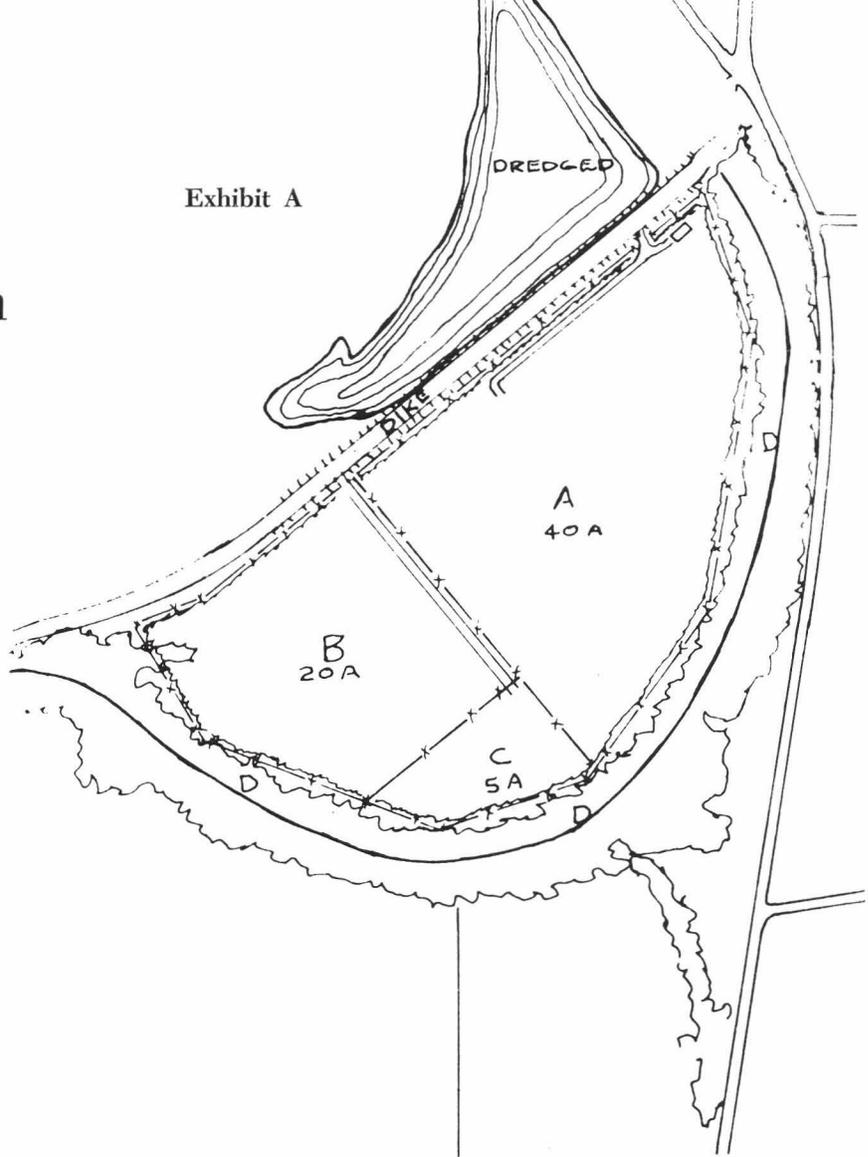
Laboratory

By DR. OTTO TIEMEIER,
Associate Professor of Zoology,
Kansas State University

The ultimate aim of fisheries research is to improve fishing. A national fishing institute uses as its motto, "To help shorten the time between bites." The Kansas Forestry, Fish and Game Commission has undertaken a co-operative research program with the U. S. Army Corps of Engineers and Kansas State University to obtain information that should lead to better fishing in Kansas and a shorter period between bites.

Because the channel catfish produces more fishing than any other fish in Kansas, the first goal is to obtain more information on the nutrition of this species. Can we, by our studies, determine better methods, feeds, etc., that will enable us to raise more and larger channel cats in hatchery ponds? The fisheries biologists of the Commission were among the first to learn how to hatch and rear large numbers of small channel cats. The Commission desires to determine better feed formulae to feed these fish in order to grow them to a larger size the first year. Having larger fish available for stocking new waters would shorten the time between stocking and fishing.

Some clear Kansas lakes have not produced enough channel cats by natural spawning to provide continued good fishing. Stocking these lakes with fingerling fish has not improved the channel cat harvest because the fingerling fish did not survive. If large numbers of channel cats can be reared to 10 to 12 inches in small ponds and then stocked in lakes the chances of sur-



vival and continued good fishing would be assured.

Investigations will be continued on the possibilities of rearing channel cats to edible size by feeding pelleted feeds. It might be desirable to stock larger fish in state waters to improve fishing. Fishing in fee ponds for this species and the commercial production would be enhanced by further knowledge.

A 25-year license has been obtained from the U. S. Army Corps of Engineers on 93 acres of land below Tuttle Creek Dam. The ultimate aim is to construct 60 experimental ponds of approximately one-fourth acre each on 40 acres of the area. Twenty-five acres will be used for experiments on trees and shrubs useful for wildlife food and cover and resistance of these plants to insects and diseases,

Twenty-three acres of the area will remain undisturbed and will be used in field studies by students in the plant and animal sciences.

Each pond will have a separate water supply and its own drainage system. These facilities will permit closely regulated and controlled experimental conditions. An excellent supply of water will be obtained for the ponds from nearby lakes. This water is clear, but not too clear, and at the proper temperature for good growth of Kansas fishes.

