

Report of Fisheries Investigations
Basic Survey and Inventory of Fish Species in Murvaul Bayou Reservoir

by

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December 1, 1959 - November 30, 1960

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A B S T R A C T

This report covers the third and final year of a basic survey and inventory of fish species conducted on Lake Murvaul. During the third year it was found that several species of fish have become well established in the lake while other species were not suited for the habitat and are minor in numbers or nonexistent. The condition of fish in the lake is good though there is a large population of black and white crappie which are very small but are sexually mature and reproducing. The water quality is good for fish life. During the third year many areas of the lake became infested with submerged vegetation which has become a serious problem. Recommendations are made to continue heavy fishing pressure and to treat large areas of vegetation along the shoreline.

Job Completion Report

Investigations Project

State of TEXAS

Project No. F-3-R-8

Name: Fisheries Investigations and Surveys
of the Waters of Region 5-B.

Job. No. B-13

Title: Basic Survey and Inventory of Fish
Species in Murvaul Bayou Reservoir.

Period Covered:

December 1, 1959 - November 30, 1960

OBJECTIVES

To continue and to conclude the gathering of information regarding the fish populations in Lake Murvaul concerning relative numbers and conditions of fish during the lake's third year of impoundment.

HISTORY

Lake Murvaul is a project of the Panola County Freshwater District No. 1. The lake was impounded in the fall of 1957, at which time this work was first initiated. Impounded by an earth fill dam, the lake covers some 4,000 acres and contains 47,000 acre-feet of water. It is located near Gary, in Panola County, Texas, and its water is for municipal and industrial use. Prior to impoundment in September, 1957, a 12-mile section of Murvaul Bayou above the dam was treated with Pro-Noxfish and powdered rotenone to eliminate as much of the existing fish population as possible. The lake was closed to fishing through two normal spawning seasons until May 30, 1959.

PROCEDURE

Data were collected quarterly, generally on the 20th of each month, during the third year. Limnological data recorded were turbidity (Secchi disk), water color, sky conditions, wind, time, and air and surface water temperatures.

Netting

Eight experimental type gill nets (1,000 feet) were set at six random locations each collection month. The dimensions of the nets were 125-feet long by 8-feet deep, with mesh sizes of 1-, 1½-, 2-, 2½- and 3-inches in 25-foot sections. The nets were set late in the afternoon and picked up the following morning. A total of 24 sets, made up of 32 nets, were made.

All fish caught in nets were saved. These fish were then separated according to species, counted, and their total weight taken. The rough fish were then destroyed and returned to the lake. The game fish were individually weighed and measured for both standard and total lengths. Spot checks were made on stomach contents and sexual

developments. Coefficients of condition ("K" factors) were determined in the laboratory. The average lengths, weights, and condition factors were calculated for each species.

Seining

Seining collections were made with a 26- by 6-foot bag seine, with a $\frac{1}{4}$ -inch mesh. Four collections, consisting of 34 hauls, were made. All specimens were preserved in 10 percent formalin solution and brought back to the laboratory for identification.

FINDINGS

During the third year netting and seining collections yielded a total of twenty-six species of fish representing nine families. There was a total of 33 species representing nine families collected the second year and a total of 42 species and twelve families collected the first year. Table 1 lists the species phylogenetically, including species of all years. The names are those used by Hubbs in his "A Checklist of Texas Freshwater Fishes", dated December, 1958.

Netting Results

Table 2 gives a tabulation of quarterly results of netting. There were 19 species collected in this manner. As can be seen from this table seven of the species were collected each and every time. This table also gives the totals of game fish and rough fish collected and percentages of each. Of the 19 species collected by gill nets, there were nine rough fish species and 10 game fish species. As a matter of definition, rough fish are those considered undesirable or those not normally sought by sports fishermen. The rough fish predominated in the catch every month. The average percentages of rough fish and game fish were 68 percent and 32 percent respectively, compared to 70 percent and 30 percent respectively the second year and 65 percent and 35 percent for the first year.

