

WHITNEY LAKE

STATE Texas

PROJECT NO. F-4-R-2, Job B-1

PERIOD June 1, 1954 - Oct. 31, 1955

FILE

SEGMENT COMPLETION REPORT

by

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TITLE

Inventory of Species Present in Lake Whitney, Texas

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, Texas approximately 38 river miles upstream from Waco, Texas. The Whitney Dam and Reservoir was constructed by the Army Engineers for flood control and development of hydroelectric power and for recreational purposes. The gates of the dam were closed on December 10, 1951. The lake reached conservation pool level with a storage of 15,800 surface acres of water in April 1954.

COLLECTING METHODS

Gill nets were used to collect random samples of the fish population. The nets were 100 or 125 feet long, 8 feet deep and had meshes of 1 to 3 inches measured on the square. Data taken from the netted fish included their length, weight, sex, and degree of gonadal development. Scale samples were collected for future reference. 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. The seined specimens 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 this period of study.

RESULTS OF SEINING COLLECTIONS

Lake Whitney was sampled with various types of minnow seines during June and September of 1954 and from February through September of 1955. A total of 11,247 specimens was collected in 42 samples from 9 seine stations. Table 2 records the species collected and the percentage of the total catch that each represents. Gizzard shad accounted for 55.65 percent and the plains red shiner for 28 percent of the total fish caught. Small shad from 1 to 2½ inches long were found to be plentiful throughout the entire sampling period. The surface temperature of the shallow water at the seining sites varied from 54½ degrees F. in February to 92 degrees F. in August. Other records show that a wider range of temperature may be found in the lake at various times of the year. The plains red shiner (Notropis lutrensis) seemed to be the least affected by a temperature drop in the shallow water. Many small fish of this species have been found throughout the entire year, indicating spawning activities in the late summer and fall.

The spottail minnow (Notropis venustus) and Parrot minnow (Pimephales vigilax) were the only other species that accounted for more than one percent of the entire collection.

Largemouth bass from $1\frac{1}{2}$ to $2\frac{3}{4}$ inches long were found in May and June. Kentucky spotted bass of approximately the same size were also collected during those months. White bass $1\frac{1}{4}$ to 3 inches long were found in small numbers during May and June. A few smallmouth buffalo, ranging in size from $1\frac{1}{4}$ to $3\frac{1}{2}$ inches, were seined in July and August. These few specimens are the only evidence that has been found which indicate the possibility of a buffalo spawn in Lake Whitney. The lone Mexican jumper was taken May 23, and was probably released by bait fishermen. Internal examination revealed that it was a female with well developed ovaries. Other Mexican jumpers have been taken when seining for bait, sometimes as many as 20 or 30 at one time. Mexican jumpers have also been collected by hook and line while fishing for bait-size bream. There is no evidence to date that this species can survive the winter temperatures of the lake.

RESULTS OF NETTING COLLECTIONS

About 200 gill net sets were made at 15 stations. Table 3 is a tabulation of data from the gill net collections. The netting sites were so chosen as to be typical of various environmental conditions found in the lake. A yield of 3,636 fish representing 21 species was collected from the nets. Gizzard shad accounted for 40.70 percent of the total number caught. Smallmouth buffalo were next in abundance followed by carp, carpsucker, and white crappie. Table 4 shows pertinent information about each species of fish taken in the gillnets.

Table 5 shows the results of the current netting collection listing the percentage that each species represents as compared with the same information from last segment's report. Shad, white bass, and bluegills made the most noticeable increase, while carp, spotted bass, and black crappie showed the greatest decrease in percentage of the total number caught. Some interesting data may be obtained by making a comparison of both percentage by number and percentage by weight columns between the two periods of study. The buffalo which represented a little less than 11 percent by number in the present study was highest in pounds of fish netted. The buffalo have grown from 8 ounces in June 1953 to about 3 pounds in October 1955. The growth could be easily followed with only a few fish of odd sizes showing in the net catches. Ripe gonads were found only once or twice in the summer of 1955 and none were found preceding that period.

Carpsuckers just about held their own in numbers and pounds captured as shown by a comparison of the two periods of study. Carp dropped considerably in percentage by numbers but only slightly in percentage by weight. Some carp spawned after every rise of the lake level during the warmer months of the year. There are certain basins and lowlands that flood each time the lake rises 3 to 5 feet above the top of conservation pool level. When covered with planted grain or natural vegetation these places are frequented by spawning carp in large numbers. Such concentrations would afford an opportune time for rough fish control work on that species.

