

Segment Completion Report

Investigations Project

State of TEXAS

Project No. F-3-R-6

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, 1957 - May 31, 1959

Abstract:

Because of administrative technicalities this report covers work done on Lake Murvaul during two periods of time and is thus written in two sections. The first section covers work done from December 1, 1957, through November 30, 1958, which is the first year of the lake's existence and thus warrants a fully detailed report. The second period was from December 1, 1958, through May 31, 1959, and is only half of the second year of the lake's existence. Insufficient data has been collected during this second period to justify a fully detailed report and only the highpoints are given.

Part I. Lake Murvaul is a new 4,000 surface acre lake on which a year long basic survey was conducted. Water samples and temperatures were taken at three locations on the lake and at five-foot intervals from surface to bottom. There were 1,000 feet of experimental type gill nets set randomly each month. The water quality proved to be very good for biological productivity. There was an excellent growth rate of fishes the first year. There are large populations of bowfin, shad, largemouth bass, both black and yellow bullheads, bluegills and various forage fish present. Recommendations are made to continue work on the lake to see what effect a bullhead removal-flathead catfish stocking program has on the fish population.

Part II. Following the recommendations of the first period, work is continuing on the lake, but with less intensity, to collect additional data on the fish populations. Gill net and seining collections were made bimonthly and water samples and temperatures are not taken. Additional stocking of the lake with fish include 103 flathead catfish, weighing up to 40 pounds each, and 46 blue catfish. This work will continue through another project period.

Objectives: Part I.

To gather fundamental data on this newly impounded reservoir in regard to its physical, chemical and biological aspects. To determine the growth rates and food of game species stocked. To observe the influx of other fish species and to record chemical changes, if any, of the water. This is a follow-up job to Job 16a-8, Project F-14-D-1, whereby the fish population in Murvaul Bayou was eradicated as nearly as possible by the use of rotenone.

#### Acknowledgements:

This writer wishes to thank the Panola County Fresh Water Supply District No. 1, Dr. W. C. Smith, Chairman; W. H. Clabaugh, Secretary; and Louis Hull, District Engineer for their cooperation and interest in this project.

#### Lake History:

Lake Murvaul is a project of the Panola County Fresh Water District No. 1. The dam and reservoir were authorized for construction by the Texas Board of Water Engineers in August 1956. Construction was begun a month later on September 26, 1956. This project was completed and the gates closed in May 1958 with official dedication ceremonies being held on June 1, 1958. Though the gates were not closed until the later date, the lake started filling in October 1957. Plans called for initiating this project in November but heavy rains at the time caused a postponement until December 1957.

Prior to impoundment, on September 17, 1957, about a twelve mile stretch of Murvaul Bayou above the dam was treated with Pro-Noxfish and rotenone powder to eliminate as nearly as possible the existing fish population. This was reported under Job 16a-8, Project F-14-D-1.

#### Lake Description:

Lake Murvaul was formed by the construction of a rolled, earth fill dam on Murvaul Bayou, about 3 miles upstream from State Highway 10 between Gary and Daniels. The dam is 8,300 feet long, with a maximum height of 51 feet above the stream bed. The spillway, which is located at the south end of the dam, is 270 feet wide and is constructed of reinforced concrete. The upstream side of the dam is protected by stone rip-rap. The crest of the dam is 10 feet wide and has a maintenance road on it.

Water, for municipal and industrial use, is released from the lake through an outlet tower located at the upstream base of the dam. There are three openings at different levels and the water is carried under the dam through a 36-inch pipe.

The reservoir capacity at spillway elevation, 265.0 msl, is 47,000 acre feet covering an area of 4,000 surface acres thereby making the average depth of the lake 11.75 feet. The spillway has a discharge capacity of 26,700 c.f.s. The reservoir, at spillway level, is about  $5\frac{1}{2}$  miles long.

The watershed above the dam lies in Rusk and Panola Counties and covers some 120 square miles. Murvaul Bayou is a tributary of the Sabine River and flows in an easterly direction. The land is used primarily for timber, farming and cattle. A portion of the lake lies within the Carthage Gas Field\*. The soils found in this area are generally sands and clays. Only about half of the timber was cleared and most of this was along the shoreline leaving a band of timber along the center of the lake. The slopes on the sides of the reservoir are moderately to steeply sloping and are covered with timber and brush with patches of grassy meadows.

Lake shore lots were leased and there are already numerous houses and boat houses built and in the process of being built. There are also public use sites set up, as well as a Boy Scout area.

## Procedure:

Data was collected once each month, generally close to or on the 20th of each month, during the job. Water samples and temperatures were taken in the afternoon at about the same time of day each month with one exception when they were taken in the morning. There were six net sets made each month at randomly selected locations.

### 1. Limnological Data

Water samples were taken with a Foerst water sampler at five foot intervals from surface to bottom. The samples were put in 250 ml glass-stoppered bottles, one for dissolved oxygen which was fixed on the spot and one for alkalinity, pH and salinity. The latter was brought back to the laboratory for analysis. There were three water sample stations set up on the lake to make a series of three for each trip. The first station was located at the intake tower at the dam, the second at the east end of the timber area of the lake and centered between the north and south shores. The third location was in the center of the Dotson Bridge at the upper end of the lake. (See Figures 1, 2 and 3)

Temperatures were taken at the same locations as the water samples. A reversing thermometer was used. Again data was collected at five foot intervals from surface to bottom. The thermometer was calibrated in degrees Centigrade so this data was converted to degrees Fahrenheit by using the conversion table found in Lagler's, "Studies in Fresh-water Biology".

Other limnological conditions recorded were turbidity (Secchi disk), color of the water, sky, wind, time and air temperature.

### 2. Netting Collections

Eight experimental type gill nets (1,000 feet) were set at six random locations each month. The dimensions of the nets were 125 feet long, eight feet deep with mesh sizes of 1,  $1\frac{1}{2}$ , 2,  $2\frac{1}{2}$  and 3 inches changing every 25 feet. The nets were set out late in the afternoon and picked up the following morning. Each location was selected with the idea of having each set in a different type of location, i.e. open water, set across a neck, off a point, in the timber, etc. In this way an effort was made to sample each type of habitat in the lake. These locations were random in the sense that they were not pre-selected and no locations were purposely used more than once. A total of 72 sets made up of 96 nets were made.