A total of 1,047 fish were caught in four gill net collections in this study period, which is only slightly less than the 1,083 fish caught in six gill net collections made the second year. There were 1,325 fish caught in twelve gill net collections during the first year. These data tend to indicate that as a lake's fish population develops, the numbers of individual fish species increase, while the total number of fish species decreases. This results in several dominant (major) species making up the bulk of the population while the remaining species make up only a minor portion of the total population.

The total of 1,047 fish collected by gill nets during the third year includes 712 rough fish and 335 game fish. Gizzard shad (Dorosoma cepedianum) were again the most abundant species with 332, or 31.71 percent, of the total numbers caught. The black bullhead (Ictalurus melas) was again next with 170, or 16.24 percent, followed by white crappie (Pomoxis annularis) with 142, or 13.56 percent, chub sucker (Erimyzon sucetta) with 71, or 6.78 percent, bluegill (Lepomis macrochirus) with 70, or 6.69 percent, black crappie (P. nigromaculatus) with 68, or 6.49 percent, and yellow bullhead (I. natalis) with 67, or 6.40 percent.

Table 3 gives a comparison of percentages of numbers of all netted fish for the

three-year period. Also, if a definite trend is indicated or obvious, an overall change is shown.

A total of 545.02 pounds of fish were taken by netting over the year. Table 4 gives the total weights of each species for each month as well as the total, percentage, and average weights for the year. The percentages of rough and game fish for each month are also given.

Over the year rough fish made up approximately 76 percent of the total weight of fish collected by nets. This compares to 67 percent the second year. Like the second year, the total weight of all bowfin (Amia calva) caught was greater than all the game fish combined. The bowfin also had the highest average weight, while the spotted sunfish (L. punctatus) had the least followed by white crappie. Blue catfish (I. furcatus) had the highest average weight of the game fish. This, however, was based on only two fish, so largemouth bass (Micropterus salmoides) could be considered the heaviest of the game fish.

The percentages of weights of netted fish from the second and third years are given in Table 5. No weights were taken the first year. The percentage of weight of rough fish captured increased some eight percent over last year. There was a big decrease in both numbers and total weight of largemouth bass taken.

Through the use of percentages and of total weights and numbers, a rough comparison can be made of the relative abundance of the fish in the lake. Of the rough fish, the gizzard shad, chub suckers, and bullhead catfish present the greatest problem with their large numbers. As for the high weights of the bowfin it is possible that they may be an asset to the lake as a predator to help contain other noxious species. The following species could be considered as the major species in the lake or the most abundant as determined by numbers or weight.

Common name	Scientific name
Bowfin	<u>Amia calva</u>
Gizzard shad	<u>Dorosoma cepedianum</u>
Spotted sucker	<u>Minytrema melanops</u>
Chub sucker	<u>Erimyzon sucetta</u>
Channel catfish	<u>Ictalurus punctatus</u>
Black bullhead	<u>I. melas</u>
Yellow bullhead	<u>I. natalis</u>
Largemouth bass	<u>Micropterus salmoides</u>
Bluegill sunfish	<u>Lepomis macrochirus</u>
White crappie	<u>Pomoxis annularis</u>
Black crappie	<u>P. nigromaculatus</u>

Seining Results

Table 6 gives the numbers of fish collected by seining each quarter. Seining yielded seventeen species and 612 specimens. This is an improvement over the second year when only fifteen species and 577 specimens were taken. The greatest numbers of fish collected were in July and October. It is encouraging to note that some of the notropid species appeared in greater numbers than the second year. The most

abundant species collected by seining was again the bluegill sunfish.

While the "moss" infested shoreline yielded the greatest numbers of sunfish, it was found that concrete boat launching ramps were the best places to collect other species such as the notropids.

Growth of Fish

Standard length records were kept on eight game fish species in order to determine their growth as near as possible. The average standard lengths for all of these fish collected during the year are given in Table 7, as well as the averages for the previous two years. A definite increase in size can be seen for largemouth bass, redear sunfish (L. microlophus), channel catfish, and blue catfish. White crappie decreased each year and the other species showed no definite trend due to different age groups involved. Table 8 gives the average weights in grams which show the same patterns as the lengths.