Preliminary experiments on certain phases of the proposed studies have been conducted in the vicinity of Manhattan. Fingerling fish about 3.5 inches long have been stocked in small ponds near the Council Grove and Herington lakes and in farm ponds. The purpose of

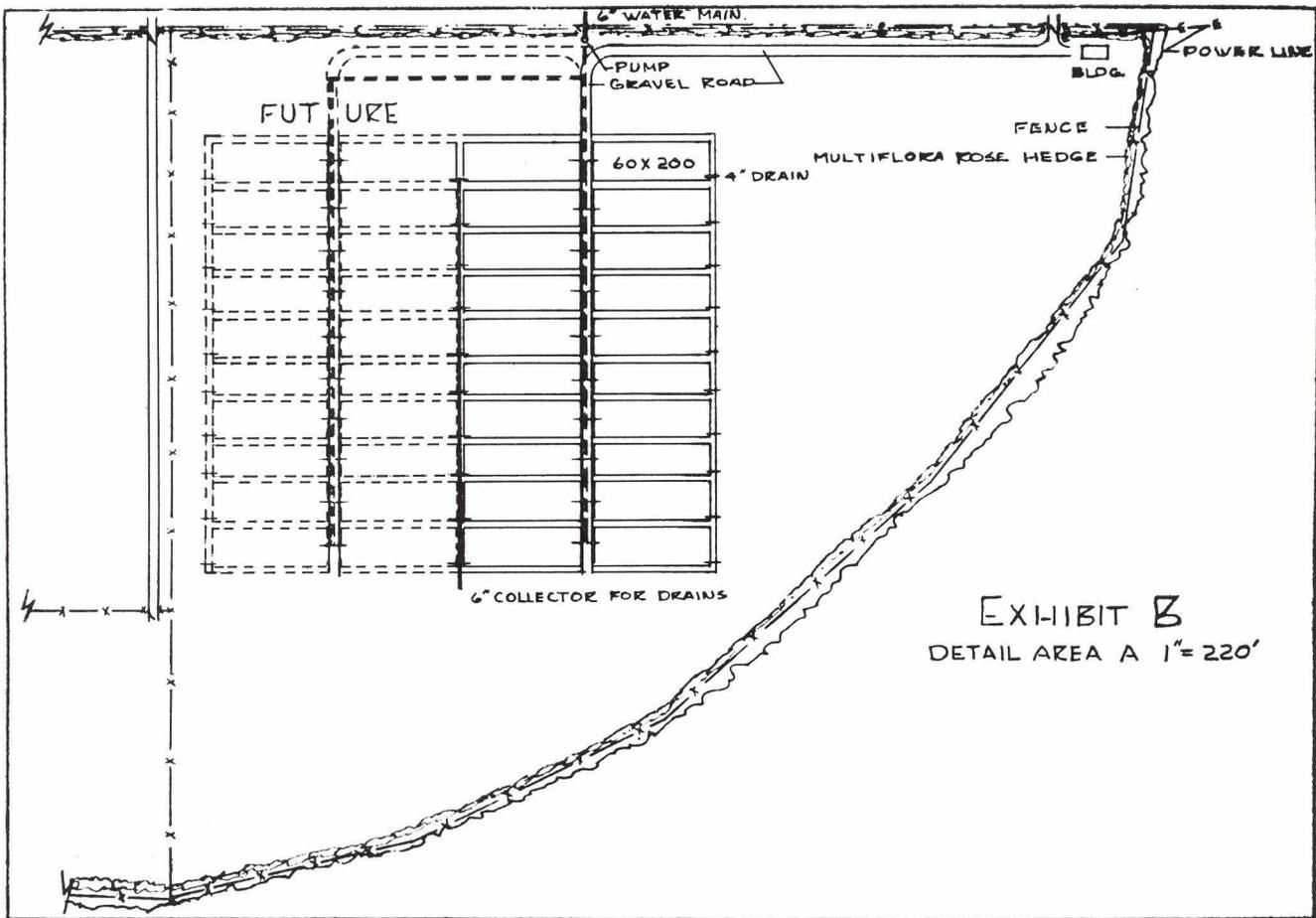
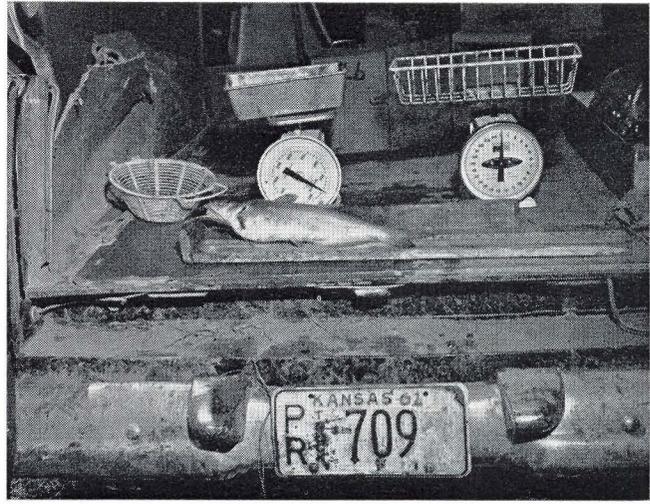


EXHIBIT B
 DETAIL AREA A 1" = 220'



these experiments was to determine the feasibility of rearing large numbers of these fish to 8-12 inches for stocking in lakes.

The small channel catfish were originally stocked at rates varying from 1,000 to 22,000 per acre. These fish were fed by the caretakers or the farmers each day at approximately the same time and place from May to September. Dry pellets of various sizes were fed at the rate of 5 percent of the total weight of fish daily. In other words, if all the fish in the pond

weighed 100 pounds, they would be fed 5 pounds of feed per day.

Every two weeks the ponds were seined and the fish weighed and measured. The same rate of feeding was maintained but as the fish grew, more feed was required.

The ponds were drained and the fish weighed, measured and removed during September and October. Approximately 94 percent of the fish that were stocked were removed in the fall.