A count was made of all rough fish caught. They were destroyed and returned to the lake. All game fish and bullhead catfish were saved. These were then weighed and measured for both standard and total lengths. Spot checks were made on stomach contents and sexual development. Coefficients of condition ("K" factors) were determined in the laboratory. The average lengths, weights and condition factors were calculated for each species each month.

### 3. Seining Collections

Seining collections were made with a 26' by 6' by  $\frac{1}{4}$ " mesh bag seine. Seining areas were difficult to find because of the nature of the shoreline of the new lake, many snags, debris and submerged weeds, and grass. However, 83 seine hauls were made. These combined are included in 12 collections. All specimens were preserved in 10% formalin solution and brought back to the laboratory for identification.

## Stocking Record:

The Game and Fish Commissions' Tyler Fish Hatchery placed the following numbers of fish in Lake Murvaul:

Largemouth bass (fry)	185,000
Channel catfish	107,700
Redear sunfish	5,000
Warmouth	3,500
Black crappie	1,500

In addition the Water District has placed, to this date, some 350 adult flathead catfish in the lake.

## Findings:

## 1. Limnological Findings

One of the primary objectives of this job was to record any chemical changes which might occur in the water. It was determined that chemically and physically the waters of Lake Murvaul remained fairly stable throughout the year with the only extreme changes at Dotson Bridge in the upper end where the main stream runs in. A contributing factor to the stability may have been that water was drawn off the bottom through the intake tower in an effort to lower the lake level to clean up the shoreline.

## a. Methyl Orange Alkalinity and pH

Table 1 gives the alkalinity and pH for each depth and location on the lake by months. Though the pH ranged from 6.0 to 7.2, the majority of the values were above the average of 6.6. The few extremely low pH values recorded were either near the bottom of the lake or at the upper end of the lake. A pH of 6.6 is a surprisingly high average considering the amount of timber left in the lake. Generally speaking, pH values varied little throughout the year and throughout the lake except in the above exceptions of the low readings.

Alkalinity followed closely the same fluctuations as pH, except the higher readings were near the bottom and upper end. The ranges were 4 to 160 ppm and the average was 44 ppm. The water seemed most stable from a pH and alkalinity stand point in the upper ten feet. The widest ranges of both were in June, July, August, and September when the lake stratified.

## b. Chlorides

Excepting for the upper end of the lake, the chlorides were the most stable. There was very little variation through the depths. If there was any difference it was either at the surface or bottom. Generally, the upper end readings were higher and occasionally lower than the rest of the lake. The chloride range was from 3.54 ppm to 78.01 ppm. The average was 27.56 ppm, which is normal for the area. The highest concentrations of

chlorides were found from April through July then dropped to the lowest reading in August. No extremely high concentrations of chlorides are anticipated for the lake. Table 2 gives the chlorides for each depth and location.

#### c. Temperatures and Dissolved Oxygen

Table 3 shows the temperatures and dissolved oxygen at five foot intervals from surface to bottom at the three locations on the lake for each month. Also, the date, time, and air temperatures are given. Every month the water temperature followed the pattern of being cooler as the depth increased with little changes in the winter months and stratification showing up during the hot summer months. On occasions, surface temperatures were slightly cooler than at five feet due to winds blowing and increased evaporation on the surface. Also, the midlake temperatures were generally slightly cooler than those near the land mass of the dam. In addition, the upper end waters were slightly cooler where Murvaul Bayou enters the lake. The water temperature ranged from 39.9 to 92.1°F.

Dissolved oxygen followed no set pattern since it was seldom uniform over the entire lake, except for a definite deficiency below 10 feet from May through August. The range was from 0.0 ppm to 10.8 ppm. There was never any oxygen deficiency due to decaying vegetation except possibly at the lower levels and this was not harmful to fish life.

#### d. Turbidity and Color

Secchi disk readings ranged from 16 to 60 inches. The average over the year was about 35 inches. What turbidity occurred was generally the result of a plankton bloom. The color of the water was generally green with some brown to black stains from the timber. Following heavy rains the water at the upper end was reddish-tan in color due to run off. During times of high winds the shoreward water was tan in color due to wave action on the shore.

It can be concluded from water analysis that Lake Murvaul is a fertile lake and should remain so for a long time.

## 2. Fish Findings

Netting and seining collections combined yielded a total of forty-two species of fish representing twelve families. Table 4 lists each species phylogenetically. The names used are those used by Hubbs in his "A Checklist of Texas Freshwater Fishes", dated December 1958.

#### a. Netting Results

Table 5 gives a tabulation of monthly netting results. As can be seen from this table there were only three species collected every month. They are the bowfin, gizzard shad and black bullhead. All of these are considered rough fish, although the shad could also be considered a forage fish and the bullhead a commercial fish. This table also gives the totals of game fish and rough fish and percentages of each. There were 26 species collected by gill nets: 12 rough species, and 14 game species. The rough fish catch predominated the catch in every month except two. The average percentages of rough fish and game fish were approximately 65% and 35% respectively over the first year.

A total of 1,325 fish were caught by gill nets over the year. This includes 867 rough fish and 458 game fish. Black bullheads were the most abundant with 369, or 27.85% of the total numbers caught. Bowfins were next with 182 or 13.74%; followed by bluegills with 148 or 11.18%; largemouth bass with 130 or 9.82%; and yellow bullheads with 110 or 8.30%. The number of species caught each month ranged from 10 to 18 and averaged 13.

Through the use of percentages and total numbers of fish caught by nets, a rough comparison can be made of the relative abundance of the species present. The only rough fishes that are problems in Lake Murvaul are the bowfin, the various suckers and the bullhead catfishes. Considering the fact that bass are not too often caught in nets, it can be said that Lake Murvaul has a relatively large bass population. This numerous bass population will help control the shad and sunfish populations. Also, commercial fishing, specifically for bullheads, and heavily stocking the lake with adult flathead catfish will help to control bullheads and other rough fish.