Condition of Fish

There was no great change in the condition of game fish in Lake Murvaul. The bass, bluegill, and crappie were down somewhat, while redear and blue catfish increased a good bit in condition. Table 9 shows the averages over the three-year period. Generally speaking all game fish are in good physical condition. Table 10 gives data on condition of eight game fish species with the ranges of standard length, weight and "K" factors given.

Food Habits

Very few of the game fish checked had any food items in their stomachs. There were two instances where channel catfish had been feeding on yellow corn, presumably from a "baited hole". The principal items in the diets of most predator fish were shad and bluegills. In addition, there was much vegetation found in stomachs of all fish containing food items examined.

Sexual Development and Spawning Activity

Spot checks were made of some game fish for sexual development. Of great significance is the fact that both species of crappie were approaching ripeness in January and by April were gravid and flowing. Even fish as small as four inches in length were sexually mature. Channel catfish checked in July and October were immature. However, the District Engineer has reported seeing fingerling channel catfish in the lake which indicates a successful spawn. Young-of-the-year bass were collected by seining.

Annotated Checklist of Fish Species

This list includes all species collected in Lake Murvaul since this study began.

1. Lepisosteus productus (spotted gar) - Only one has been collected during the three-year period.
2. Amia calva (bowfin) - Though not as abundant as before this is the heaviest fish in the lake with an average weight, based on those collected, of 4.42 pounds.

3. Dorosoma cepedianum (gizzard shad) - This is by far the most commonly collected fish in the lake making up 31.71 percent of the total. They are of a small size with an average weight of only 0.15 pounds.
4. Esox americanus (grass pickerel) - Only three were collected during the third year. They are most active during the winter months.
5. Ictiobus bubalus (smallmouth buffalo) - Only one was collected. It weighed 7.50 pounds. If at all, they apparently are not reproducing in any large numbers.
6. Carpoides carpio (river carpsucker) - None were collected during the second or third years.
7. Moxostoma poecilurum (blacktail redhorse) - None were collected the third year and only one was collected the second year.
8. Minytrema melanops (spotted sucker) - Based on collections, the population of this fish has apparently decreased somewhat.
9. Erimyzon sucetta (chub sucker) - This is one of the major species in the lake.
10. Notemigonus crysoleucas (golden shiner) - Only a moderate number of this fish is present. They were collected by both seining and netting.
11. Opsopoeodus emiliae (pugnose minnow) - It was collected only once during the second year.
12. Notropis fumeus (ribbon shiner) - None were collected the third year and only two were collected the second year.
13. N. venustus (spottail shiner) - Though not in large numbers, this is a fairly common shiner in the lake.
14. N. lutrensis (redhorse shiner) - Though not present in large numbers, this is one of the most common of the shiners in the lake.
15. N. stramineus (sand shiner) - Only ten specimens were collected during the third year.
16. N. atrocaudalis (blackspot shiner) - None were collected during the second or third years.
17. N. volucellus (mimic shiner) - Though none were collected the second year, it was the most commonly collected shiner during the third year.
18. N. maculatus (taillight shiner) - None were collected during the second or third years.
19. Hybognathus nuchalis (silvery minnow) - None were collected during the second or third years.
20. Pimephales vigilax (parrot minnow) - This species is rare in the lake.
21. Ictalurus punctatus (channel catfish) - This fine sport fish is gradually increasing in numbers.
22. I. furcatus (blue catfish) - Though there is no evidence of reproduction, the blue catfish which are caught average about five pounds in weight.
23. I. melas (black bullhead) - This species is still very abundant and, based on collection data, the population has apparently leveled off.
24. I. natalis (yellow bullhead) - The numbers of this species are lower than they were last year but their weight has increased.
25. Pylodictus olivaris (flathead catfish) - None were collected the third year. Several large ones have been taken by fishermen.
26. Schilbeodes gyrinus (tadpole madtom) - None were collected the third year and only two were collected during the second year.
27. Fundulus notatus (blackstripe topminnow) - None were collected the third year and only two were collected in the second year.
28. Gambusia affinis (common mosquitofish) - This is a fairly common species in the lake.
29. Aphredoderus sayanus (pirate perch) - Only three were collected the first year and none thereafter.

