FILE

Report of Fisheries Investigations

Check on Commercial Catch of Rough Fish from Lake Whitney.

by

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Dingell-Johnson Project F-4-R-4, Job B-12

November 1, 1956 to October 31, 1957

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SEGMENT COMPLETION REPORT

State of TEXAS

Project No. F4R4 Name: Fisheries Investigations and Surveys of the Waters of Region 4-B.

Job No. B-12 Title: Check on Commercial Catch of Rough Fish from Lake Whitney.

Period Covered: November 1, 1956 to October 31, 1957

ABSTRACT:

A study was made of the effectiveness of hoop nets versus gill nets in the capture of rough fish on Lake Whitney. Hoop nets were found to be selective for carp and gill nets were selective for buffalo.

About 94,900 pounds of fish were removed from the lake. Buffalo accounted for 70 percent by number and 78 percent by weight of all fish caught. Carp amounted to 28 percent by number and nearly 22 percent by weight of the total fish captured. An average of six pounds of rough fish per surface acre were removed from the lake, which is an insufficient quantity for adequate control of the undesirable species of that impoundment.

Recommendations were made for study of the type of gear and techniques used by the commercial fishermen. It was also suggested that technical help and biological data be offered the netter where such information would increase the harvest of rough fish.

OBJECTIVES:

To determine the effectiveness of commercial fishing on the control of rough fish and predatory species and the value of the local fishery as well as the relative abundance and seasonal variation by species in the commercial catch.

TECHNIQUES USED:

The commercial fishermen were supplied forms to be filled out on which they recorded the amount and weight of each species that was netted. The forms were collected each month by mail or by personal contact with the fishermen.

DISCUSSION:

The only type of commercial fishing allowed on Lake Whitney is by state contract. The operator is bonded and compelled to submit a monthly report of his catch. He is limited to specific devices which may be used and the contract states which species of fish that may be taken from the lake. The responsibility of the operation of the netters is under jurisdiction of the local game warden.

There have been only two commercial fishermen on Lake Whitney during the past year and neither have operated continuously for the entire 12-month period. One fishermen used hoop nets and netted from November 1956 through April 1957. The other fishermen used large-mesh gill nets and operated from August 18 through October of 1957. Both fishermen netted the middle third of the lake. Although the length of the netting period and the season of operation are hardly comparable for the two fishermen, a comparison of their catches is interesting. Table 1 is a comparison of the effectiveness of capture by hoop nets and gill nets on four species of fish. It is obvious that hoop nets are selective for carp and large-mesh gill nets are selective for buffalo, with consideration allowed for the techniques used by each fishermen. Carp, buffalo, carpsucker, shad and gar are the only fish which can be retained by the commercial fishermen. Carp and buffalo composed the bulk of the catch with both types of gear used. Shad and gar were seldom captured in the hoop nets and only a relatively small mumber of gar and practically no shad were caught in the large-mesh gill nets. Catfish will invade a hoop net set after a period of continuous baiting and sometimes forces the fishermen to move his nets. Sunfish are notorous robbers of hoop nets when they are baited with cottonseed cake and sometimes eat a large percentage of the netters bait. Large bass occasionally enter the hoop nets and catfish, bass, white bass and large crappie at times become entangled in the large-mesh gill nets.

The combined catch of both fishermen was 27,188 fish weighing 94,932 pounds. Table 2 shows the number of each species netted and the percent by number and percent by weight that each represents. Table 3 lists the pounds of each species caught and the market value of the fish. The market value of $18,317.14 represents the total value of the fish if all were sold and none lost by spoilage. The fisherman using gill nets was the only one operating on the lake during the latter half of the study. He was very successful and harvested a large number of fish during the short time that he nett . Good cooperation was obtained while working with this fisherman. The effectiveness of various types of nets and techniques were discussed and the netter was encouraged in the use of experimental gear that he was working on. Aerial photographs of the lake basin taken before it was flooded were used to study the bottom at various net sites. The writer is grateful to the U. S. Corps of Engineers for furnishing these excellent and very helpful photographs. Of specieal interest was the consistency of the catch at some of the stations. Repeated netting at these sites produced about the same number of fish night after night. Other stations netted by the commercial fishermen was found to be productive only in certain spots. It is believed that additional work with the netter will produce data that will be usable in the ecological study of several species of fish.