#### b. Seining Results

Table 6 gives the numbers of fish collected by bag seine each month. Seining yielded 30 species and 7,099 specimens. By far, the most abundant species according to the collections was the gizzard shad. The greatest number of fish were collected during the months of March through October, though it was April before many of the species showed up. In other months they were practically not to be found. No species was taken every month, although the gambusia was perhaps the most commonly taken species, followed by red shiners, largemouth bass and bluegills.

The number of species collected each month ranged from 0 to 20 and averaged 7. There were 17 species that were taken twice or less, and only about 7 species that could be collected fairly consistently.

It can be concluded from seining that there is a good supply of bait or forage fish available. The most abundant are golden shiners and sand shiners, along with red shiners and parrot minnows.

#### c. Growth Rates

Standard length records were kept for five game fish species and two commercially important rough fish species in order to determine their growth. Insufficient numbers of other game fish species were collected during the project to provide information on their growth rates. The best data was collected for the largemouth bass. An average length was determined each month. Table 7 gives these standard lengths for each month (range and averages) as well as the number of specimens measured. As can be seen from studying this table, several species remain about the same length throughout the year. However, largemouth bass had a fairly constant increase every month from May on through November. Though the range of lengths does not indicate it, most of the bass measured were within only a few millimeters of each other each month.

#### d. Condition of Fish

Generally speaking the condition of the fish in Lake Murvaul is excellent. In fact some of the fish are ridiculous looking because they are so "pot bellied" and thick bodied. Their bodies are out of proportion to their heads. (See Figures 5, 6, 7, and 8.)

Table 8 gives the average standard lengths, the average weight and the average coefficients of condition for the entire year for several species which were netted.

e. Food Habits

No intensive study was made of the food habits of the fish in Lake Murvaul. Spot checks were made, however, of several game fish to get an idea of the main diets of some species. Though most of the stomachs checked were empty the chief item in the diet of warmouths, bullheads and bass during March, April, May and June was crayfish. They were quite numerous and many were picked up in nets and by seining. From October on their diets consisted almost entirely of shad. Aquatic insects were found occasionally in all stomachs. Toward the end of the segment the bass turned very glutinous. They ate anything from insects, to fingerling bullheads, to shad. As many as four shad, 3 to 4 inches long, were found in bass stomachs. Crappie ate shad and crayfish as they became available.

f. Sexual Development and Spawning Activity

Like the food habits, no intensive study was made of sexual development. Spot checks were made on some game fish. Bass and warmouths were nearing ripeness in March and were very ripe in April. By May, the bass had spawned. This was indicated by the large schools of fry observed prior to stocking. Bluegills were ripe in May and were spawning in June. The following October the yearling bass were immature but eggs were forming. The fact that the lake filled in the fall gave the native fish a good chance for a spawn the following spring. Unfortunately the rough fish got off a good spawn too.

g. Annotated Checklist of Fish Species

1. Lepisosteus productus - only one spotted gar was picked up over the year. This is a good indication that they are rare.
2. Amia calva - the bowfin was the second most common fish netted. They are quite numerous and of a large size. Most of them weigh from two to four pounds each.
3. Dorosoma cepedianum - this is the most abundant forage fish in the lake but there may be enough predators present to keep the gizzard shad under control.
4. Esox americanus - fairly common fish in the lake, the grass pickerel is not too important.
5. Ictiobus bubalus - the smallmouth buffalo's occurrence was scattered and at the present time is of no importance commercially.
6. Carpionodes carpio - carpsuckers were found only in the spring and were small in size.
7. Moxostoma poecilurum - only six blacktail redhorses were collected.
8. Minytrema melanops - though not too common at present, the spotted sucker could become a problem.
9. Erimyzon sucetta - though more common than the spotted sucker, the chub sucker is not as yet a problem in this lake.

10. Notemigonus crysoleucas - the golden shiner was fairly consistently taken in small numbers in nets.
11. Notropis fumeus - only one ribbon shiner was found.
12. N. venustus - spottail shiners, in relatively small numbers, were found on only three occasions.
13. N. lutrensis - the redhorse shiner is one of the most consistently found minnows in the lake.
14. N. stamineus - the sand shiner was found on only four occasions. Once it was taken in large numbers making it one of the most numerous minnows collected.
15. N. atrocaudalis - eleven blackspot shiners were found only once.
16. N. volucellus - very few mimic shiners were found.
17. N. maculatus - thirty taillight shiners were collected in May. This was the only time it was collected.
18. Hybognathus nuchalis - only fifteen silvery minnows were found in August.
19. Pimephales vigilax - fairly common, the parrot minnow was found from April through September.
20. Ictalurus punctatus - the channel catfish was stocked by the hatchery. However, a few adults were placed in the lake by the Water District. Two of these were caught in September.
21. I. furcatus - the only blue catfish was also caught in September and was one of those put in by the Water District.
22. I. melas - the black bullhead was the most commonly netted fish in the lake. This fish is the main objective of contract fishermen on the lake. They were collected by seining only once.
23. I. natalis - the yellow bullhead, though only about one third as numerous as the black, runs about fourth in numbers collected. The two bullheads made up 36.15% of the netted fish caught.
24. Pylodictus olivaris - though none was collected, there had been at least 350 adult flathead catfish put in the lake to help reduce the bullhead population. Plans call for more of these fish to be stocked in the lake as they become available.
25. Schilbeodes gyrinus - only one tadpole madtom was collected during this project.
26. Fundulus notatus - a single black stripe topminnow was collected in January.
27. Gambusia affinis - the gambusia is the second most numerous collected fish and ties for being collected the most number of times by seining.
28. Aphredoderus sayanus - there were three pirate perches caught.

29. Micropterus punctulatus - only four spotted bass were collected. They, of course, are native to the stream.

30. M. salmoides - the largemouth bass - This popular game fish was fourth in numbers netted and seined. They were caught in large numbers during the last few months of this segment.