Shad have been mentioned as being abundant. Observation of young schooling shad plus small specimens collected with minnow seines indicate that the young are present in the lake throughout most of the year. But, it is believed that one of the most productive spawning periods comes in mid-April when the surface temperature of the water approaches 65 degrees. Concentrated runs of shad have been observed over the large areas of shallow water around Bear Creek at that time of the year. The control of shad in the Bear Creek area by the use of chemicals might be very effective about the middle of April each year.

White bass have become more abundant in the lake and composed 3.38 percent by number of all the fish netted as compared to 0.61 percent in the previous survey. Kentucky spotted bass have decreased from a former 3.80 percent to the present 0.52 percent. Black crappie have likewise become less abundant and accounted for only 0.41 percent of the total fish caught during this study as compared with 3.28 percent for the previous study.

A comparison of the game and rough fish population in Lake Whitney for both periods of study is given in Table 6. It may be of interest to note that the game and rough fish population as represented by numbers netted have remained almost stable. This seems encouraging when one considers that about 8 million more game fish than rough fish have been harvested from the lake. Game fish have increased from 0.30 pound to 0.51 pound for a 70 percent increase in the average weight per individual netted.

The results of the stomach analyses is given in Table 7. The stomach contents were studied without the aid of a microscope and it is possible that many of the items listed as unidentifiable fish remains were shad.

It is recommended that further study be made on Lake Whitney in order to closely follow the development of the fish population in that impoundment.

SUMMARY

1. Lake Whitney is a clear-water lake impounding 15,800 surface acres of water at the top of conservation pool level.
2. The lake was sampled with approximately 200 gill net sets and 42 seine collections from June 1, 1954 to October 31, 1955. Nearly 15,000 fish were collected and worked to obtain various data.
3. Gizzard shad accounted for 56 percent of the seined fish and 41 percent of the netted fish collected.
4. Smallmouth buffalo represented 24.92 percent by weight of all fish netted and exceeded any other one species in total pounds caught.
5. White bass, white crappie, and bluegills have made appreciable gains in numbers of fish in the lake, while shad were the only rough fish which showed any marked increase.
6. Kentucky spotted bass and black crappie have shown a sharp population decrease in Lake Whitney.
7. Carp have shown a population decrease, but it may not be a true representation due to the fact that this species does not frequently inhabit the shallow water or top layer of water during the colder months where most of the netting was done.
8. Game fish have increased in weight from 0.30 pounds to 0.51 pound for a 70 percent increase for the average individual netted.
9. Rough fish have increased from 0.70 pound to 1.01 pound for a 44.29 percent increase for the average fish netted.
10. The game fish and rough fish populations, as represented by percentage of total fish netted, have remained almost stable, although better than 8 million more game fish (about 570 per surface acre) than rough fish have been taken from the lake.

Table 1. Checklist of Fish Species From Lake Whitney, Texas, 1954 - 55.

Common Name	Scientific Name
1. Spotted Gar	<u>Lepisosteus productus</u>
2. Longnose Gar	<u>Lepisosteus osseus</u>
3. Gizzard Shad	<u>Dorosoma cepedianum</u>
4. Mexican Jumper	<u>Astyanax fasciatus</u>
5. Smallmouth Buffalo	<u>Ictiobus bubalus</u>
6. River Carpsucker	<u>Carpionodes carpio</u>
7. Grey Redhorse	<u>Moxostoma congestum</u>
8. Carp	<u>Cyprinus carpio</u>
9. Golden Shiner	<u>Notemigonus crysoleucas</u>
10. Pugnose Minnow	<u>Opsopoeodus emiliae</u>
11. Sharpnose Shiner	<u>Notropis oxyrhynchus</u>
12. Brazos River Shiner	<u>Notropis brazosensis</u>
13. Pallid Shiner	<u>Notropis amnis</u>
14. Blacktail Shiner (Spottail)	<u>Notropis venustus</u>
15. Red Shiner (Redhorse)	<u>Notropis lutrensis</u>
16. Parrot Minnow	<u>Pimephales vigilax</u>
17. Fathead Minnow	<u>Pimephales promelas</u>
18. Stoneroller	<u>Campostoma anomalum</u>
19. Southern Channel Catfish	<u>Ictalurus punctatus</u>
20. Black Bullhead	<u>Ameiurus melas</u>
21. Yellow Bullhead	<u>Ameiurus natalis</u>
22. Flathead Catfish	<u>Pilodictus olivaris</u>
23. Blackstripe Topminnow	<u>Fundulus notatus</u>
24. Gambusia	<u>Gambusia affinis</u>
25. White Bass	<u>Morone chrysops</u>
26. Kentucky Spotted Bass	<u>Micropterus punctulatus</u>
27. Largemouth Black Bass	<u>Micropterus salmoides</u>
28. Warmouth	<u>Chaenobryttus coronarius</u>
29. Green Sunfish	<u>Lepomis cyanellus</u>
30. Redear Sunfish	<u>Lepomis microlophus</u>
31. Bluegill Sunfish	<u>Lepomis macrochirus</u>
32. Orangespotted Sunfish	<u>Lepomis humilis</u>
33. Yellowbelly Sunfish	<u>Lepomis auritus</u>
34. White Crappie	<u>Pomoxis annularis</u>
35. Black Crappie	<u>Pomoxis nigromaculatus</u>
36. Logperch	<u>Percina caprodes</u>
37. Freshwater Drum	<u>Aplodinotus grunniens</u>