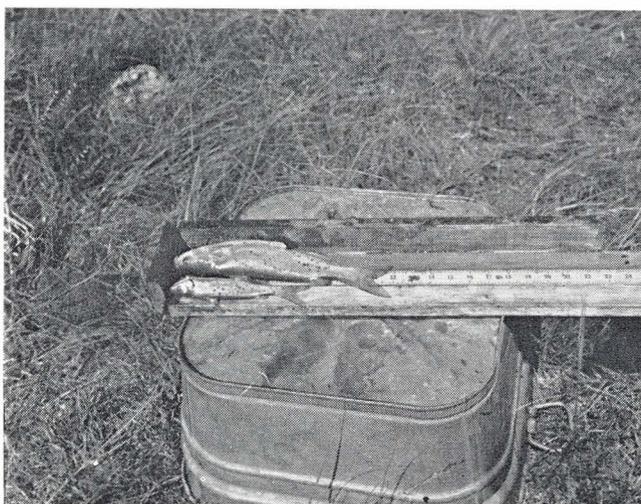
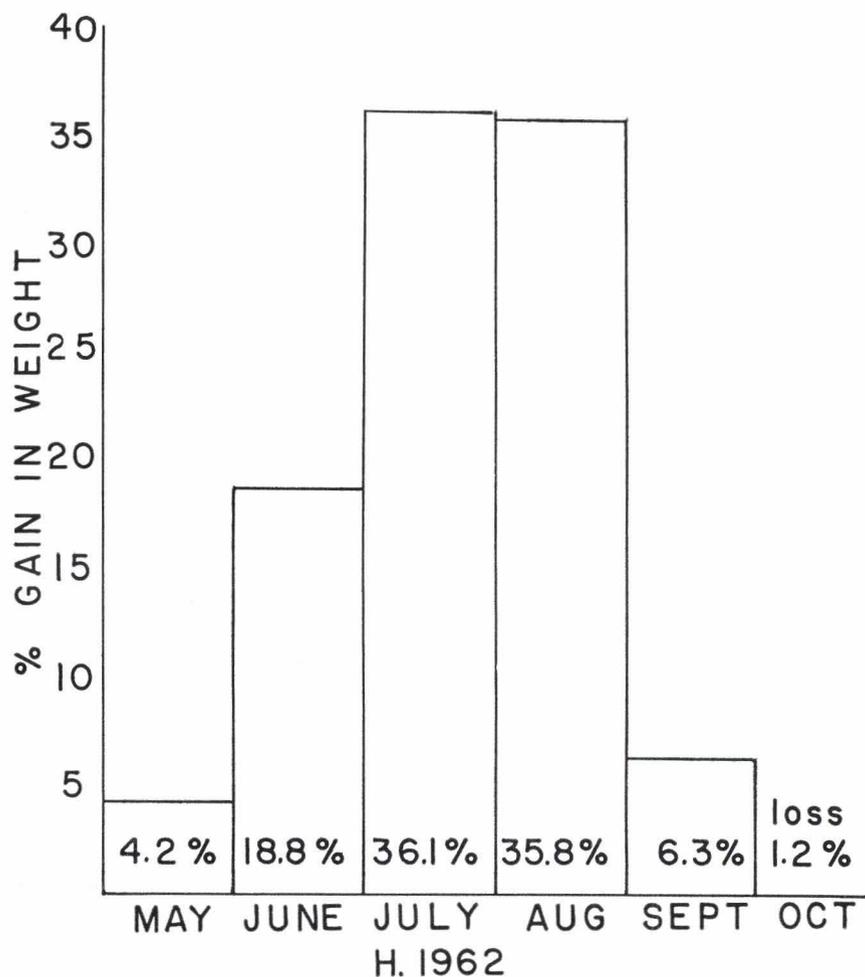
The length of the fish when removed varied between 7 and 12

inches or an average of about 9 inches. These fish should be large enough to escape from most of their predators when stocked into the large lakes.

The fish stocked at the rate of 1,000 per acre were considerably larger than the fish stocked at the higher rates but the pounds of fish produced per acre was considerably less. The rate of gain at the different stocking rates varied from 330 to 2,240 pounds per acre for the four months of the feeding period.

The accompanying figure shows that about 72 percent of the gain in weight was made during the months of July and August. Only 10.5 percent of the total gain was made during May and September and the fish lost weight in October. This indicates that the fish grow more when the water is warm and less when the temperature of the water is cool because they apparently do not feed regularly or not as much when the water is cool. Similar growth might be expected in different areas of Kansas but I would assume that the growing season would be longer in southwestern Kansas than we found at Manhattan. We have only scratched the surface in obtaining information on this type of experiment.

We have also conducted feeding experiments in farm ponds to feed channel catfish to an edible size of one pound. Fingerling fish about 3.5 inches long have been stocked at approximately 1,000 per surface acre of water. The fish were fed the dry pelleted feed daily at 5 percent of their weight. These fish were treated the same as those in the previous experiments. In this area of the state one to two feeding seasons or summers were required to raise the fish to this size. Cost of feed to produce these fish varied between 12 and 19 cents per pound.



Fish of same age. Variation of size indicates selection might be fruitful.



Large enough to stock in any lake.



Fin clipping to mark them.

The flesh of these fish is sweet and delicious. In some experiments we have had the fish hickory smoked and obtained a delicious treat. Some farmers state that these fed fish cannot be caught by fishing and others say they can't catch them unless they do feed them. I am inclined to think that a diligent fisherman would be adequately rewarded when fishing in these ponds. Certainly we can produce more and larger fish in a much shorter period of time. The question would appear to be whether or not the fisherman would be willing to pay the extra cost.

We have tried several formulae to make our pellets. For the interested persons, the following is included. We believe that there are better and cheaper formulations but we have been gratified with our results. Any feed mill that has a pelleting machine can produce the pellets.

Fish meal	360 lb.
Soybean meal	450 lb.
Meat scraps	300 lb.
Distillers' solubles	100 lb.
Salt	35 lb.
Aurofac (1.8)	5 lb.
Wheat middlings	500 lb.
Dehydrated alfalfa meal	250 lb.
	2,000 lb.

These ingredients are processed into pellets $\frac{3}{16}$ inches in diameter and approximately $\frac{3}{8}$ inches long.

These proposed ponds will enable us to conduct a number of

experiments on different formulas during the same feeding period to determine cheaper and better methods of feeding channel catfish. These experiments would be conducted on fish to be used for stocking as well as those grown to edible size. Kansas is fortunate in having a milling department at Kansas State capable of producing and formulating any feed we wish to try.

The feasibility of feeding other kinds of fishes will also be investigated. We may be able to determine methods of feeding bass and bluegills. This would be desirable in many of our state waters.

The effects on the fish of the waste products excreted by many fish crowded into a small area will be investigated. Biologists have indicated that certain fishes may grow better in water that has previously been stocked with fish but other studies seem to indicate that waste products of fish may reach a level that inhibits or slows down the growth of fish.

There is much information we can obtain about the feeding habits of different fishes that will be valuable to the fishermen. This type of information we have placed in the category of behavior studies.

