

STATE Texas
PROJECT NO. F-7-R-1,
Job B-3
PERIOD June 15, 1953 -
May 31, 1954

Job Completion Report

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TITLE

Inventory of the Species of Fishes Present in Lake Kickapoo, Texas.

OBJECTIVES

To determine the species present and their relative abundance as well as to determine the ecological factors influencing their distribution.

TECHNIQUES USED

Six collection stations were established at various parts of the lake on August 10, 1953 at sites designed to sample the varied ecological niches present. It was intended that the stations should be sampled at least once each month - preferably every three weeks - for periods of two days and two nights at a time. These plans were adhered to except when stormy weather prevented running the stations for short periods during the winter months. The stations were run on the following dates: August 10-11; September 4-5; September 22-23; October 27-29; November 18-20 and December 8-10, 1953 and January 12-13, February 9-12; March 2-4 and March 23-25, 1954.

All fishes taken in gill nets were removed and, as soon as was practicable, the specimens were identified, measured, weighed and their sex and stages of gonadal development were recorded. All ripe ovaries and the filled stomachs of predacious species were preserved for laboratory analysis. All abnormalities and diseases were noted and, if pathological conditions were apparent, tissues were saved and sectioned in the laboratory for histological examination. Detailed notes were taken, with especial attention given to ecological and environmental data.

The smaller fishes were taken at irregular intervals, with $\frac{1}{4}$ inch meshed seines, as weather conditions and equipment permitted. Specimens taken were preserved in formalin for laboratory examination. Extreme variations in water level of the lake, and abundance of drowned timber and stumps, made it impossible to establish permanent stations for comparative samplings of the small fish populations.

FINDINGS

Lake Kickapoo, located in Archer County, is an impoundment of moderate size. The mile and one-half long dam retains, at spillway level, 106,000 acre ft. of water. The lake, owned by the City of Wichita Falls, is relatively recent in origin. The dam was completed in 1946. The lake is extremely irregular in shape, measuring roughly seven by five miles.

The sources of Lake Kickapoo are the sources of the Little Wichita River and a small watershed adjacent to the lake. During the early part of the study the river sources were almost dry and the river itself almost still. Heavy rains in

the fall of 1953 caused a considerable rise in water level and greatly enlarged the lake area, especially to the west. At no time previous to May 1954 however, was the lake less than six feet from spillway level.

Lake Kickapoo is devoid of rooted aquatic vegetation. There is an abundance of drowned mesquite timber beneath the water surface that may serve as cover for fishes. During the extreme low water level of the lake in the spring and summer of 1953, brush and weeds grew densely on the exposed flats. With the lake rise in the fall, this vegetation was covered and remains covered to date. It serves, in a sense, as emergent aquatic vegetation as far as cover for fishes is concerned. There is little or no fixed algae, except in the most sheltered coves and bays.

Lake Kickapoo is a "fresh water" lake, with a dissolved salt concentration far below the "taste" level. The lake is the source of drinking water for the city of Wichita Falls. The water is mildly alkaline (pH of 7.4 to 8.5). Lack of flocculating salts results in water of extreme turbidity. To sight the lake is muddy, even after periods of calm weather, and following storms is dark, reddish brown in color. Extremes of turbidity, recorded with a Seichi disk, ranged from 44 mm. after storms to 200 mm. after periods of summer calm. Surprisingly, the lake is quite productive, as far as plankton is concerned, in spite of turbidity. The temperatures of the surface water, away from shore, ranged from a maximum of 29°C (temperatures taken each collection date at 7:30 AM) to a minimum of 0°C. The western end of the lake froze to a depth of nearly an inch and remained frozen for 48 hours in January, 1954.

A total of 23 species of fishes was detected in the lake. These fall into three general groups: species of relatively large size and which are present in numbers great enough to cause them to be important in fisheries management either as game species or as rough fish; forage fishes, of the "minnow" and "sunfish" type (sunfishes in Lake Kickapoo rarely reach 100 grams in weight; are almost never fish for); casual species, too scarce to be of economic importance. Each of these groups is considered separately.

Large and Important Species

Eleven species belong in this group. Five are rough fish species, and together make up 31.4% of the large fish population (49.6% by weight). Six species are game fishes and, together make up 68.4% of the large fish population (50.5% by weight.)

Although the number of important rough fish species in Lake Kickapoo is greater than in nearby lakes (see Completion Reports, Jobs B-1 and B-2) the total number of rough fish individuals is remarkably small. The river carpsucker is the second most abundant of the large fishes of the lake and, by weight, most important. This situation is usual in all nearby lakes, sometimes in an even more exaggerated manner (19% in Lake Diversion, 43% in Lake Kemp). It is the relative scarcity of the other rough fishes, especially the gizzard shad, that brings the total rough fish population of Lake Kickapoo so low. The presence, in fair numbers, of both the largemouth buffalo and smallmouth buffalo, is not entirely unfortunate. These forms encourage commercial fishing in the lake and commercial fishermen must, according to Texas law, remove other rough fish species taken in their nets.