Figure 1 shows the pounds of fish harvested per surface acre of the four species of fish netted. The total harvest for all species of fish was only six pounds per surface acre for the entire lake. The mean of 15,800 surface acres used here is based on the yearly average lake level excluding the abnormal floods that occurred during the spring months. Although nearly three times as many fish were taken this year as were netted last year, six pounds per acre harvest of fish is negligible for rough fish control work and it is hoped that a larger catch can be made during the next period of study.

RECOMMENDATIONS:

It is recommended that the investigation of the commercial catch of rough fish on Lake Whitney be continued, and that close study is given to the gear and techniques used as well as the ecological habitats that yield the most consistent catches of fish.

Table 2 is a comparison of the rough fish and game fish population of Lake Waco as represented by data obtained from the gill net collections. Actually the game fish population is only fair and would not be as good as shown in the table if drum were considered as rough fish instead of game fish. The population of game fish would then represent about 24 percent of the entire fish population, exclusive of seine sampling data.

Table 3 shows the seasonal variation of capture of different species when identical gear was used over the same type of ecological habitat. The reader is especially referred to the gar, crappie, channel catfish and drum group. It is evident that an insufficient number of samples of the above named species could have produced entirely different data regarding the standing population of these fish. Table 4 records the frequency of occurrence of food items from fish collected by gill nets.

RESULTS OF THE MINNOW SEINE COLLECTIONS:

Nine stations were seined to collect 906 fish representing 11 species. The red shiner, Notropis lutrensis, was the most abundant species collected and accounted for about 83 percent of the fish captured. No doubt a better seine check of the lake could have been made if the physical features of the impoundment had allowed a greater number of samples to be taken. Table 5 is the results of seine work on Lake Waco. Table 6 is a checklist of the species collected in the fisheries survey on that lake. Table 7 is an analysis of the Waco City Water as furnished by the Waco City Water Works. It is the only chemical analysis available for the lake and may differ slightly from seasonal analysis that could be made on the lake proper.

RECOMMENDATIONS:

It is recommended that the basic survey on Lake Waco be terminated but periodic checks should be made on the impoundment to obtain current data regarding the fish population.

It is recommended that consideration be given to making a selective kill by chemicals but that such activity be preceded by well directed publicity explaining the aims of the program.

It is also suggested that a controllable type of aquatic vegetation be planted on the lowlands that are exposed during the periods of water draw down. This should improve both the production and the harvest of black bass as well as other species.

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Table 1. Tabulation of Data from Gill Net Collection from Lake Waco, Texas - November 1956 - October 1957.

Species	Number Caught	Percent of Total No.	Pounds Caught	Percent of Total Wt.	Avg. Wt. in Lbs.	No. of Fish per 100' Net	Lbs. of Fish per 100' Net
Spotted gar	55	2.66	103.86	8.53	1.89	1.49	2.81
Longnose gar	7	0.34	30.61	2.51	4.37	0.19	0.83
Gizzard shad	1107	53.63	502.38	41.24	0.45	29.92	13.58
Buffalo	46	2.23	63.15	5.18	1.37	1.24	1.71
Carpsucker	21	1.01	15.46	1.27	0.74	0.57	0.42
Carp	1	0.05	0.37	0.03	0.37	0.37	0.01
Channel catfish	138	6.69	134.09	11.01	0.97	3.73	3.62
Flathead catfish	3	0.15	4.26	0.35	1.42	0.08	0.12
Largemouth bass	39	1.89	27.24	2.24	0.70	1.05	0.74
Redear sunfish	2	0.10	0.59	0.05	0.30	0.05	0.02
Bluegill sunfish	3	0.15	0.67	0.05	0.22	0.08	0.02
White crappie	303	14.68	131.86	10.82	0.44	8.19	3.56
Drum	339	16.42	203.67	16.72	0.60	9.16	5.50
Total	2064	100.00	1218.21	100.00		56.12	32.94

Table 2. A Comparison of the Rough and Game Fish Caught by Gill Nets in Lake Waco, Texas, 1956 - 1957.

Total Number of Specimens Caught	2,064
* Total Weight of Specimens Caught	1,218
Average Weight per Specimen	0.59
Total Weight of Rough Fish	715
Total Number of Rough Fish	1,237
** Total Weight of Game Fish	503
Total Number of Game Fish	827
Average Weight per Rough Fish	0.57
Average Weight per Game Fish	0.61
Percent Rough Fish (by weight)	58.70
Percent Game Fish (by weight)	41.30
Percent Rough Fish (by number)	59.93
Percent Game Fish (by number)	40.07

* - Weight in Pounds
** - Catfishes and Drum included in Game Fish

Table 3. * Seasonal Variation of Capture of Different Species by Gill Nets, Lake Waco, Texas - 1956 - 1957.