30. Micropterus punctulatus (spotted bass) - No spotted bass were collected the third year.
31. M. salmoides (largemouth bass) - The numbers of this fish in the netting collections were down from the previous two years. Seining indicated a good spawn was obtained in the spring of 1960.
32. Chaenobryttus gulosus (warmouth) - The warmouth is not too common, however, the ones collected were in good condition.
33. Lepomis cyanellus (green sunfish) - This is a rare species in the lake.
34. L. punctatus (spotted sunfish) - Spotted sunfish are not too common in Lake Murvaul.
35. L. microlophus (redecor sunfish) - This is one of the minor game fishes in the lake.
36. L. macrochirus (bluegill sunfish) - By far the most commonly collected species by seining, it is also very common taken in netting and is a very popular fish with the anglers.
37. L. auritus (yellowbelly sunfish) - None were collected during the third year.
38. L. megalotis (longear sunfish) - Only one was collected by netting the third year.
39. Pomoxis annularis (white crappie) - Though the average weight was only one ounce, this was the third most commonly collected fish by netting.
40. P. nigromaculatus (black crappie) - This species is also very common in the lake. The average weight of those netted was less than two ounces (0.21 pounds).
41. Centrarchus macropterus (flier) - None were collected during the third year.
42. Ammocrypta vivax (Arkansas sand darter) - None were collected the second or third years.
43. Etheostoma gracilie (slough darter) - Only two were collected the third year.

Limnological Conditions

The water quality of Lake Murvaul is of a good quality for fish life. The pH is 7.3, the methyl-orange alkalinity is 50 p.p.m. and the chloride content is 63.83 p.p.m. During the third year the turbidity, as determined by a Secchi disk, ranged from 28 to 48 inches.

Air temperatures ranged from 35 to 90 degrees F., while the surface water temperatures ranged from 50 to 95 degrees F. The color of the water normally was green but had a brown stain at times. Weather conditions varied from clear and calm to thunderstorms

Vegetation

During the year of 1959, the first traces of aquatic vegetation began showing up. During the year of 1960, certain species of submerged vegetation presented quite a serious problem in the shallow water areas of the lake. Muskgrass (Chara sp.) was the principal troublesome plant encountered. In addition, several patches of cattail (Typha lattifolia) began showing up. Water district personnel treated several areas of muskgrass with copper sulphate but obtained only temporary results. Other aquatic plants noted but not in serious amounts were duck potatoes (Sagittaris sp.), pondweeds (Potamogeton sp.) and water lilies (Nymphaeaceae).

Lake Management

Aside from the vegetation work mentioned above, there have been several thousand

bullhead catfish removed from the lake by water district personnel. Also, there has been continuous heavy fishing pressure for sunfish. Fishing pressure on crappie, because of their small size, has been somewhat less intense.

There has been some question concerning the advisability of additional stocking of channel catfish obtained from state fish hatcheries. Considering the numbers of predacious fish present in the lake, additional stocking would not be advisable unless the catfish are first put into rearing ponds and fed until they reach a length of six to ten inches. They then could be put in the lake.

CONCLUSIONS AND RECOMMENDATIONS

During Lake Murvaul's third year of existence the fish population has tended to level off and certain species have become less common or nonexistent. The average size of most fish caught has decreased due to a number of age groups now involved. There has been a slight increase in the minnow and shiner populations. Both species of crappie are greatly overpopulated. Submerged and emergent vegetation have become a problem in the lake.

Considering the above findings it is therefore recommended that:

1. Heavy fishing pressure be continued.
2. The lake be kept closed to commercial fishing except that contract fishing be allowed for rough fish removal.
3. The rough fish removal program carried on by Water District personnel should be continued.
4. Additional channel catfish should be stocked only if allowed to grow in rearing ponds first or if they are of a minimum of six inches in length.
5. Vegetation control work should be concentrated in coves or along larger areas of the shore instead of in spot treatments.

