

JOB COMPLETION REPORT

STATE OF TEXAS

Project No. F4R3 Name Fisheries Investigations and Surveys of the Waters of Region 4-B.

Job No. B-1 Title Inventory of Species Present in Lake Whitney, Texas.

Period Covered: June 1, 1953 - October 31, 1956

ABSTRACT

1. Lake Whitney is a clear-water impoundment containing 15,800 surface acres at normal lake level.
2. The lake is located on the Brazos River in Hill, Bosque, and Johnson Counties approximately 38 river miles upstream from Waco, Texas. The gates of the dam were closed December 10, 1951.
3. The fish population was sampled with gill nets each month from June 1953 through October 1956.
4. The first three years of the lakes existence was the most productive period for game fish.
5. The fish population is slowly changing from game fish to rough fish.
6. Gizzard shad have increased from 27.60 percent of the total fish netted during the first period of survey to 63.05 percent of the fish captured by nets during the third period of survey.
7. Game fish increased in average weight throughout the study but decreased from 30.04 percent to 24.80 percent in number of total fish netted between the first and last period of survey.
8. The number of largemouth bass decreased in the net catches as well as the anglers harvest after the first year of survey.
9. White crappie showed a noticeable decrease in the net catch and a very sharp decrease in the anglers harvest after the second year of survey.
10. Black crappie and Kentucky spotted bass showed a very sharp drop in numbers following the first period of survey.
11. White bass increased from 0.61 percent to 6.84 percent of the total fish netted between the first and third period of survey.

OBJECTIVES

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

HISTORY OF LAKE

Lake Whitney is located on the Brazos River in Hill, Bosque, and Johnson Counties

approximately 38 river miles up stream from Waco, Texas. The Whitney Dam and Reservoir was constructed by the Corps of Army Engineers for flood control, development of hydroelectric power and recreational purposes. The gates of the dam were closed December 10, 1951 and the lake reached conservation pool level in April 1954.

Lake Whitney is a large, clear-water impoundment 37 miles long at elevation 520, which is the top of the power pool. It has a shoreline 190 miles long characterized by limestone bluffs interspaced with long stretches of gently sloping beaches. A drainage area of 17,656 square miles is controlled by the dam, which backs up 15,800 surface acres of water with a maximum depth of 95 feet at normal lake level. Approximately one-third of the lake area has a depth of 10 feet or less which is conducive to good fisheries production. Part of the timber was cleared from the lake bottom before impoundment began but much of the timber along the original stream banks and some of the smaller brush in the general lake area was left standing.

Excellent accommodations are offered to the public by over 50 modern fishing camps and concessions. The lake has been heavily fished and pleasure boat riding and water skiing are rapidly becoming a major pastime.

COLLECTING METHODS

Gill nets were used to collect random samples of the fish population. The nets were 100 or 125 feet long and had meshes of 1 to 3 inches measured on the square. A major part of the netting was done with nets composed of meshes $1\frac{1}{2}$ inches in size. Netting stations of various ecological types were selected in order to typify the different environmental areas of the lake. Data taken from the netted fish included their length, weight, sex, and degree of gonadal development. Scale samples were collected from many of the game fish. Notes were made of any fungus or parasites found on the fish. Sampling was also done with minnow seines during most months of the year. Collections were made with rotenone from several stations. The seined and rotenone samples were preserved in 6 percent formalin and taken to the laboratory to be counted and identified. Table 1 is a checklist of all species collected from Lake Whitney during the entire period of study.

DISCUSSION

Consideration will be given to each major species of fish and the changes that took place in the population of those species throughout the period of study. Table 2 records the number and species of fish that have been stocked in Lake Whitney. Table 3 shows the results of the seine collections made during the last segment of the survey. Table 4 records the frequency of occurrence of food items from fish collected by gill nets during the last segment. Table 5 is a tabulation of data from the gill net collections made during the last period of survey and shows pertinent information regarding each species of fish. Table 6 is a comparison of the changes in the net catch and average weight and "K" factor of several species for the three periods of study. Table 7 is a comparison of the game fish and rough fish populations and shows the percentage of change between various periods of the survey. Table 8 shows the water depth areas of Lake Whitney and the percentage of the lake area that is covered by various depths of water. Table 9 shows the high-water frequencies that will be theoretically attained over a period of years.