We have observed in the fall when we removed all of the fish from a pond that some of the fish were 7 inches long and others were 13 to 14 inches long. These fish were stocked at the same time and were approximately the same length. These results made us think that it might be possible by selection and selective breeding to obtain a faster growing strain of channel catfish similar to selection studies in farm livestock. Chickens, turkeys, swine and other animals can be grown to marketable size in less time now than just a few years ago. Part of this difference has resulted by selection. It may be possible to do similar experiments with channel catfish.

The rate at which these experiments will be conducted is dependent upon the funds that are

made available. A greater variety of experiments could be conducted at the same time if a large number of ponds are available.

All the experiments should help to decrease the time between bites for Kansas fishermen. More information about how, when, where, and what to feed fish should result in more fish and larger fish.

Studies on the "behavior" of fishes may provide clues about how to fish for certain species. If we can select a strain of channel cats that will grow more rapidly than the wild fish, the fishermen would have more large fish to catch. Maybe this is a lot of dreaming or wishful thinking, but in essence, this is what makes experiments.

Tuttle Creek Dedication

(Continued from page 6)

Tuttle Creek Reservoir is the largest reservoir in the state of Kansas and boasts a conservation pool of 16,000 acres. The shoreline measures over 100 miles. Fishing outlook for the season appears to be excellent, especially for channel catfish and crappie.

Tuttle Creek State Park is expected to be in operation by dedication time with adequate camping and picnic facilities available. Two concessions are now being completed and will be in operation in the near future. The Randolph Marina, located on the west side of the reservoir about eleven miles north of the dam, will soon have available a complete line of goods and services. The other, Spillway Bay Marina, is under construction on the east side of the lake just north of the east end of the dam.

The addition of Tuttle Creek Reservoir to the Kansas scene means that there is now a total of 43,250 acres of water in the state's federal reservoirs.

The mallard duck's food consists mostly of sedges, grasses, smartweeds, pondweeds, other aquatic plants and acorns.



A view of Brown County State Lake from the north entrance.

Brown County State Lake

19th of a Series on the State Lakes of Kansas

By GEORGE VALYER

"Any fisherman worth his salt will tell you that springtime fishing is the best of all. That is, except those who prefer fall fishing. As far as I am concerned, I'll just fish whenever the opportunity arises."

This sentiment was expressed to me by a wiry fellow of about fifty years of age the last time I visited at Brown County State Lake. Unfortunately, I didn't record this man's name but I guess it doesn't make a lot of difference anyway. He wasn't having any more success than I was and the result for both of us was almost nil.

Considering the last statement made, it may surprise you to know that, for my books, Brown County State Lake is a good fishing spot. The same went for this fisherman. He, too, was convinced that this lake had much to offer and his conviction was based on past experi-

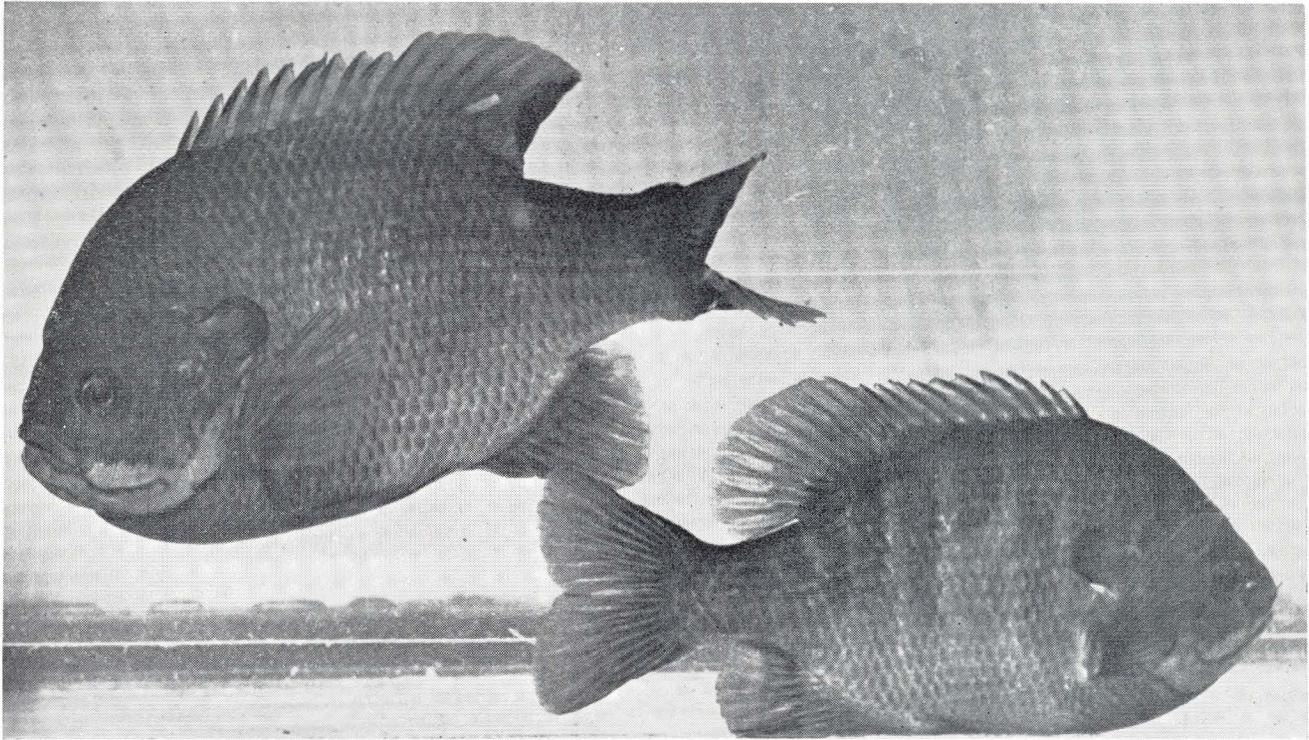
ence. He had taken his share of lunker bass from its cool, clear environs and had seen many large channel catfish gracing the stringers of other fishermen.

Let's face it, the people who really catch fish are those who fish often and long. The fellow who fishes only four or five times a year, and then for only an hour or two, can hardly expect to come home with enough for a meal. Of course it does happen, now and then, but it is not the rule. The most successful anglers I know are those who spend a lot of time at it, at least enough to learn how to properly present a bait and study the various water conditions and how they affect fish. This is not to say that the occasional angler doesn't have fun. Sure he enjoys himself. And, occasionally, lady luck drops him a good catch.