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Table 1. A checklist of Lake Murvaul fish species.

Name	First year	Second year	Third year
Spotted gar	x		
Bowfin	x	x	x
Gizzard shad	x	x	x
Grass pickerel	x	x	x
Smallmouth buffalo	x	x	x
River carpsucker	x		
Blacktail redhorse	x	x	
Spotted sucker	x	x	x
Chub sucker	x	x	x
Golden shiner	x	x	x
Pugnose minnow		x	
Ribbon shiner	x	x	
Spottail shiner	x	x	x
Redhorse shiner	x	x	x
Sand shiner	x	x	x
Blackspot shiner	x	x	x
Mimic shiner	x		
Taillight shiner	x		
Silvery shiner	x		
Parrot minnow	x	x	x
Channel catfish	x	x	x
Blue catfish	x	x	x
Black bullhead	x	x	x
Yellow bullhead	x	x	x
Flathead catfish	x	x	
Tadpole madtom	x		
Blackstripe topminnow	x	x	
Common mosquitofish	x	x	x
Pirate perch	x		
Spotted bass	x	x	
Largemouth bass	x	x	x
Warmouth	x	x	x
Green sunfish	x	x	x
Spotted sunfish	x	x	x
Redear sunfish	x	x	x
Bluegill sunfish	x	x	x
Yellowbelly sunfish	x	x	
Longear sunfish	x	x	x
White crappie	x	x	x
Black crappie	x	x	x
Flier	x	x	
Arkansas sand darter	x		
Slough darter	x		x
Total number of species	42	33	26

Table 2. Numbers of fish collected by quarterly netting on Lake Murvaul.

Fish	January	April	July	October	Total	Percent
Bowfin*	9	24	3	7	43	4.11
Gizzard shad*	17	153	107	55	332	31.71
Grass pickerel*	3				3	0.29
Smallmouth buffalo*		1			1	0.09
Spotted sucker*	8	5		7	20	1.91
Chub sucker*	58		2	11	71	6.78
Golden shiner*	3			2	5	0.48
Channel catfish		5	8	11	24	2.29
Blue catfish		1	1		2	0.19
Black bullhead*	15	71	26	58	170	16.24
Yellow bullhead*	6	13	5	43	67	6.40
Largemouth bass	2	7		6	15	1.43
Warmouth		1	1	3	5	0.48
Spotted sunfish			3		3	0.29
Redear sunfish	3			2	5	0.48
Bluegill sunfish	6	17	32	15	70	6.69
Longear sunfish		1			1	0.09
White crappie	11	50	47	34	142	13.56
Black crappie	8	8	8	44	68	6.49
* denotes rough fish						
Rough fish	119	267	143	183	712	
Game fish	30	90	100	115	335	
Total	149	357	243	298	1,047	100.00
Percent rough fish	79.86	74.78	58.84	61.40	68.00	
Percent game fish	20.14	25.22	41.16	38.60	32.00	

Table 3. Change in percentages of numbers of netted fish from Lake Murvaul.

Fish	First year	Second year	Third year	Overall change
Spotted gar*	0.08	0	0	-
Bowfin*	13.74	10.16	4.11	-
Gizzard shad*	4.30	19.39	31.71	+
Grass pickerel*	0.98	1.85	0.29	-
Smallmouth buffalo*	0.98	0.09	0.09	-
River carpsucker*	2.04	0	0	-
Blacktail redhorse*	0.45	0.09	0	-
Spotted sucker*	1.50	5.82	1.91	-
Chub sucker*	3.00	9.60	6.78	-
Golden shiner*	2.19	1.75	0.48	-
Channel catfish	0.16	0.65	2.29	+
Blue catfish	0.08	0.37	0.19	-
Black bullhead*	27.85	13.48	16.24	-
Yellow bullhead*	8.30	8.13	6.40	-
Spotted bass	0.32	0.09	0	-
Largemouth bass	9.82	12.19	1.43	-
Warmouth	6.87	1.39	0.48	-
Green sunfish	0.98	0.37	0	-
Spotted sunfish	0.39	0.09	0.29	-
Redear sunfish	0.60	0.55	0.48	-
Bluegill sunfish	11.18	7.29	6.69	-
Yellowbelly sunfish	0.83	0.28	0	-
Longear sunfish	0.08	0.09	0.09	-
White crappie	2.19	1.57	13.56	+
Black crappie	0.70	4.62	6.49	+
Flier	0.39	0.09	0	-
*denotes rough fish				
Rough fish	65.41	70.36	68.00	
Game fish	34.59	29.64	32.00	
Total	100.00	100.00	100.00	