LARGEMOUTH BASS

The most productive years for largemouth bass in Lake Whitney were during the first two and one-half years of its existence. As long as the rising water inundated new ground during the initial filling of the lake, the bass population was active and showed signs of a rapid increase in numbers. But, as the smaller vegetation completed its cycle of decay and the areas of submerged vegetation became bare, the bass population was less

active and apparently began to decrease in numbers. Naturally, many of the bass harvested during the later part of the survey were larger than those taken during the first part of the study, but the total harvest in both pounds and numbers became smaller as the lake aged.

Bass accounted for a progressively smaller percentage of the fish netted during each successive segment of the survey. Reference to the netting data shows that this species represented 3.69 percent of the total fish netted during the first study made on the lake, but dropped to 2.48 and 2.00 percent between the first and latter surveys represents a drop of 46 percent in the bass population during three and one-half years as shown by the gill net collections. As the same methods of survey were used throughout the entire study, it seems that the population decrease indicated is reasonable. The angler's harvest followed a similar but more pronounced trend.

KENTUCKY SPOTTED BASS

The Kentucky spotted bass population is on a rapid decline. The species was once as abundant as the largemouth bass but dropped very sharply in the percentage of the total bass harvested during the second and third segment of the survey. The Kentucky spotted bass accounted for only 0.22 percent of the total fish netted during the last year of survey as compared with 3.69 percent of all the specimens captured in the first survey. The ecological requirements are probably more exacting for the Kentucky spotted bass than are required for the largemouth bass. Our experience was to find the species more closely associated with rocky creeks and firm sand beaches. The Kentucky spotted was more active than the largemouth bass during cold weather. The species is a hard fighting fish when hooked and was very popular with the fishermen.

WHITE BASS

The white bass population came from fish that were in the Brazos River prior to the formation of the lake. Very few bass were captured during the first year of the survey but the population expanded rapidly until they were taken quite frequently in the net catches. White bass accounted for only 0.61 percent of the total fish netted during the first survey, but composed 3.38 and 6.84 percent of the fish captured in the remaining two surveys. The increase from 0.61 to 6.84 percent between the first and last surveys represents an approximate 1000 percent rise in the white bass population.

Fishing for white bass is becoming more popular on Lake Whitney. Anglers were eager to search for the early morning schools of whites, or sand bass as they are sometime called, and many good catches were made of that species while fishing for only an hour or two during the early part of the day. The white bass is given considerable credit for his voracious foraging habits upon the schools of small shad.

WHITE CRAPPIE

White crappie are the most abundant of the two species of crappie that are found in Lake Whitney. Crappie are very popular with the fishermen and are fished for more consistently than any other species. Data from the creel census that was performed on Lake Whitney from August 1953 through October 1955 reveals that fishermen caught 87 pounds of crappie per surface acre from that lake during the 27-month period. The creel census also showed that the harvest of crappie was not as good during 1955 as it had been in the two previous years. From January through October of 1954 fishermen averaged catching 32 crappie per hour of fishing time. During the same period of 1955 fishermen caught an average of only 0.10 crappie per hour of fishing time. It is well known that crappie fishing has not been good on Lake Whitney since that time. The cause of the poor crappie harvest during the last two years is difficult to determine from data collected in our netting survey. However, a review of the data does show that only 1.54 crappie were captured

per 100 feet of gill net during the last year of survey as compared to 1.80 crappie caught per 100 feet of net during the previous period of survey. This represents a drop of 14 percent. Although it is not as large a drop as shown by the data from the creel census, it is probably indicative of a declining crappie population. As crappie are difficult to accurately survey with a gill net in lakes containing lots of brush, it would be better to study the crappie population in Lake Whitney with gear and techniques more suitable for the problems involved.