The point we are trying to make is that no one can adequately judge the fishing potential at any lake by one visit. Recently I fished for a few hours at one of the best reservoirs in this part of the country and came away with only a memory of the beautiful surroundings. It would certainly be an error to claim that there were no fish in the lake, just because they wouldn't hit that day.

Let's review some of the facts. Brown County State Lake is located in the glacial hills of northeast Kansas where the corn grows tall and the meadows are thick and verdant. The bulk of land in the drainage area is in pastures interspersed with patches of cropland. Some silt is carried into the lake during periods of heavy rain but, for the most part, it remains clear enough for good bass and crappie production. In the bottom of the lake are several springs which help maintain the water level in times of subnormal rainfall.

(Continued on page 18)



The Sunfishes

Kansas waters play host to a great number of different kinds of fish but the most plentiful, as far as numbers are concerned, are probably the sunfishes. The name "sunfish" is a family name and includes several species, among them are bluegill, green sunfish, orange-spotted sunfish, and long-eared sunfish. Also in the sunfish family are the less-abundant rock bass and warmouth. Crappie and the black basses belong to this family group but are usually not associated with them by most anglers.

IDENTIFICATION

It is sometimes difficult to identify various species of sunfish. Many fishermen lump them together under the name sunfish or "sun perch." Actually, there are only two members of the perch family found in Kansas, the ring perch and the walleye. One of

the major reasons for trouble in identification is the fact that there is much crossing between the species. Where two or more are present in the same waters, combinations are generally found.

Bluegill, sometimes called breem or pumpkinseed, is very common throughout the state. It is best distinguished by its small mouth and blue-black spot on the gill cover. This spot has no light colored margin around it. The side of the bluegill is usually marked by 5 or 6 vertical bars formed by darker scales. Color is a poor indicator for most sunfish species.

The green sunfish, commonly called black perch, can be distinguished by its large mouth and seven or eight dark green vertical bars on its sides. Its tail and fins are generally ringed with orange.

The orange-spotted sunfish, or shellcracker, is generally more

streamlined in appearance with a medium-large mouth. It is easily distinguished by the 20 to 30 squarish orange spots which dot its sides.

The long-eared sunfish is, perhaps, the most colorful of the sunfishes. It is sometimes known as the "red perch" because of its high coloration during the breeding season. These fish are generally thin bodied and, as the name implies, they have a long dark flap or "ear" on their gill covers.

The rock bass and warmouth are almost identical in appearance. Coloration is usually a dark olive green. Both species have red eyes which leads to the names goggle-eye and red-eye. The two can be distinguished mainly by the number of spines in the anal fin. (The fin located at the back on the underside.) The rock bass has five

(Continued on page 20)

Brown County State Lake

(Continued from page 16)

Brown County State Lake was contracted in the spring of 1953 and construction was finished in January of 1954. An interesting aspect about the construction phase was that a vein of coal was uncovered while the footings for the dam and spillway were being excavated. This coal was relatively hard but, since all coal is porous, it had to be removed to prevent seepage. Cultivated land in the 1,400-acre drainage area was mostly under conservation practices prior to the building of the lake.

Enough water had been impounded so that stocking of the lake was made in the fall of 1954. At that time channel catfish, largemouth bass, crappie and bluegill were placed in the lake. As is usually the case, other species of fish inhabited the watershed and bullheads found their way into the impoundment.

Access roads were constructed during the summer of 1955 and other facilities were added at that time. By the fall of '56, the fish had grown to a good catchable size and opening day was set for November 29 of that year.

Opening day dawned clear and cold with a thin sheet of ice over the water. This failed to chill the

ardor of the hardier fishermen and those who fished from boats were well paid for their efforts. Bank fishing was almost out of the question due to the ice. Channel cats made up the bulk of the take and they averaged nearly 2½ pounds each.

Since that time large bass and channels have been regularly taken at Brown County State Lake. Last spring several bass weighing over six pounds were strung and even larger ones may be expected this year. Crappie fishermen will also be kept busy when this species is on a feeding spree.

A concession operated by Ray Zimmers is located on the east shore of the lake and Ray is happy to serve the public with food, fish bait and rental boats. Gasoline for outboards is also available. Picnic tables and grills are located at many spots around the shoreline and camping is popular during the summer months.

Caretaker Eddie Grove is a busy man but he will be glad to visit with anyone who has a problem or wants some information on the fishing. He can be found almost any day during the spring or summer at the equipment shed northeast of the concession or mowing the day-use areas. He might also ask to see your fishing license while on his regular patrol around the lake.

The shape of Brown County State Lake could be roughly described as a hand with three fat fingers. The dam is located where the wrist would be and the fingers fan out to the north. A favorite fishing spot with many anglers is off the points which separate the three lake arms.

When the fresh, tender leaves of springtime are bursting forth and a light breeze is rippling the water, who could help but feel a twinge of excitement at such a view. If your fishing fever isn't already at a peak, we suggest you give Brown County State Lake a look-see. Maybe this spring will be the time you catch that big one and maybe this will be the place.

Talking Turkey

(Continued from page 7)

partment has hastened this movement by live-trapping the turkeys and transplanting them along drainage systems farther north. As a result of these efforts, Kansas has a small breeding population of Rio Grande turkeys becoming established along its southern tier of counties, from Elk and Chautauqua Counties, west. Population growth has been slow, but it is thought that poaching and the ravages of spring floods have played havoc with the struggling "newcomers." This practice of live-trapping and transplanting turkeys has worked exceptionally well in all states using this technique as a means of restoration.