Table 2. Results of Seining Collections by Number of Each Species, Lake Whitney, Texas, 1954 - 55.

Species	Number Collected	Percent of Total
Gizzard Shad	6,259	55.65
Mexican Jumper	1	0.01
Smallmouth Buffalo	8	0.07
Carp	5	0.04
Pugnose Minnow	3	0.03
Sharpnose Shiner	78	0.69
Brazos River Shiner	44	0.39
Pallid Shiner	7	0.06
Blacktail Shiner (Spottail)	764	6.79
Red Shiner (Redhorse)	3,152	28.03
Parrot Minnow	579	5.15
Fathead Minnow	1	0.01
Stoneroller	1	0.01
Blackstripe Topminnow	2	0.02
Gambusia	25	0.22
White Bass	15	0.13
Tennessee Spotted Bass	14	0.12
Largemouth Black Bass	58	0.52
Warmouth	4	0.04
Green Sunfish	3	0.03
Redear Sunfish	3	0.03
Bluegill	59	0.52
Orangespotted	2	0.02
Yellowbelly Sunfish	92	0.82
Logperch	68	0.60
Total	11,247	100.00

Table 3. Tabulation of Data from Gill Net Collections, Lake Whitney, June 1954 Through October 1955.

Species	Number Caught	Percentage of Total Number	Pounds Caught	Percentage of Total Weight	Average Weight in Pounds	No. of Fish Per 100' Net
Longnose Gar	42	1.16	91.72	2.91	2.18	.21
Spotted Gar	20	.55	34.95	1.11	1.74	.10
Gizzard Shad	1,480	40.70	708.08	22.47	.47	7.41
Smallmouth Buffalo	396	10.89	785.18	24.92	1.98	1.98
Gray Redhorse	7	.19	14.33	.45	2.04	.04
River Carpsucker	310	8.53	447.92	14.22	1.44	1.55
Carp	311	8.55	520.22	16.51	1.67	1.56
Southern Channel Catfish	127	3.49	176.75	5.61	1.39	.64
Yellow Catfish	1	.03	3.19	.10	3.19	.02
Black Bullhead	3	.08	1.07	.03	.35	.02
White Bass	123	3.38	68.31	2.17	.55	.66
Largemouth Black Bass	90	2.48	91.11	2.89	1.01	.45
Kentucky Spotted Bass	19	.52	15.95	.51	.89	.10
Warmouth	5	.14	1.67	.05	.33	.03
Green Sunfish	2	.06	.47	.02	.24	.01
Yellowbelly Sunfish	8	.22	1.73	.05	.21	.04
Redear Sunfish	5	.14	.47	.02	.09	.03
Bluegill Sunfish	276	7.59	42.97	1.36	.15	1.38
White Crappie	360	9.90	119.26	3.79	.33	1.80
Black Crappie	15	.41	7.44	.24	.49	.08
Fresh Water Drum	36	.99	17.95	.57	.49	.18
Total	3,636	100.00	3,150.74	100.00		18.27

Table 4. Length, Weight, and Coefficient of Condition of Fish Collected by Gill Nets From Lake Whitney, June 1, 1954 Through October 31, 1955 *

Species	No. Specimens	Std. Length		Std. Length		Weight		Weight		"K" Average
		Range	Average	Range	Average	Range	Average	Range	Average	
Spotted Gar	20	385-750	506	277-1388	792	0.6				
Longnose Gar	42	460-900	636	539-2892	990					
Gizzard Shad	1,480	105-337	221	44-519	217	2.0				
Smallmouth Buffalo	396	240-385	290	285-1701	899	3.7				
River Carpsucker	310	195-352	286	315-1474	655	2.8				
Grey Redhorse	7	225-355	297	327-1219	928	3.5				
Carp	311	190-395	288	170-1474	758	3.1				
Southern Channel Catfish	127	175-470	345	85-2381	631	1.5				
Black Bullhead	3	180-195	185	137-210	161	2.5				
Flathead Catfish	1		430		1,446	1.8				
White Bass	123	140-350	252	80-737	252	1.6				
Kentucky Spotted Bass	19	173-320	255	120-737	405	2.4				
Largemouth Black Bass	90	102-430	254	39-2523	459	2.8				
Warmouth	5	122-165	152	71-208	151	4.4				
Green Sunfish	2	125-160	143	77-140	109	3.8				
Redear Sunfish	5	100-100	100	40-40	43	4.1				
Bluegill Sunfish	276	85-155	119	30-140	71	4.1				
Yellowbelly Sunfish	8	119-130	126	92-114	98	4.9				
White Crappie	360	124-303	178	46-907	150	2.7				
Black Crappie	15	130-217	180	110-392	225	4.4				
Freshwater Drum	36	147-345	215	75-539	226	2.3				