BLACK CRAPPIE

The black crappie population had decreased rather sharply in Lake Whitney during the past three years. When the netting survey was first begun, black crappie were found in the net catches almost as frequently as white crappie. Black crappie accounted for 3.28 percent of the total fish netted during the entire first period of study as compared to 7.14 percent of the fish accounted for by white crappie. During the next period of study the black crappie percentage had dropped to 0.41 while the white crappie percentage had risen to 9.90. The population of black crappie has continued to be low since the initial netting survey. Fishermen express their preference for the black species and a larger population of the fish would be highly welcomed.

CHANNEL CATFISH AND YELLOW CATFISH

Lake Whitney is a good channel cat lake and has produced many excellent catches of that species. The fish are usually very fat and show signs of rapid growth. There are a number of limestone bluffs containing many holes, and vast areas of thick brush and large boulders that offer ideal spawning facilities for catfish. Channel cat represented 5.72 percent of the total fish netted during the first survey and 3.49 and 4.31 percent of the fish collected during the other two surveys. The average weight per fish for each period of survey was 0.95, 1.39 and 0.89 of a pound respectively. The harvest of fish was 1.23, 0.64 and 0.95 of a fish per hundred feet of net, beginning with the first survey.

The yellow cat (flathead) population of Lake Whitney is good and offers fair catches to those who like to trotline for that species. Yellow cats were not caught very frequently in the gill nets, which was not surprising as most of the nets were floated in the upper eight feet of water.

COMPARISON OF THE GAME FISH AND ROUGH FISH POPULATION

The fish population of Lake Whitney is slowly progressing toward the rough fish species. Reference is given to Table 7 which records the changes in the composition of the fish population and shows the percentage of change from one period of inventory to another. It also shows the percentage change between the first and last periods of study. It will be noted that the game species dropped in percentage by number throughout the entire study but regained part of their percentage by weight during the last segment of the survey. The gain is reflected in the average weight per game fish which showed a continuous rise throughout the period of study. Most of the gain in the rough fish population resulted from an increase in the number of shad, which showed a yearly gain of approximately 50 percent over the previous period of study.

It is amazing that the rough fish population has not increased even more rapidly than it has due to the vast numbers of game fish that have been harvested in comparison to the small number of rough fish that have been taken from the lake.

RECOMMENDATIONS

It is recommended that the monthly netting of Lake Whitney be discontinued, but that some provision be provided for an occasional check on the lake to obtain current data regarding the fish population.

It is recommended that a study of the crappie be made to try to find reasons for the recent small harvest of that species from Lake Whitney.

It is further recommended that the large concentrations of carp that spawn in the flooded basins during lake rises be killed as it would involve only a minimum of chemicals and labor.

It is also suggested that test strips of wild buckwheat or similar vegetation be planted on the lowlands that are exposed during periods of water drawdown. This would concentrate the bass when the areas flood during rises with the possibility of greatly increasing the fishermen's harvest of bass.

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Table 1. Checklist of Fish Species From Lake Whitney, Texas, 1953-56.