Today, there are approximately 360 wild turkeys in the state. Over two-thirds of these birds are the Rio Grande subspecies. The remainder are pen-reared eastern and Merriam's turkeys. Two principal methods were used to collect the turkey population data. Personal interviews with local residents residing in the occupied range, and a turkey questionnaire were the basic techniques used to determine the population. In addition, on-the-spot field checks, often in the company of rural residents or other interested persons, were made in an effort to document sight records, and to verify reports. As has been previously stated, most of the turkeys are located along the southwestern tier of counties, but recent releases of pen-reared turkeys by interested persons in Decatur and Norton Counties in northwestern Kansas have temporarily established the bird in that area. You will note that the word "temporarily" was used. Every state, with the exception of Pennsylvania, that has used pen-reared turkeys in their restoration programs has met with failure or only limited success. In the attempt to produce a "good" wild bird through selective breeding, game-farm advocates have come up with a semi-domesticated tur-



The concession is a popular meeting place in the main fishing season.

key that can't adapt itself to the environment. In many cases this type of turkey disperses to the vicinity of human habitation, but does not permanently remain there. Customarily they spend most of their time in adjacent wooded areas and return once a day or once every two to three days to a house or barnyard and feed. Some flocks reside near houses or barnyards but do not visit them, yet they are not disturbed by the nearby activities of man. Sometimes, in inclement weather during the winter these flocks temporarily move to barnyards to feed. Only rarely do these flocks succeed in reproduction and productivity is never high enough to sustain their numbers. If poaching does not occur, these flocks may exist at one location for several years. Pen-reared turkeys are physiologically, and psychologically incapable of adapting themselves to the environment. Wild turkeys must be able to find food at all times of the year, reproduce and sustain their numbers and escape from their enemies, but research has indicated that many pen-raised birds succumb to the environment or die in the clutches of predators soon after release. This is not the case with live-trapped wild turkeys. In his summary of the First National Wild Turkey Symposium 1959, Leonard Foote of the Wildlife Management Institute had this to say. "Hardy, Gilpin (researchers in Kentucky and West Virginia, respectively), and others presented crystal-clear evidence of the futility of playing with game-farm stock when restoration is the objective. Why some states continue, even for the sake of experimentation, is almost beyond my comprehension." These are not idle words. The continued release of pen-reared turkeys in this state can only be detrimental to future restocking attempts. Therefore, only areas that have no record of having been contaminated by game-farm releases will be considered at the time of stocking.

A habitat evaluation study is now in progress. In this phase of

the project it is hoped that by determining the habitat requirements of the turkeys present, this knowledge can be projected and compared with the habitat in areas that do not have a wild turkey population. The word habitat can be interpreted to mean many things. In our study, it means determining the major vegetation in the area, land-use practices and their extent, topography and soil type, climatological data, available surface water, food availability, and many other subtle factors that may become apparent as the project progresses.

In a study conducted by E. A. Walker of the Texas Game and Fish Commission, a definite pattern developed with regard to success and failure of Rio Grande Wild Turkey transplants. He found that successful transplants were restricted largely to a belt in which the mean annual rainfall ranged from slightly less than 20 inches to slightly more than 30 inches. This information will be taken into consideration when releases of Rio Grande Wild Turkeys are made. Why shouldn't Kansas profit from the research efforts of other states?

Food seems to be the major factor determining the daily movement of wild turkeys over any given range. The principal food items are grasses, seeds, fruits, and insects. Grasses provide the most important year-around food, while fruits and nuts of trees and woody plants provide the principal source of food from November to February. Grasshoppers and other insects play an important role in the late summer months.

The food requirements of wild turkeys are relatively small in volume as compared with range animals dependent upon plants, and their versatile food habits and great mobility enable them to adjust themselves to moderate competition with livestock. Sound land management with a view to sustained production of livestock, is highly compatible with a successful turkey population.

The practice of supplemental

feeding will not make up for losses in the natural food supply. Provision of domestic crops is much more economical and effective than any artificial feeding or baiting practices, but the natural complement of native foods (if allowed to grow), is adequate for the wild turkey's needs and is a good deal more satisfactory.

Favorable wild turkey habitat then, includes many things. Few researchers have ever come out with a successful formula. However, favorable habitat is construed to mean adequate food-producing vegetation, sufficient cover for nesting and general concealment, and suitable roost trees. A well distributed supply of surface water, readily accessible to both young and adult turkeys, must also be available. In addition, there must be adjacent range to which any subsequent population increase might spread.

Wild turkey stocking operations will begin in the winter of 1963-1964. Kansas hopes to obtain at least 400 live-trapped Rio Grande Wild Turkeys from the Texas Game and Fish Commission. Transplants of these turkeys will be concentrated in the 20- to 30-inch rainfall belt of central Kansas. In time, as population increase becomes evident, broodstock will be live-trapped in the areas of increase and transplanted in other locations that meet the habitat requirements of this bird.

The game division is also trying to obtain live-trapped eastern turkeys for release. If the birds can be procured, they will be released in selected areas in the eastern one-third of the state. However, the habitat requirements of the eastern turkey differs somewhat from those of the Rio Grande Wild Turkey. The eastern turkey requires large tracts of mast (nut) producing trees. Acorns are an essential item in the late fall and winter diet of this bird. There is some difference of opinion among researchers as to the extent of timber or woodland required, but in

(Continued on next page)

all cases the figure generally accepted exceeds 10,000 acres. It may be well that the size of the release area is not as important as the relative amounts and quality of habitat, degree of disturbance by humans, and accessibility to the area. As research continues, the answers to these and other questions may become more apparent.

Areas to be stocked will be selected on the basis of suitable habitat, and the interest and co-operation shown from people living within the area. People exerting some effort in behalf of the program will give greater protection to the released birds than if the commission selects an area without knowledge of the attitudes of the local residents. Thus far, the ranchers and farmers have welcomed the turkeys enthusiastically and have protected and fostered their increase in every way possible.

Because of the wild turkey's wide-ranging characteristics, assistance from all observers and agencies will be welcomed in locating wild turkeys, and will be expected to play a considerable part in plotting their spread and their success in producing young.

Poaching has been considered a limiting factor in many states engaged in turkey restoration projects. If this form of harassment can be reduced or eliminated entirely, and the wild turkeys are released in suitable habitat, then there is no reason why this restoration program should fail.

The chief objective of the wild turkey restoration attempt in Kansas today, is the establishment of a huntable population in as much of the suitable range as possible. In the future, Kansans may be doing more than just "talking turkey," they may be having it for Thanksgiving Dinner.

The Sunfishes

(Continued from page 17)

or six spines while the warmouth has only two or three.