31. Chaenobryttus gulosus - there are a good number of warmouths in the lake and they are of a large size and good condition.

32. Lepomis cyanellus - the green sunfish showed up during the first half of the segment but then they became rare.

33. L. punctatus - the spotted sunfish collected were scattered out over the year.

34. L. microlophus - the hatchery stocked the lake with redears and they were native to the stream. However, only a few have been collected.

35. L. macrochirus - the bluegill is third in netted numbers and also quite numerous by seining. There were approximately 65,000 removed by contract netters in an effort to prevent this fish from over-populating.

36. L. auritus - the yellowbelly was picked up only occasionally over the year.

37. L. megalotis - only one longear was collected.

38. Pomoxis annularis - the white crappie though not stocked has sufficient numbers present to produce a good population. All collected were in excellent condition.

39. P. nigromaculatus - while not as numerous as the white, the black crappie will also produce a good population, especially since 1,500 fry were stocked by the hatchery.

40. Centrarchus macropterus - the flier showed up only on occasion.

41. Ammocrypta vivax - this Arkansas sand darter appeared in collections twice during the spring.

42. Etheostoma gracile - there were only six slough darters collected during late spring and late summer.

### 3. Vegetation

At this time there is no known undesirable aquatic vegetation to be found in Lake Murvaul with the exception of some filamentous algae at times and some black willow (Salix nigra). There is, of course, about 2,000 acres of dead and dying timber in the lake.

### Commercial Fishing:

Because of the extremely high population of rough fish encountered the second month of this segment (some 90% rough fish, of which 75% were bullhead catfish) a contract netter, Mr. Dale Sipple, was permitted to fish the lake for the purpose of removing these undesirable fish as a management practice. Over two periods of time, late winter and late summer, there were some 33,000 bullhead catfish removed along with 4,200 bowfin, 65,000

bluegill sunfish and several hundred other rough fish. These bullhead catfish weighed approximately one pound each. Through these efforts the rough-game fish ratios have been helped greatly. Mr. Sipple will again fish the lake next spring before spawning to further reduce the rough fish population. It was noted that during the time of his netting the rough fish numbers collected for this project were lower. The type of equipment used by Mr. Sipple permits game fish to be removed from the traps with out harm.

This lake should be kept closed to commercial fishing with the exception of contract fishing under the close supervision of the Game and Fish Commission.

#### Lake Management:

Though no management program was planned this first year, circumstances prevailed whereas various practices could be put to use. The high bullhead catfish population prompted the use of contract netters to reduce the bullhead population. At the same time, the lake is being stocked with adult flathead catfish to further control the bullheads.

It was recommended that the lake could be opened to fishing in September 1958 but a meeting was held with the Water District and it was decided to wait until boat house construction, timber and log clearing was further along. May 30, 1959, was set as the opening date for fishing. This will give the fish two spawning seasons before game fish are removed.

It is rather difficult to evaluate the results of treating the stream before impoundment with rotenone since no comparison can be made with another lake of similar likeness. A complete kill is desirable but for all practical purposes is impossible. It is possibly advantageous to reduce the numbers of fish in a stream before impounding in order for the remaining fish to have a faster growth rate. This is apparently what happened in Lake Murvaul.

#### Conclusions and Recommendations:

During Lake Murvaul's first year of existence, the growth of the game fish has been excellent. There is a good ratio of rough fish to game fish though some species of rough fish are too numerous.

The water quality in the lake is ideal for East Texas and for the fish present. Aquatic vegetation is no problem.

Considering the above discussions and conclusions it is therefore recommended that:

1. When the lake opens for fishing that fishing pressure be kept high.
2. The lake be kept closed to commercial fishing, except that contract fishing be allowed for rough fish removal, but only under close supervision of the Game and Fish Commission.
3. Bullhead catfish removal program should be continued.
4. Additional flathead catfish should be stocked.
5. Additional data should be collected on the population to determine the effectiveness of the "bullhead removal-flathead stocking" program.
6. Additional data should be collected to see what effect opening the lake to fishing after two spawning seasons has on the game fish populations.
7. Keep all vegetation under control as soon as it appears.

Table 1. Methal Orange Alkalinity and pH at Different Depths and Locations on Lake Murrvaul.

Location	Depth	Dec		Jan		Feb		Mar		Apr		May	
		pH	Alk										
Lower End Near Outlet Tower	0	6.9	30	7.0	40	6.8	40	6.9	37	7.1	41	6.8	35
	5	7.0	31	6.8	40	6.8	34	6.9	33	7.1	43	7.1	39
	10	6.9	30	6.8	40	6.8	32	6.9	33	7.0	44	6.9	40
	15	6.8	28	6.8	40	6.8	30	6.8	36	6.6	46	6.5	38
	20	6.6	38	6.8	40	6.8	33	6.8	33	7.1	59	6.6	40
	Down to 25				6.8	40	6.8	33	6.8	31			6.6
Midlake at Edge of Timber	0	6.8	31	6.8	40	6.7	43	6.9	34	7.1	47	7.0	38
	5	6.8	40	6.8	40	6.8	33	6.9	38	7.1	45	6.9	40
	10	6.8	33	6.8	40	6.8	32	6.8	34	7.1	42	6.8	31
	15	6.7	27	6.8	40	6.2	26	6.8	38	6.8	53	6.4	34
	20			6.8	40	6.8	30	6.7	33	6.6	115	6.5	39
	Down to 23												
Dotson Bridge	0	6.4	33	6.2	35	6.4	28	6.6	35	7.0	63	6.8	32
	5	6.4	35	6.6	30	6.4	27	6.6	34	6.8	60	6.8	35
	10	6.4	35	6.6	30	6.4	30	6.6	37	6.6	87	6.4	36
	Down to 15											6.4	36

Table 1. (Continued) Methal Orange Alkalinity and pH at Different Depths and Locations on Lake Murvaul.