Table 4. Total weights of quarterly netted fish from Lake Murvaul.

Fish (total numbers)	January	April	July	October	Total weight (pounds)	Percent of Total	Average weight (pounds)
Bowfin* (43)	40.25	116.25	13.37	20.00	189.87	34.84	4.42
Gizzard shad* (332)	2.13	18.50	14.00	13.56	48.19	8.84	0.15
Grass pickerel* (3)	1.25				1.25	0.23	0.42
Smallmouth buffalo* (1)		7.50			7.50	1.38	7.50
Spotted sucker* (20)	10.69	6.75		11.06	28.50	5.23	1.43
Chub sucker* (71)	27.50		1.00	4.63	33.13	6.08	0.47
Golden shiner* (5)	0.50			0.31	0.81	0.15	0.16
Channel catfish (24)		7.90	8.94	20.44	37.28	6.84	1.55
Blue catfish (2)		4.44	5.62		10.06	1.84	5.03
Black bullhead* (170)	6.56	26.50	6.50	22.06	61.62	11.30	0.36
Yellow bullhead* (67)	3.00	5.50	2.00	30.59	41.09	7.54	0.61
Largemouth bass (15)	2.44	23.88		10.69	37.01	6.79	2.47
Warmouth (5)		0.19	0.13	0.81	1.13	0.21	0.23
Spotted sunfish (3)			0.31		0.31	0.06	0.10
Redear sunfish (5)	1.75			0.69	2.44	0.45	0.49
Bluegill sunfish (70)	1.75	4.56	4.37	2.44	13.12	2.41	0.19
Longear sunfish (1)		0.13			0.13	0.02	0.13
White crappie (142)	1.25	5.38	5.31	5.63	17.57	3.22	0.12
Black crappie (68)	1.00	0.94	1.44	10.63	14.01	2.57	0.21
*denotes rough fish							
Rough fish (712)	91.88	181.00	36.87	102.21	411.96		0.58
Game fish (335)	8.19	47.42	26.12	51.33	133.06		0.40
Total (1,047)	100.07	228.42	62.99	153.54	545.02	100.00	0.52
Rough fish percent	91.82	79.23	58.53	33.43		75.59	
Game fish percent	8.18	20.77	41.47	66.57		24.41	

Table 5. Comparison of percentages of weights of all netted fish from Lake Murvaul.

Fish	First year	Second year	Third year
Spotted gar*	**	0	0
Bowfin*		39.58	34.84
Gizzard shad*		3.84	8.84
Grass pickerel*		1.03	0.23
Smallmouth buffalo*		0.91	1.38
River carpsucker*		0	0
Blacktail redhorse*		0.03	0
Spotted sucker*		5.90	5.23
Chub sucker*		3.72	6.08
Golden shiner*		0.41	0.15
Channel catfish		0.66	6.84
Blue catfish		0.91	1.84
Black bullhead*		7.16	11.30
Yellow bullhead*		4.89	7.54
Spotted bass		0.05	0
Largemouth bass		26.45	6.79
Warmouth		0.56	0.21
Green sunfish		0.09	0
Spotted sunfish		0.02	0.06
Redear sunfish		0.18	0.45
Bluegill sunfish		1.89	2.41
Yellowbelly sunfish		0.10	0
Longear sunfish		0.02	0.02
White crappie		0.82	3.22
Black crappie		0.75	2.57
Flier		0.03	0
*denotes rough fish			
**no weights were recorded the first year			
Rough fish		67.46	75.59
Game fish		32.54	24.41
Total	Unknown	100.00	100.00

Table 6. Results of quarterly seining on Lake Murvaul.