* Length in Millimeters and Weight in Grams.

Table 5. Results of the Current Netting Collections from Lake Whitney as Compared with Collections of the Preceding Study.

Species	June 1953 - May 1954				June 1954 - October 1955			
	Percentage of Total Catch		Avg. "K" Factor	Percentage of Total Catch		Avg. "K" Factor		
	By Number	By Weight		By Number	By Weight			
Spotted Gar	0.51	2.40	0.73	0.55	1.11	0.60		
Longnose Gar	2.08	6.93	?	1.16	2.91	?		
Shad	27.60	13.97	2.06	40.70	22.47	2.00		
Smallmouth Buffalo	14.73	16.84	3.26	10.89	24.92	3.70		
River Carpsucker	7.89	12.07	2.69	8.53	14.22	2.80		
Carp	15.86	18.33	2.73	8.55	16.51	3.10		
Gray Redhorse Sucker	0.99	2.33	2.44	0.19	0.45	3.50		
Southern Channel Catfish	5.72	8.23	1.70	3.49	5.61	1.50		
Flathead Catfish	0.17	0.38	1.45	0.03	0.10	1.80		
Yellow Bullhead	0.06	0.23	2.49	0.00	0.00	0.00		
Black Bullhead	0.24	0.22	2.55	0.08	0.03	2.50		
White Bass	0.61	0.77	2.76	3.38	2.17	1.60		
Largemouth Black Bass	3.69	5.24	2.24	2.48	2.89	2.80		
Kentucky Spotted Bass	3.80	4.42	2.38	0.52	0.51	2.40		
Bluegill Sunfish	3.15	0.44	3.98	7.59	1.36	4.10		
Yellowbelly Sunfish	1.06	0.17	4.00	0.22	0.05	4.90		
Redear Sunfish	0.00	0.00	0.00	0.14	0.02	4.10		
Warmouth	0.10	0.02	3.61	0.14	0.05	4.40		
Green Sunfish	0.03	0.03	?	0.06	0.02	3.80		
White Crappie	7.14	4.40	2.21	9.90	3.79	2.70		
Black Crappie	3.28	2.00	2.27	0.41	0.24	4.40		
Freshwater Drum	1.29	0.65	2.15	0.99	0.57	2.30		

Table 6. A Comparison of the Game and Rough Fish Caught by Gill Nets in Lake Whitney.

Netting Collections	June 1953	June 1954	Percentage Change	
	through May 1954	through October 1955	Increase	Decrease
Total No. of Specimens Caught	2,927	3,636	24.22	
*Total Wt. of Specimens Caught	1,513	3,151	108.26	
Average Wt. Per Specimen	0.51	0.87	70.59	
** Total Wt. of Game Fish	305	547	79.34	
Total Wt. of Rough Fish	1,108	2,603	134.93	
Total No. of Game Fish	879	1,067	21.39	
Total No. of Rough Fish	2,048	2,569	25.44	
Avg. Wt. Per Game Fish	0.30	0.51	70.00	
Avg. Wt. Per Rough Fish	0.70	1.01	44.29	
Percent Game Fish By Number	30.04	29.35		2.30
Percent Rough Fish By Number	69.96	70.65		0.99
Percent Game Fish By Weight	26.78	17.37		35.14
Percent Rough Fish By Weight	73.22	82.63		12.85

* Weight in pounds

** Catfishes, drum and white bass included in game fish

Table 7. Frequency of Occurrence of Food Items from Fish Collected by Gill Nets, Lake Whitney, June 1954
Through October 1955.

Species	Shad	Unidentifiable Fish Remains	Insects	Algae and Vegetation	Bream	Food Scraps or Stock Feed	Total No. of Fish Examined
Largemouth Black Bass	2	22	1	2			73
White Crappie	9	148	5	6			318
Southern Channel Catfish		16	18	20	5	11	120
White Bass		29					95
Bluegill Sunfish		8	26	49			135
Longnose Gar	1	9		1	1		26