Location	Depth	June		July		Aug		Sept		Oct		Nov	
		pH	Alk	pH	Alk	pH	Alk	pH	Alk	pH	Alk	pH	Alk
Lower End Near Outlet Tower	0	7.0	36	7.1	39	7.0	42	7.1	43	6.8	36	6.9	38
	5	7.0	38	7.1	39	7.0	42	7.1	43	6.8	36	6.9	38
	10	7.0	38	7.1	39	6.7	42	7.1	43	6.7	39	6.8	38
	15	6.5	69	6.4	72	6.4	50	6.9	43	6.7	39	6.8	38
	20	6.5	70	6.4	88	6.2	111	6.3	35	6.7	36	6.8	38
	Down to 25	6.4	93	6.4	91								
	0	6.9	46	7.2	39	6.9	38	7.0	43	6.8	37	6.8	38
	5	6.9	44	7.1	39	6.9	40	6.9	43	6.8	38	6.7	38
	10	6.6	44	6.5	39	6.6	40	6.9	43	6.8	38	6.7	37
	15	6.6	63	6.2	135	6.2	68	6.2	43	6.7	38	6.7	37
20	6.4	93	6.2	142	6.2	160	6.8	43	6.4	58	6.6	48	
Down to 23	6.4												
Midlake at Edge of Timber	0	6.5	41	6.8	43	6.6	40	6.2	4	6.5	28	6.4	40
	5	6.4	50	6.4	43	6.4	45	6.2	10	6.2	25	6.4	38
	10	6.4	60	6.2	68	6.2	70	6.0	8	6.3	40	6.4	40
	Down to 15	6.4	89										
Dotson Bridge	0	6.5	41	6.8	43	6.6	40	6.2	4	6.5	28	6.4	40
	5	6.4	50	6.4	43	6.4	45	6.2	10	6.2	25	6.4	38
	10	6.4	60	6.2	68	6.2	70	6.0	8	6.3	40	6.4	40
	Down to 15	6.4	89										

Alkalinity range 4-16  
Alkalinity average 7.4

pH range 6.0-7.2  
pH average 6.6

pH range  
pH average

Table 2. Chlorides at Different Depths and Locations on Lake Murvaul. Numbers are parts per million.

Location	Depth	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	
Lower End Near Outlet Flower	0	21.28	14.18	21.28	28.37	35.46	35.46	35.46	35.46	3.54	28.37	28.37	21.28	
	5	21.28	14.18	28.35	28.37	35.46	35.46	28.37	28.37	3.54	21.28	28.37	21.28	
	10	21.28	14.18	28.35	28.37	35.46	35.46	28.37	21.28	3.54	21.28	28.37	14.18	
	15	28.37	14.18	28.35	35.46	35.46	35.46	28.37	28.37	7.09	21.28	28.37	21.28	
	20	21.28	14.18	28.35	35.46	35.46	35.46	21.28	28.37	7.09	21.28	28.37	21.28	
	Down to 25			28.35	35.46	35.46	35.46	14.18	28.37			28.37	21.28	
	Midlake at Edge of Timber	0	21.28	21.28	28.35	28.37	35.46	35.46	28.37	21.28	7.09	21.28	28.37	21.28
		5	21.28	21.28	28.35	35.46	35.46	35.46	28.37	21.28	14.18	21.28	28.37	21.28
		10	28.37	21.28	28.35	35.46	35.46	35.46	28.37	28.37	14.18	21.28	28.37	14.18
		15	28.37	28.37	28.35	35.46	35.46	35.46	28.37	28.37	14.18	21.28	28.37	21.28
20				28.35	35.46	35.46	35.46	28.37	28.37	14.18	21.28	28.37	21.28	
Down to 23												28.37	21.28	
Dotson Bridge		0	56.77	21.28	42.55	63.83	56.74	35.46	35.46	14.18	14.18	7.09	28.37	28.37
		5	42.55	21.28	49.64	56.74	56.74	35.46	28.37	21.28	14.18	7.09	28.37	28.37
		10	42.55	28.37	49.64	56.74	78.01	35.46	28.37	21.28	14.18	7.09	28.37	28.37
		Down to 15						35.46	28.37					28.37

Table 3. Temperatures and Dissolved Oxygen at Different Depths and Locations on Lake Murvaul.

Date and Time	Dec 18		Jan 22		Feb 20		Mar 20		Apr 22		May 22	
	T	DO	T	DO								
Lower End Near Outlet Tower	0	55.8	52.2	5.4	45.3	63.0	9.2	69.4	6.4	89.4	7.6	0.0
	5	55.8	48.2	7.6	45.3	58.5	9.4	68.7	8.6	74.5	7.0	0.0
	10	55.0	47.8	6.0	45.3	53.6	6.2	65.5	7.6	72.3	5.8	0.2
	15	54.3	47.8	6.0	45.3	53.2	8.2	61.9	6.4	66.2	0.2	0.2
	20	54.3	47.8	8.0	45.3	52.7	8.2	61.5	2.0	64.4	0.2	0.2
25												
Midlake at Edge of Timber	0	54.7	50.7	9.8	46.0	56.8	6.4	70.2	10.0	84.6	7.8	0.2
	5	54.3	48.6	10.0	45.7	53.2	8.2	70.0	8.4	73.8	6.0	0.0
	10	53.6	48.2	9.0	45.7	52.9	6.4	67.6	8.2	70.7	5.4	0.6
	15	53.4	47.8	9.0	45.7	52.5	5.4	63.3	5.2	65.5	0.6	0.6
	20		47.8	4.8	45.7	52.2	6.8	63.3	0.2	63.7	0.2	0.2
23												
Dotson Bridge	0	56.1	50.7	4.4	39.9	57.6	7.0	63.7	7.6	83.8	10.8	0.2
	5	55.8	49.1	7.6	44.2	51.8	5.6	63.7	6.0	72.3	6.6	0.2
	10	52.0	48.2	9.0	43.5	51.4	2.2	63.3	0.8	64.4	0.2	0.2
15												
Air Temp	64	65	46	68	82	91						

Range of water temperatures 39.9-92.1  
 Range of dissolved oxygen 0.0-10.8

Table 3. (Continued) Temperatures and Dissolved Oxygen at Different Depths and Locations on Lake Murvaul.