DISTRIBUTION

Blue gill may be found in almost all waters in the state. This

species is hatched and distributed by the Kansas Forestry, Fish and Game Commission and is stocked in farm ponds and lakes throughout Kansas. Small bluegill provide good forage for larger game species such as bass.

Green sunfish and orange spotted sunfish are also found nearly statewide with the heaviest concentrations in the eastern portion of Kansas. The green sunfish are the most abundant of the two, probably because they are more prolific.

The long-eared sunfish and rock bass occupy the same general range; they may be found from the Flint Hills eastward, usually in the clear streams and lakes.

The warmouth is more tolerant of turbid water and may be found in various localities in the eastern one-half of the state.

LIFE HABITS

All species of the sunfish family are nest builders. This is in contrast with such species as walleyes and carp which scatter their eggs during spawning. Sunfish males fan out a shallow depression on the bottom of the stream or lake with their tail. This nest comprises the spawning area and is defended against intrusion. Upon completion of the nest, the male fish seemingly herds the female of his choice to the site where she deposits her eggs. The male then fertilizes the eggs with milt and remains to guard the nest while the female goes her merry way. The young are protected for a short time after hatching by the male fish but as soon as they are able to swim strongly, they are on their own.

A large adult female bluegill can lay as many as 40,000 eggs in one spawning, but the small young fish are preyed upon by many larger fish. The green sunfish are also quite prolific and, where sufficient predation is not present, they soon overpopulate their environment. Fewer young are produced by the orange spotted sunfish, warmouth and rock bass.

The diet of the sunfishes is quite varied and seems to be

limited only by the size of their mouths. Since bluegill, orange spotted sunfish and long eared sunfish possess relatively small mouths, they feed mostly on small aquatic animals. The green sunfish, rock bass, and warmouth have larger mouths which allow them to include in their daily fare such items as small crayfish and minnows.

FISHING METHODS

Generally these sunfish species do not grow to "tackle-busting" proportions. However, it has been said that, ounce for ounce, they are the scrappiest fish alive. The current state record for bluegill is 2 lbs., 5 ounces but a "pounder" is considered large. Green sunfish grow to approximately the same size with the Kansas record standing at 2 lbs., 2 ounces. The long eared sunfish and orange spotted sunfish seldom grow to weigh more than a pound. The rock bass and warmouth have been known to grow to over two pounds in some localities to the south but the average top weight in Kansas would be much under this figure.

The warmouth and rock bass are frequently night feeders and are not taken often during the heat of the day. Shady areas are the best bet for daylight fishing and the bait should be drifted under roots, logs and rock outcroppings. In the evening, spinners and popping bugs may be used to take these fish in more open waters. Grasshoppers, worms and small minnows are the favorite live bait.

The other sunfish species seem to bite at almost any time of the day or night and are voracious feeders. Many a youngster has been introduced to fishing by dunking worms for bluegill. The time between bites is generally short and the youngster's interest is retained. Worms are not the only bait attractive to bluegill, long eared and green sunfish. Other favorites include crickets, wasp larvae, grasshoppers and small beetles. Small artificials such as flies and tiny spinners also produce well at times.

The fly rod and light spinning

tackle are the favorites of those who fish consistently for sunfish. Small hooks are a necessity and quick reflexes help considerably, especially when fishing with artificials. The flesh of these gamesters is highly palatable and ranks with the best when fried in deep fat to a golden brown. The meat is tender and is easily removed from the bones.

MANAGEMENT

The principal management problem for sunfish in Kansas is over population in ponds and lakes. Due to their high reproductive potential, they tend to become too

numerous for the amount of natural food present in the water. When this occurs, they become stunted and do not grow to a size suitable for angling opportunities. This is not so much of a problem in deep, clear lakes where predator fish, such as black bass, can keep the population in check.

In streams, overpopulation is usually held down, either by predator fish or unfavorable water conditions. Size limits and creel limits are not necessary due to their high reproductive potential. Wherever water conditions are favorable, you will probably find an abundance of sunfish.

presented a slide lecture on the management of quail. Charles Schwartz discussed the production of a wildlife movie. Schwartz produced three films used by the commission: *The Mourning Dove Story*, *Bobwhite Through the Year*, and *Cottontail*.

Robert Downing and Richard Whiting from the Georgia Conservation Commission demonstrated the use of a Capture-Gun in the taking of game animals for research purposes or restocking in another area. They also discussed problems of deer management and results of their studies.

Cloyse Bond, Information-Education Chief of the Oklahoma Department of Wildlife Conservation, described the value of public relations and the role of the information-education division. The importance of co-operation between divisions and with all news media as well as the public was illustrated.

The development of the deer management program in Nebraska was explained by Ken Johnson of the Nebraska Game, Forestation and Parks Commission.

Departments of Kansas state government included; Kansas Highway Patrol, Kansas Bureau of Investigation, Attorney General's Office, Kansas Public Employees Retirement System, State Civil Service System, and the Water Pollution Control Section of the Kansas State Board of Health.

Others on the program included a representative of the General Electric Company, and the wildlife conservation department of Kansas State University.

Special research studies were outlined by the project leaders and future plans were disclosed. Division chiefs discussed the purpose of their respective divisions.

George Whitaker, game protector supervisor in the northwest Kansas region described the use of mouth-to-mouth resuscitation and showed a movie on the subject.

John Ray, commission biologist covered snake and insect bites; treatment and general first-aid and the treatment of shock.

Fish and Game Personnel Get Training in Department School

Pictures on next page

Game protectors, game biologists, fisheries biologists, lake superintendents, maintenance personnel and other employees of the Kansas Forestry, Fish and Game Commission attended a departmental training school during the week of March 18-22 at Rock Springs 4-H Camp near Junction City. Five states including Kansas were represented on the program. Personnel from fish and game departments in Oklahoma, Missouri, Nebraska, Georgia, and Kansas, representatives of various departments of state government and universities and manufacturers, presented one of the most extensive departmental schools ever held for Kansas fish and game employees.

The purpose of the training session was to further the basic knowledge of the employee in his particular field, to better acquaint him with the operation of other divisions within the commission and to help him become familiar with what other groups in a related field are accomplishing.

Previous schools were primarily for game protectors, but this year it was expanded to include the entire department. According to

George C. Moore, Director of the commission, the school will be on an annual basis.