Common Name	Scientific Name
Spotted gar	<u>Lepisosteus productus</u>
Longnose gar	<u>Lepisosteus osseus</u>
Gizzard shad	<u>Dorosoma cepedianum</u>
Mexican Jumper	<u>Astyanax fasciatus</u>
Smallmouth buffalo	<u>Ictiobus bubalus</u>
River carpsucker	<u>Carpionodes carpio</u>
Grey redhorse	<u>Moxostoma congestum</u>
Carp	<u>Cyprinus carpio</u>
Golden shiner	<u>Notemigonus crysoleucas</u>
Pugnose minnow	<u>Opsopoeodus emiliae</u>
Sharpnose shiner	<u>Notropis oxyrhynchus</u>
Brazos river shiner	<u>Notropis brazosensis</u>
Pallid shiner	<u>Notropis amnis</u>
Blacktail shiner (spottail)	<u>Notropis venustus</u>
Red shiner (redhorse)	<u>Notropis lutrensis</u>
Sandshiner	<u>Notropis deliciosus</u>
Plains minnow	<u>Hybognathus placita</u>
Parrot minnow	<u>Pimephales vigilax</u>
Fathead minnow	<u>Pimephales promelas</u>
Stoneroller	<u>Campostoma anomalum</u>
Southern channel catfish	<u>Ictalurus punctatus</u>
Black bullhead	<u>Ictalurus melas</u>
Yellow bullhead	<u>Ictalurus natalis</u>
Flathead catfish	<u>Pylodictus olivaris</u>
Blackstripe topminnow	<u>Fundulus notatus</u>
Gambusia	<u>Gambusia affinis</u>
White bass	<u>Roccus chrysops</u>
Kentucky spotted bass	<u>Micropterus punctulatus</u>
Largemouth black bass	<u>Micropterus salmoides</u>
Warmouth	<u>Chaenobryttus gulosus</u>
Green sunfish	<u>Lepomis cyanellus</u>
Redear sunfish	<u>Lepomis microlophus</u>
Bluegill sunfish	<u>Lepomis macrochirus</u>
Orangespotted sunfish	<u>Lepomis humilis</u>
Yellowbelly sunfish	<u>Lepomis auritus</u>
White crappie	<u>Pomoxis annularis</u>
Black crappie	<u>Pomoxis nigromaculatus</u>
Logperch	<u>Percina carprodes</u>
Freshwater drum	<u>Aplodinotus grunniens</u>

Table 2. Stocking of Fish in Lake Whitney, Texas by State Fish Hatcheries.

Species	1950	1951	Total
Largemouth black bass	50,000	120,000	170,000
Black crappie	110,000		110,000
Channel catfish	150,000		150,000
Bream (Bluegill and Redear)	40,000		40,000
Warmouth bass	45,000		45,000
Total	395,000	120,000	515,000

Table 3. Results of Seining Collections by Number of Each Species, Lake Whitney, Texas.

Species	Number Collected	Percent of Total
Gizzard shad	1,318	32.94
Carp	2	0.05
Sharpnose shiner	6	0.15
Blacktail shiner (Spottail)	14	0.35
Red shiner (Redhorse)	242	6.05
Sand shiner	1,792	44.79
Plains minnow	1	0.02
Parrot minnow	1	0.02
Blackstripe topminnow	345	8.62
Gambusia	1	0.02
White bass	185	4.62
Kentucky spotted bass	3	0.07
Largemouth black bass	1	0.02
Green sunfish	33	0.82
Redear sunfish	2	0.05
Bluegill sunfish	2	0.05
Orangespotted sunfish	51	1.27
Logperch	1	0.02
	1	0.02
Total	4,001	99.95

Table 4. Frequency of Occurrence of Food Items from Fish Collected by Gill Nets, Lake Whitney, Texas, November 1955 through October 1956.

Species	Shad	Undentifiable Fish Remains	Algae and Vegetation	Sunfish	Food Scrap or Stock Feed	Total No. of Fish Examined
Spotted gar	0	3	0	0	0	16
Longnose gar	2	3	0	0	0	47
Southern channel catfish	0	22	27	29	5	153
White bass	4	59	0	0	0	243
Largemouth black bass	0	15	0	0	0	79
Bluegill sunfish	0	2	4	18	0	112
White crappie	0	119	6	5	1	249
Black crappie	0	5	1	0	0	16
Freshwater drum	0	3	0	0	0	23

Table 5. Tabulation of Data from Gill Net Collections from Lake Whitney, November 1955 through October 1956.