Date and Time	Location	Depth	Jun 19		Jul 21		Aug 20		Sep 23		Oct 20		Nov 20	
			T	DO	T	DO	T	DO	T	DO	T	DO	T	DO
Lower End Near Outlet Tower		0	86.4	6.4	92.1	7.0	89.6	7.4	81.3	5.2	71.6	6.4	66.6	9.0
		5	85.3	7.0	90.7	6.8	88.7	5.2	81.0	5.2	71.6	4.6	64.4	
		10	84.9	5.6	88.3	6.4	84.6	4.8	80.2	6.0	71.2	4.0	64.0	
		15	68.4	0.4	70.0	0.2	84.6	3.0	77.7	6.4	71.2	4.8	64.0	
		20	66.0	0.4	65.5	0.0	69.1	0.8	76.3	2.4	71.2	5.8	64.0	
Down to 25		63.3	0.2	65.3	0.0							64.0	7.2	
Midlake at Edge of Timber		0	86.4	5.4	89.8	7.0	89.2	6.4	81.3	5.0	71.6	3.2	66.4	8.8
		5	84.9	5.0	87.1	5.2	87.4	6.0	79.5	4.8	71.4	4.0	66.2	
		10	84.9	2.6	84.6	1.2	87.4	4.2	78.6	4.0	71.4	4.6	64.4	
		15	69.1	0.4	70.2	1.2	87.3	0.4	78.6	3.4	71.4	2.8	64.4	
		20	65.1	0.0	64.0	0.8	76.6	1.8	74.3	3.0	69.4	1.2	63.5	
Down to 23												63.3	2.8	
Dotson Bridge		0	84.6	2.6	89.4	1.2	89.6		81.7	7.0	69.1	4.2	61.3	4.2
		5	79.2	1.0	83.8	0.8	81.7		76.6	6.6	68.7	2.8	61.2	
		10	76.6	0.8	72.1	0.8	81.0		75.2	4.0	68.7	0.8	57.6	
		Down to 15		72.3	0.6									4.2
Air Temp		92		92		92		90		75		72		

Table 4. A Checklist of Lake Murvaul Fish Species

- I. Family: LEPISOSTEIDAE - Gars
1. Lepisosteus productus - spotted gar
- II. Family: AMIIDAE - Bowfins
2. Amia calva - bowfin
- III. Family: CLUPEIDAE - Herrings
3. Dorosoma cepedianum - gizzard shad
- IV. Family: ESOCIDAE - Pickerels
4. Esox americanus - grass pickerel
- V. Family: CATOSTOMIDAE - Suckers and buffalofishes
5. Ictiobus bubalus - smallmouth buffalo
  6. Carpionodes carpio - river carpsucker
  7. Moxostoma poecilurum - blacktail redhorse
  8. Minytrema melanops - spotted sucker
  9. Erismyzon sucetta - lake chubsucker
- VI. Family: CYPRINIDAE - Shiners and minnows
10. Notemigonus crysoleucas - golden shiner
  11. Notropis fumeus - ribbon shiner
  12. N. venustus - spottail shiner
  13. N. lutrensis - redhorse shiner
  14. N. stramineus - sand shiner
  15. N. atrocaudalis - blackspot shiner
  16. N. volucellus - mimic shiner
  17. N. maculatus - taillight shiner
  18. Hybognathus nuchalis - silvery minnow
  19. Pimephales vigilax - parrot minnow
- VII. Family: AMEIORIDAE - Freshwater catfishes
20. Ictalurus punctatus - channel catfish
  21. I. furcatus - blue catfish
  22. I. melas - black bullhead
  23. I. natalis - yellow bullhead
  24. Pylodictus olivaris - flathead catfish
  25. Schilbeodes gyrinus - tadpole madtom

Table 4. (Continued) A Checklist of Lake Murvaul Fish Species.

## VIII. Family: CYPRINODONTIDAE - Killifishes and topminnows

26. Fundulus notatus - blackstripe topminnow

## IX. Family: POECILIIDAE - Mosquitofishes

27. Gambusia affinis - gambusia

## X. Family: APHREDODERIDAE - Pirate perch

28. Aphredoderus sayanus - pirate perch

## XI. Family: CENTRARCHIDAE - Black basses and sunfishes

29. Micropterus punctulatus - spotted bass  
 30. M. salmoides - largemouth bass  
 31. Chaenobryttus gulosus - warmouth  
 32. Lepomis cyanellus - green sunfish  
 33. L. punctatus - spotted sunfish  
 34. L. microlophus - redbreast sunfish  
 35. L. macrochirus - bluegill sunfish  
 36. L. auritus - yellowbelly sunfish  
 37. L. megalotis - longear sunfish  
 38. Pomoxis annularis - white crappie  
 39. P. nigromaculatus - black crappie  
 40. Centrarchus macropterus - flier

## XII. Family: PERCIDAE - Perches and darters

41. Ammocrypta vivax - Arkansas sand darter  
 42. Etheostoma gracile - slough darter

Table 5. Tabulation of Monthly Netting Results on Lake Murvaul.