Each of the six division chiefs of the commission was responsible for the portion of the program concerning his particular field. The program covered administration, law enforcement, information-education, game management, fish management, and field services. It was a long day for those attending with the sessions beginning around 8 a. m. and concluding as late as 10:30 p. m.

Harold Ensley, "The Sportsmen's Friend," was the guest speaker on the evening program of the first day. His contact with numerous sportsmen in this part of the country enabled him to describe accurately the thoughts of the public in relation to their favorite sports. The main theme of his presentation, described in the vernacular of the fishermen dealt with public relations. The role of the fish and game employee in relation to the public and the wildlife resources of any particular area, was emphasized throughout his lecture.

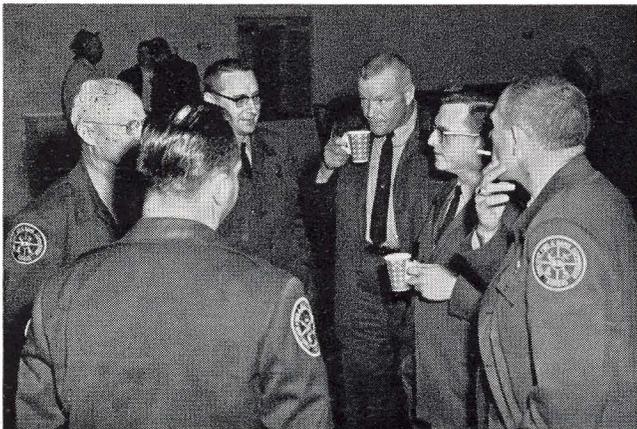
The out-of-state visitors from Missouri covered two phases of fish and game work. Jack Stanford



Harold Ensley, "The Sportsmen's Friend," talked with commission personnel following the meeting. Royal Elder, Manhattan, and Tommie Crispino, Parsons, are shown talking with the well-known angler.



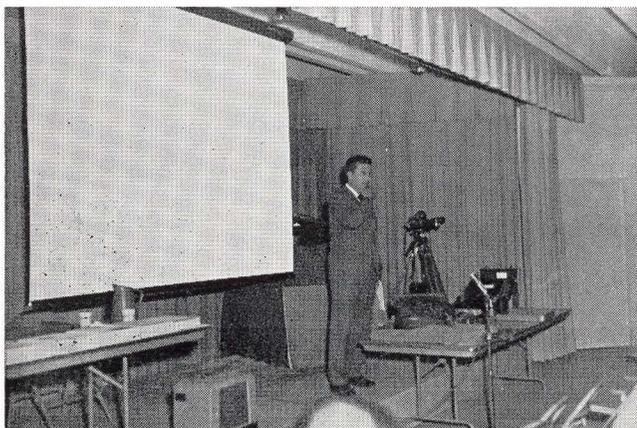
George C. Moore, Director of the Kansas Forestry, Fish and Game Commission, gave the welcoming address on the opening day and summarized the training session at the close on Friday morning.



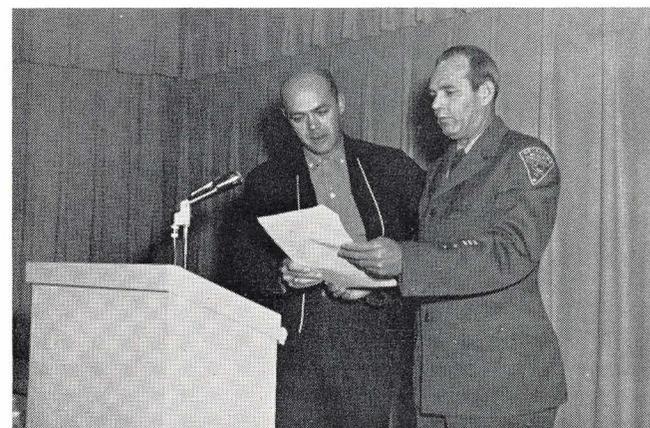
Coffee-breaks were a good time to discuss some of the points brought out in lectures. Left to right are Eddie Gebhard, Meade; Pat Bryan, Kansas City, Kan.; Paul Lies, Hutchinson; John Dunlap, Valley Center; Charles Schmidtberger, Hillsboro; and Fred Warders, Assistant Director, Pratt.



Members of the Commission also attended the departmental school. Shown here are G. G. Boling, Chairman, Charles Hulme, Great Bend, and behind Mr. Hulme, Harlan Boxberger of Russell.



Charles Schwartz, Missouri Conservation Commission, displayed some of his equipment used in filming three films used by the Kansas fish and game commission: *The Mourning Dove Story*, *Cottontail*, and *Bobwhite Through the Year*.



John Polson, Chief of the Information-Education Division for Kansas and Cloyse Bond, Information-Education Chief of the Oklahoma Department of Wildlife Conservation, discuss the program schedule.

KANSAS FISHING CREEL LIMIT AND SIZE LIMIT

The lawful daily creel limit (midnight to midnight) for all waters of the State of Kansas shall be as follows:

Species	Daily limit	Minimum length
Black bass (largemouth, spotted, Kentucky, smallmouth)	10	None
Channel catfish, blue catfish	10	None
Flathead catfish	10	None
(Note: The daily creel limit of any combinations of the above species shall not exceed ten fish in all.)		
Walleye, sauger	5	None
Crappie	Not to exceed 30 lbs.	None
White bass	No limit	None
Bullhead catfish	No limit	None
All other species, except northern pike	No limit	None
Northern pike	No open season	

The open season for the catching and taking of fish in Kansas, *except northern pike*, is from January 1, to December 31, both dates inclusive. *There is no open season for the taking of northern pike.*

LICENSE REQUIREMENTS

All Kansas residents of the ages of 16 to 70 must have the resident license in possession when fishing in this state.

All nonresidents regardless of age must have a nonresident fishing license in possession when fishing in Kansas.

The owner of any land and his immediate family domiciled with him, and tenants renting land for agricultural purposes or the members of their immediate families domiciled with them, may fish by legal methods on such lands without licenses.

This is not intended to be a complete summary of the various provisions of the legislation and regulations pertaining to fishing. Regulations are subject to change. Certain waters have restricted limits. Please check for local restrictions when fishing.