Species	Number Caught	Percent of Total		Pounds Caught	Percent of Total Weight		Avg. Weight in Pounds	No. of Fish Per 100 Net	Pounds Fish Per 100 Net
		Number Caught	Total		Weight	Total			
Spotted gar	16	0.45	1.43	35.20	1.43	2.20	0.10	0.22	
Longnose gar	47	1.32	7.38	181.29	7.38	3.86	0.29	1.12	
Gizzard shad	2240	63.05	40.70	999.86	40.70	0.43	13.85	6.18	
Buffalo	130	3.66	14.11	346.59	14.11	2.67	0.80	2.14	
Carp sucker	162	4.56	10.99	269.92	10.99	1.67	1.00	1.67	
Gray redhorse	8	0.22	0.60	14.85	0.60	1.86	0.05	0.09	
Carp	67	1.88	4.39	107.82	4.39	1.61	0.41	0.67	
Golden shiner	1	0.03	0.01	0.17	0.01	0.17	0.01	Negligible	
Channel catfish	153	4.31	5.52	135.65	5.52	0.89	0.95	0.84	
Black bullhead	2	0.06	0.04	1.07	0.04	0.54	0.01	0.01	
Flathead catfish	2	0.06	0.22	5.43	0.22	2.72	0.01	0.03	
White bass	243	6.84	5.51	135.38	5.51	0.56	1.50	0.84	
Kentucky spotted bass	8	0.22	0.26	6.28	0.26	0.79	0.05	0.04	
Largemouth bass	71	2.00	3.66	89.84	3.66	1.27	0.44	0.56	
Warmouth	3	0.08	0.04	0.87	0.04	0.29	0.02	0.01	
Bluegill sunfish	112	3.15	0.57	14.02	0.57	0.13	0.69	0.09	
White crappie	249	7.01	3.70	90.86	3.70	0.36	1.54	0.56	
Black crappie	16	0.45	0.26	6.39	0.26	0.40	0.10	0.04	
Drum	23	0.65	0.61	14.94	0.61	0.65	0.14	0.09	
Total	3553	100.00	100.00	2456.43	100.00		21.96	15.20	

Table 6. A Comparison of Fish Caught Per 100 Feet of Net and their Average Weight and "K" Factor, Lake Whitney, Texas.

Species		No. of Fish Per 100' Net	Avg. Wt. (pounds)	Avg. "K" Factor
Largemouth bass	1954	0.80	0.86	2.24
	1955	0.45	1.01	2.80
	1956	0.44	1.27	2.38
Kentucky spotted bass	1954	0.82	0.69	2.38
	1955	0.10	0.89	2.40
	1956	0.05	0.79	2.25
White crappie	1954	1.55	0.33	2.21
	1955	1.80	0.33	2.70
	1956	1.54	0.36	2.71
Black crappie	1954	0.71	0.37	2.27
	1955	0.08	0.49	4.40
	1956	0.10	0.40	3.25
White bass	1954	0.13	0.77	2.76
	1955	0.66	0.59	2.72
	1956	1.50	0.56	2.60
Channel cat	1954	1.23	0.94	1.70
	1955	0.64	1.39	1.50
	1956	0.95	0.89	1.56

Table 7. A Comparison of the Changes in the Game Fish and Rough Fish Populations of Lake Whitney, Texas.

	June 1953 through May 1954	June 1954 through Oct. 1955	% change from previous segment	Nov. 1955 through Oct. 1956	% Change from previous segment	Percentage Change between first and last segment
Average weight per specimen for all fish netted	0.51	0.87	70.59	0.69	-20.69	35.29
Average weight per game fish	0.30	0.51	63.33	0.57	11.76	90.00
Average weight per rough fish	0.70	1.01	44.29	0.73	-27.72	4.28
Percent game fish by number	30.04	29.35	-2.30	24.80	-15.50	-17.44
Percent rough fish by number	69.96	70.65	0.99	75.20	6.44	7.49
Percent game fish by weight	26.78	17.37	-35.14	20.32	16.98	-24.12
Percent rough fish by weight	73.22	82.63	12.85	79.68	-3.57	8.82

Table 8. Water Depth Areas. (Pool Elevation 520)

Depth Range Feet	Area, Acres	Percent of Area (rounded)
0 - 5	2,700	17
5 - 10	2,290	15
10 - 20	3,170	20
20 - 45	5,010	32
45 - 70	2,040	12
70 - 95 (maximum depth)	590	4
Total	15,800	100

Table 9. High-Water Frequencies.

Pool Level	Frequency
520 (Power Pool Level)	Once every 0.6 years
525	Once every 1.3 years
530	Once every 2.2 years
535	Once every 3.2 years
540	Once every 4.5 years
545	Once every 6.5 years
550	Once every 9.8 years
555	Once every 16.0 years
560	Once every 29.4 years
565	Once every 50.0 years