No.	Species	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Total	Percent
1	<i>Lepisosteus productus</i> *													1	0.08
2	<i>Ambloplites rupestris</i> *	6	4	2	8	10	31	16	6	38	25	21	15	182	13.74
3	<i>Dorosoma cepedianum</i> *	3	5	3	7	4	3	3	10	4	4	4	7	57	4.30
4	<i>Esox americanus</i> *				1	1		1			4	3	3	13	0.98
5	<i>Ictalurus bubalus</i> *	5	2			5	11	3	5				1	13	0.98
6	<i>Carpionoxys carpio</i> *			2	6	5						1		27	2.04
7	<i>Moxostoma poecilurum</i> *		5		3	1	1						2	6	0.45
8	<i>Minytrema melanops</i> *	5	8		2	1								20	1.50
9	<i>Erimyzon sucetta</i> *		2	1	2					1	1	6	27	40	3.00
10	<i>Notemigonus crysoleucas</i> *	1	8	3	8	1	2	2		1	2	1		29	2.19
11	<i>Ictalurus punctatus</i>										2			2	0.16
12	<i>I. furcatus</i>										1			1	0.08
13	<i>I. melas</i> *	10	91	31	62	59	21	15	23	28	8	10	11	369	27.85
14	<i>I. natalis</i> *		6		7	5	3	9	11	24	7	16	22	110	8.30
15	<i>Micropterus punctulatus</i>									1	3			4	0.32
16	<i>M. salmoides</i>			3	3	8	8	8	7	13	35	12	41	130	9.82
17	<i>Chaenobryttus gulosus</i>		6		13	11	14	14	6	18	4	4	1	91	6.87
18	<i>Lepomis cyanellus</i>	1	2	1	2	4	1	1			2			13	0.98
19	<i>L. punctatus</i>	1						2			1			5	0.39
20	<i>L. microlophus</i>							6				2		8	0.60
21	<i>L. macrochirus</i>	12	3			8	28	29	12	27	22	6	1	148	11.18
22	<i>L. auritus</i>		1		3	2				5				11	0.83
23	<i>L. magalotis</i>									1				1	0.08
24	<i>Pomoxis annularis</i>	2						4	4	1	5	7	6	29	2.19
25	<i>P. nigromaculatus</i>						1	1	1	2	2	2	1	10	0.70
26	<i>Centrarchus macropterus</i>	1	1				1			1	1			5	0.39
	Total	47	144	46	125	111	125	114	85	166	129	95	138	1,325	100.00
	Game Fish Numbers	17	13	4	21	25	53	65	30	69	78	33	50	458	
	Rough Fish Numbers	30	131	42	104	86	72	49	55	97	51	62	88	867	
	Game Fish Percentage	36.17	9.03	8.70	16.80	22.52	42.40	57.02	35.29	41.57	60.47	34.74	36.23	34.57	
	Rough Fish Percentage	63.83	90.97	91.30	83.20	77.48	57.60	42.98	64.71	58.43	39.53	65.26	63.77	65.43	
	Number of Species	11	14	8	13	12	13	15	10	16	18	14	13		

Note: \* Indicates Rough Fish Species



Table 7. Standard Lengths in Millimeters of Some Species Showing Growth.

	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.		
Largemouth bass	Numbers		3	3		26	23	17	27	32	20	42		
	Range		140-152	155-258		23-305	38-275	60-238	60-369	74-253	82-335	78-340		
	Average		145.66	190.00		77.69	104.86	123.88	156.25	191.78	169.05	254.97		
Bluegill sunfish	Numbers	12	3											
	Range	98-143	88-135			117-137	93-178	90-138	83-143	91-138	100-142	100-135	130	
	Average	121.08	107.66			124.09	130.65	120.44	116.46	117.40	124.33	117.75	130.00	
Warmouth	Numbers		7		10									
	Range		95-141		103-161		95-138	100-150	106-150	103-125	110-157	108-156	106-160	118
	Average		110.28		126.50		111.20	118.70	119.31	113.40	133.92	129.75	131.00	118.00
White crappie	Numbers	2					5	4	1	5	7	6		
	Range	115-120					128-244	161-210	226	221-235	182-255	140-270		
	Average	117.50					174.05	185.00	226.00	226.40	226.85	237.83		
Black crappie	Numbers					1								
	Range					180								
	Average					180.00								
Black bullhead	Numbers	9	25	20	20	20	20	13	11	24	8	10	10	
	Range	140-322	123-287	167-292	140-333	162-295	133-267	23-275	145-280	163-283	110-285	122-305	115-250	
	Average	240.88	222.36	213.20	230.40	235.20	199.55	95.06	223.18	223.41	188.87	196.30	205.80	
Yellow bullhead	Numbers	6			6	8	3	6	10	20	7	16	10	
	Range	140-256			133-229	146-208	133-233	154-232	160-255	162-313	230-303	132-250	150-270	
	Average	179.16			173.50	169.62	184.33	193.83	200.00	227.40	247.85	191.50	208.00	

Table 8. Data on Condition of Netted Fish from Lake Murvaul.

Species	Numbers	Standard	Average	Weight	Average	"K" Range	Average "K"
		Length Range mm	Standard Length mm	Range gms	Weight gms		
<u>Ittalurus melas</u>	190	110-333	216.72	24-1219	357.78	1.23-4.87	2.92
<u>I. natalis</u>	92	132-313	203.32	45-822	226.98	1.70-3.41	2.35
<u>Lepomis macrochirus</u>	129	83-178	121.77	26-360	96.03	3.40-6.30	4.93
<u>L. microlophus</u>	5	104-147	117.40	43-127	65.80	3.47-4.04	3.84
<u>L. cyanelus</u>	5	102-115	107.80	40-60	53.20	2.97-4.28	3.79
<u>L. auritus</u>	3	131-141	135.33	125-143	132.00	5.19-5.59	5.39
<u>Micropterus punctulatus</u>	4	109-224	188.75	22-342	215.00	1.69-3.04	2.50
<u>M. salmoides</u>	112	137-369	236.75	40-1446	439.58	2.07-5.69	2.89
<u>Chaenobrytus gulosus</u>	72	95-161	121.48	39-199	84.50	2.57-5.70	4.36
<u>Pomoxis annularis</u>	30	115-270	207.26	46-851	380.30	2.11-4.45	3.52
<u>P. nigromaculatus</u>	9	110-251	191.55	38-652	299.55	2.85-4.37	3.62