As regards game fishes, Lake Kickapoo is like nearby lakes, in general, but is unique in three ways: abundance of channel catfish, of flathead catfish, and crappie. The low salinity and high turbidity may contribute to the abundance of the catfishes. Whatever the reason, the types of fishing employed on Lake Kickapoo differ considerably from those of other lakes. Trotlining for catfish is very

common. Channel catfish up to six pounds in weight are often taken. The flat-head catfish, though less desirable for the table, is eagerly sought because of its large size. Most specimens taken on trotlines range from six to thirty pounds in weight.

The abundance of crappie is not an unmixed blessing. Many, perhaps the majority of the crappie in the lake, are too small to constitute either game or food. Nevertheless crappie of "eating size" are abundant and, in contrast to nearby lakes, can be taken in the summer as well as winter.

White bass and black bass are both moderately common in Lake Kickapoo but are not extremely popular sports fishes as they are in other lakes. The high turbidity of the Lake Kickapoo water seems to preclude successful trolling and greatly impedes the efficiency of artificial baits. In spite of this, numerous white bass and black bass are taken, especially on live bait.

The drum is considered an inferior game and food fish by most fishermen but is almost always saved and eaten when taken. Most drum are taken incidentally to fishing for other species. Some drum from Lake Kickapoo reach large size, specimens weighing twenty pounds having been taken.

Forage Fishes

Included here are those small fishes that, presumably, make up much of the food of the predacious forms. There is no evidence, in our lakes, that they do so. Indeed it would seem that most of the food of the predacious fishes consists of the young of the rough fishes and drum (see Completion Report, Job B-4).

The small fish fauna of Lake Kickapoo is relatively poor, including only ten species and one of these (Hybognathus placita) was probably released bait of a fisherman. Only a single specimen of this form was taken. A single green sunfish (Lepomis cyanellus) was taken but this may be due to the habits of the species. The green sunfish is a species that prefers to lurk under cover. The abundance of stumps and drowned mesquite trees in Lake Kickapoo affords cover in abundance, but such places are exactly the habitats we were unable to seine effectively.

A single species of minnow, Notropis lutrensis, constituted 87.24% of the small fish sample. Another minnow N. buchanani formed 5.39% of the population and the longeared sunfish, Lepomis megalotis, formed 2.74%. No other species made up even 2% of the population.

Casual Forms

Three species seem to be so rare in Lake Kickapoo that they are not of economic importance.

A single longnosed gar was taken in the lake. This individual was very large and extremely fat. Abundance of gars is characteristic of other lakes in the area. It is possible that a larger number of gars might cut down on the large population of small crappie.

The single plains minnow, Hybognathus placita, taken in the lake may well have been a released or escaped fisherman's bait. This is the most common bait minnow of the area, often used for crappie in Lake Kickapoo. The present scarcity of the species in the lake indicates that they are unable to exist successfully in the lake; they must have been introduced into the lake countless times. We have noted that the plains minnow is most successful in saline waters, sometimes in extremely salty water.

The single record of a black bullhead catfish, Ameiurus melas, was from a shallow, sheltered, mud-bottomed bay. It was apparently ideal bullhead habitat. Two gill nets were maintained at this station throughout the study but no other bullheads were taken, here or elsewhere in the lake. This is not surprising for the black bullhead in north central Texas is a pond and a river pool fish. It seems unable to exist in numbers in even moderately large lakes.

Remarks

Lake Kickapoo is unique, among the Wichita Valley lakes, in several respects. It is still a "young" lake, both chronologically and biologically. The game fishes still dominate the rough fishes but the present abundance of the river carpsucker indicates that this happy condition will not persist long. The almost complete absence of gars is unusual and perhaps to be regretted. This may account for the overabundance of crappie. The abundance of channel catfish and flathead catfish is probably a result of the turbid water, unusual in a region where excess salinity is the rule. Perhaps for this reason the bigmouth buffalo exists in the lake in fair numbers and seems to reproduce successfully there.

SUMMARY

Lake Kickapoo is located in Archer County, in north central Texas. It is an impoundment (dam constructed in 1946) of 106,000 acre ft. volume at spillway level. The lake is the water supply for the City of Wichita Falls.

Lake Kickapoo is a "fresh water" lake (total soluble salts less than 225 ppm). In the absence of the flocculating effect of dissolved salts, the water remains extremely muddy (turbidity 44 to 200 mm.) and is mildly alkaline (pH of 7.4 to 8.5, usually less than 8.0). Summer temperatures of the surface water reached 29°C at 7:30 A. M.; winter temperatures reached a minimum of 0°C., when a part of the lake froze over for two days and nights. There is no rooted aquatic vegetation in the lake and but little fixed algae. The lake is rich in plankton.