Fish	January	April	July	October	Total
Gizzard shad		2	2	2	6
Golden shiner			10		10
Spottail shiner	20		1		21
Redhorse shiner	16	1	18	2	37
Sand shiner	3	2	1	4	10
Mimic shiner			39		39
Parrot minnow	2			2	4
Yellow bullhead			3		3
Common mosquitofish		8	6	3	17
Largemouth bass			10	3	13
Warmouth			2		2
Green sunfish		2			2
Spotted sunfish			10	3	13
Redear sunfish			1	19	20
Bluegill sunfish	11	8	186	206	411
Black crappie			1	1	2
Slough darter	2				2
Total	54	23	290	245	612
Number of hauls	10	7	8	9	34

Table 7. Comparison of average standard lengths in millimeters of several game fish species from Lake Murvaul.

Fish	First year		Second year		Third year	
	Number of fish	Length	Number of fish	Length	Number of fish	Length
Channel catfish			7	254.42	24	332.04
Blue catfish			4	333.50	2	462.50
Largemouth bass	112	236.75	132	274.20	15	316.53
Warmouth	72	121.48	15	140.53	4	136.50
Redear sunfish	5	117.40	5	142.00	5	169.60
Bluegill sunfish	129	121.77	32	129.40	43	127.76
White crappie	30	207.26	15	146.53	60	129.48
Black crappie	9	190.55	30	116.86	39	135.20

Table 9. Comparison of average coefficients of condition ("K") of several game fish species from Lake Murvaul.

Fish	First year		Second year		Third year	
	Number of fish	"K"	Number of fish	"K"	Number of fish	"K"
Channel catfish			7	1.67	24	1.64
Blue catfish			4	2.17	2	2.30
Largemouth bass	112	2.89	132	3.18	15	2.88
Warmouth	72	4.36	15	3.90	4	3.98
Redear sunfish	5	3.84	5	3.69	5	4.31
Bluegill sunfish	129	4.93	32	4.50	43	4.36
White crappie	30	3.52	15	2.98	60	2.66
Black crappie	9	3.62	30	3.01	39	2.99

Table 8. Comparison of average weight in grams of several game fish species from Lake Murvaul.

Fish	First year		Second year		Third year	
	Number of fish	Weight	Number of fish	Weight	Number of fish	Weight
Channel catfish			7	336.71	24	699.87
Blue catfish			4	829.25	2	2282.50
Largemouth bass	112	439.58	132	694.45	15	1110.20
Warmouth	72	84.50	15	117.06	4	107.75
Redear sunfish	5	65.80	5	108.60	5	214.60
Bluegill sunfish	129	96.03	32	102.65	43	96.23
White crappie	30	380.30	15	183.46	60	60.93
Black crappie	9	299.55	30	55.40	39	79.56

Table 10. Data on condition of several game fish species from Lake Mirveau.

Fish	Number of fish	Standard length range in millimeters	Average standard length in millimeters	Weight range in grams	Average weight in grams	"K" range	Average "K"
Channel catfish	24	248-503	332.04	230-2381	699.87	1.21-2.49	1.64
Blue catfish	2	450-475	462.50	2013-2552	2282.50	2.21-2.38	2.30
Largemouth bass	15	220-409	316.53	196-2381	1110.20	1.79-3.64	2.88
Warmouth	4	115-165	136.50	59-174	107.75	3.64-4.53	3.98
Redear sunfish	5	153-181	169.60	146-288	214.60	3.48-5.11	4.31
Bluegill sunfish	43	92-168	127.76	27-230	96.23	3.11-5.52	4.36
White crappie	60	108-217	129.48	28-260	60.93	1.24-4.84	2.66
Black crappie	39	111-187	135.20	43-197	79.56	2.20-3.62	2.99