Species	November 1956	January 1957	March 1957	May 1957	June 1957	July 1957	August 1957	September 1957	October 1957
Spotted gar				6.38	5.23	15.15	0.79	1.95	
Longnose gar	0.28		9.30		0.20			0.49	
Gizzard shad	41.88	85.35	34.88	70.74	74.45	37.88	17.63	47.80	31.15
Buffalo	1.14		2.33	2.66	2.41	10.61	0.79	1.46	18.03
Carpsucker		1.10	4.65	0.53	1.21	6.06	0.26	0.49	4.92
Carp							0.26		
Channel catfish	2.28	0.37	23.26	6.38	6.04	4.55	8.68	14.63	18.03
Flathead catfish	0.57				0.20				
Largemouth bass	7.12	1.10	2.33	0.53	0.21	3.03		0.49	8.20
Redear sunfish	0.28	0.37							
Bluegill sunfish	0.57							0.49	
White crappie	39.03	7.69	18.60	5.85	3.22	16.67	10.26	24.88	14.75
Drum	6.84	4.03	4.65	6.91	6.04	6.06	61.32	7.32	4.92

* - Figures represent percentage of total catch.

Table 4. Frequency of Occurrence of Food Items from Fish Collected by Gill Nets, Lake Waco, Texas. November 1956 - October 1957.

Species	Shad	Fish Remains	Algae and Vegetation	Food Scrap or Stock Feed	Detritus and Insects	Total No. Fish Exam.
Spotted gar	1	1	0	0	0	27
Longnose gar	0	0	0	0	0	1
Channel catfish	1	9	19	15	8	97
Flathead catfish	0	0	0	0	0	3
Largemouth bass	0	1	0	0	0	27
Redear sunfish	0	0	0	0	0	1
Bluegill sunfish	0	0	0	0	0	1
White crappie	6	79	2	1	0	208
Freshwater drum	0	2	0	0	0	35

Table 5. Results of Seining Collections by Number of Each Species - Lake Waco, Texas.

Species	Number Collected	Percent of Total
Gizzard shad	27	2.98
River shiner	2	0.22
Red shiner (redhorse)	751	82.89
Parrot minnow	21	2.32
Blackstripe topminnow	64	7.06
Gambusia	6	0.66
Largemouth black bass	3	0.33
Redear sunfish	4	0.44
Bluegill sunfish	23	2.54
Yellowbelly sunfish	4	0.44
White crappie	1	0.11
Total	906	99.99

Table 6. Checklist of Fish Species from Lake Waco, Texas - 1956 - 1957.

Common Name	Scientific Name
Spotted gar	Lepisosteus productus
Longnose gar	Lepisosteus osseus
Gizzard shad	Dorosoma cepedianum
Smallmouth buffalo	Ictiobus bubalus
River carpsucker	Carpiodes carpio
Carp	Cyprinus carpio
River shiner	Notropis blennius
Red shiner (redhorse)	Notropis lutrensis
Parrot minnow	Pimephales vigilax
Southern channel catfish	Ictalurus punctatus
Flathead catfish	Pylodictus olivaris
Blackstripe topminnow	Fundulus notatus
Gambusia	Gambusia affinis
Largemouth black bass	Micropterus salmoides
Redear sunfish	Lepomis microlophus
Bluegill sunfish	Lepomis macrochirus
Yellowbelly sunfish	Lepomis auritus
White crappie	Pomoxis annularis
Freshwater drum	Aplodinotus grunniens

Table 7. An Analysis of the Waco City Water as Furnished by the Waco City Water Works.

Total Solids	Parts Per Million		
	Average	Max.	Min.
Total Solids	246	333	194
Total Alkalinity	133	145	125
Total Hardness	151	170	142
pH Value	7.6	8.1	7.3
Silica	6.6	11.1	4.7
Iron and Aluminum Oxides	3.3	6.2	0.5
Calcium Bicarbonate	215	235	201
Calcium Sulfate	12.2	18.4	0
Magnesium Sulfate	29.1	34.7	25.2
Sodium Sulfate	16.6	41.2	0.8
Sodium Chloride	36.9	72.3	19.8
Fluoride	0.25	0.30	0.20