Twenty-three species of fishes were found in the lake. Eleven are of large size and important in fisheries management. Five of these are rough fishes (gizzard shad, bigmouth buffalo, smallmouth buffalo, river carpsucker, European carp), constituting 31.4% of the large fish population and 49.6% by weight. Six species of game fishes (channel catfish, flathead catfish, white bass, black bass, white crappie, drum) make up 68.4% of the large fish population and form 50.5% by weight. The most striking features of the game fish population are the abundance of the channel catfish, flathead catfish and crappie. Catfish are extensively sought with trotlines in Lake Kickapoo. The muddy water makes artificial lures relatively inefficient.

The small fish population includes ten species, of which one is probably not resident (Hybognathus placita). One minnow (Notropis lutrensis) makes up 87.24% of the forage fish population; another minnow (N. buchanaani) makes up 5.39% and a sunfish (Lepomis megalotis) constitutes 2.74%. Other species occur in less than 2% of the population.

One longnosed gar and one black bullhead catfish were taken. These species and the plains minnow already mentioned are casual or rare forms.

Lake Kickapoo is still a "young" lake, both chronologically and biologically. The large number of carpsuckers in the lake should be watched and, if possible, controlled. The lake may otherwise soon see a dominance of rough fishes at the expense of the game fishes.

Table 1. Checklist of Fishes from
Lake Kickapoo

Species	Large and Important	Forage Fishes	Casual Forms
<u>Lepisosteus osseus</u>			X
<u>Dorosoma cepedianum</u>	X		
<u>Ictiobus cyprinellus</u>	X		
<u>Ictobus bubalus</u>	X		
<u>Carpionodes carpio</u>	X		
<u>Cyprinus carpio</u>	X		
<u>Notropis buchmanii</u>		X	
<u>Notropis deliciosus</u>		X	
<u>Notropis lutrensis</u>		X	
<u>Hybognathus placita</u>			X
<u>Pimephales vigilax</u>		X	
<u>Ictalurus punctatus</u>	X		
<u>Ameiurus melas</u>			X
<u>Pilodictus olivaris</u>	X		
<u>Gambusia affinis</u>		X	
<u>Morone chrysops</u>	X		
<u>Micropterus salmoides</u>	X		
<u>Lepomis cyanellus</u>		X	
<u>Lepomis microlophus</u>		X	
<u>Lepomis megalotis</u>		X	
<u>Pomoxis annularis</u>	X		
<u>Aplodinotus grunniens</u>	X		

Table II. Percentage Composition and Sex Ratios of Large and Important Species of Fishes from Lake Kickapoo, as Determined from Gill Nets Only.

Species	Total	% of Total	% Males	% Females
<u>Dorosoma cepedianum</u>	40	2.8	37	63
<u>Ictiobus cyprinellus</u>	9	.6	67	33
<u>Ictiobus bubalus</u>	33	2.3	52	48
<u>Carpiodes carpio</u>	292	20.7	54	46
<u>Cyprinus carpio</u>	71	5	59	41
<u>Ictalurus punctatus</u>	141	10	53	47
<u>Pilodictus olivaris</u>	13	1	60	40
<u>Morone chrysops</u>	81	6	47	53
<u>Micropterus salmoides</u>	27	2	55	45
<u>Pomoxis annularis</u>	628	44	50	50
<u>Aplodinotus grunniens</u>	77	5.4	60	40

Table III. Weights, Percentage Composition by Weight and Mean Weights of Large and Important Fishes from Lake Kickapoo, as Determined From Gill Nets.

Species	Weight	% of Total	Mean Weight
<u>Dorosoma cepedianum</u>	11.45 lbs.	1.0	.29 lbs.
<u>Ictiobus cyprinellus</u>	27.27	2.4	3.03
<u>Ictiobus bubalus</u>	79.05	6.9	2.40
<u>Carpiodes carpio</u>	371.60	32.3	1.27
<u>Cyprinus carpio</u>	80.06	7.0	1.13
<u>Ictalurus punctatus</u>	163.92	14.3	1.16
<u>Pilodictus olivaris</u>	53.61	4.7	3.97
<u>Morone chrysops</u>	65.61	5.7	.81

Table III. Weights, Percentage Composition by Weight and Mean Weights of Large and Important Fishes from Lake Kickapoo, as Determined from Gill Nets (Continued)

Species	Weight	% of Total	Mean Weight
<u>Micropterus salmoides</u>	107.60	9.4	4.00
<u>Pomoxis annularis</u>	169.39	14.7	.27
<u>Aplodinotus grunniens</u>	19.35	1.7	.25

Table IV. Percentage Composition of Forage Fishes from Lake Kickapoo, As Determined from Seine Samples Only.

Species	Total	Percent
<u>Notropis buchanaui</u>	85	5.39
<u>Notropis deliciosus</u>	2	.13
<u>Notropis lutrensis</u>	1370	87.24
<u>Pimephales vigilax</u>	27	1.72
<u>Hybognathus placita</u>	1*	.06
<u>Gambusia affinis</u>	28	1.79
<u>Lepomis cyanellus</u>	1	.06
<u>Lepomis macrochirus</u>	9	.57
<u>Lepomis megalotis</u>	43	2.74
<u>Lepomis microlophus</u>	2	.13

* Probably released fishermen's bait.