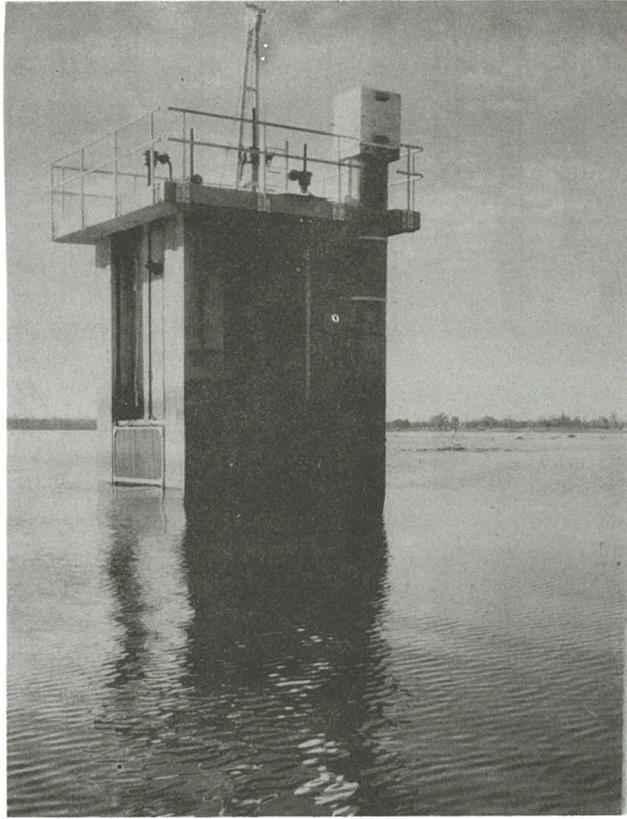


Figure 1. Outlet Tower at Lake Murvaul. This was the Location of Water Sample Station #1. (All photos by the author.)

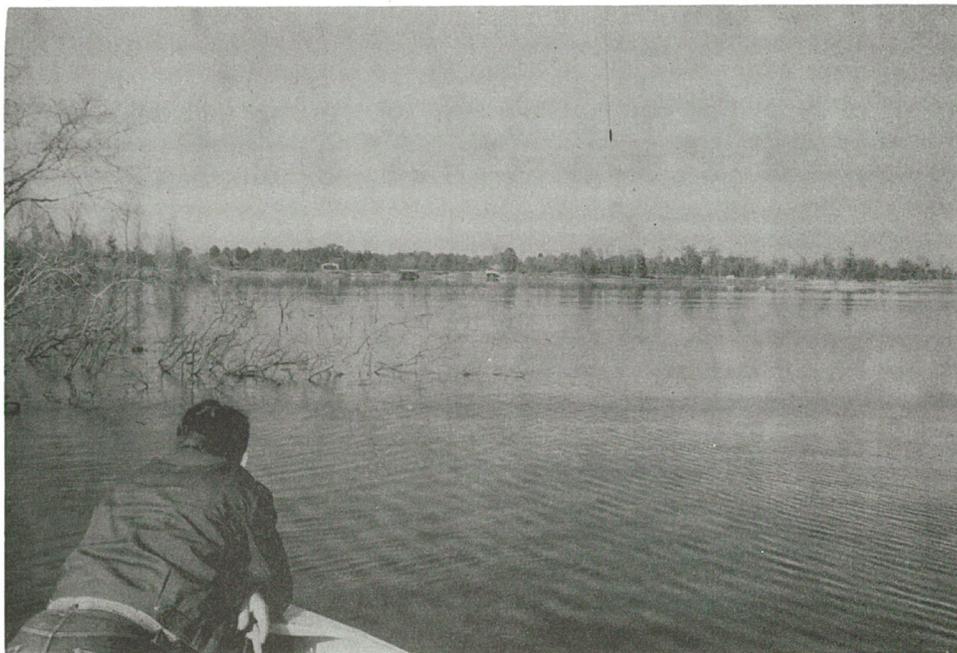


Figure 2. Midlake at East Edge of Timber. This was the Location of Water Sample Station #2.

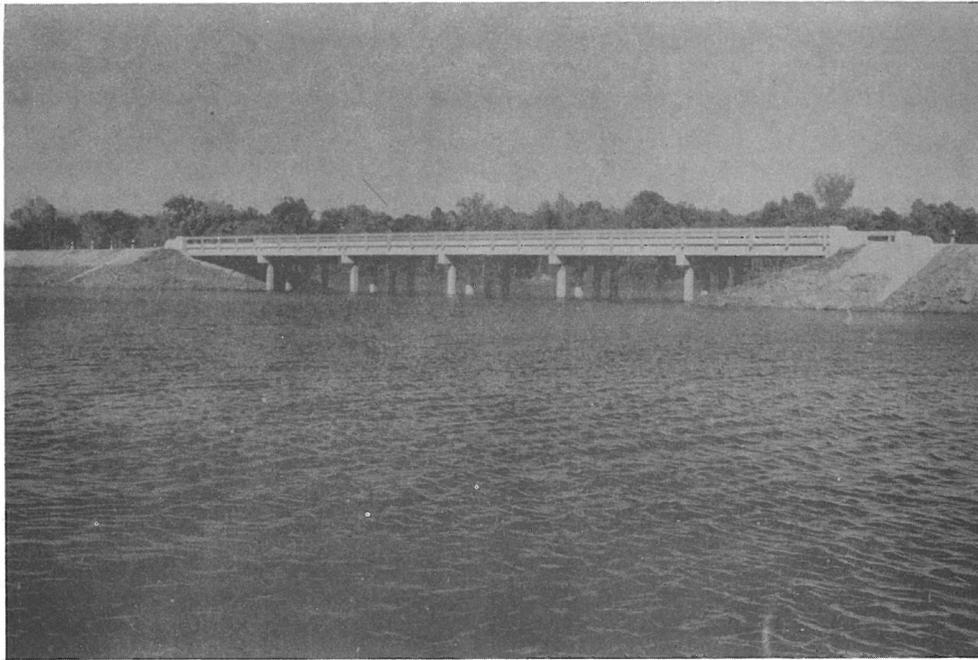


Figure 3. Dotson Bridge at the Upper End of Lake Murvaul. This was the Location of Water Sample Station #3.



Figure 4. Some of the Houses and Boat Houses That Have Already Been Built on the Shores of Lake Murvaul.



Figure 5. Typical Bullhead Catfish From the March 1958 Netting Collection. These "Ridiculous" Looking Fish Initiated Contract Netting on Lake Murvaul. Note the Pocket Knife at the Top of the Picture for a Size Comparison.



Figure 6. Two Black Bullheads From the March 1958 Collection.

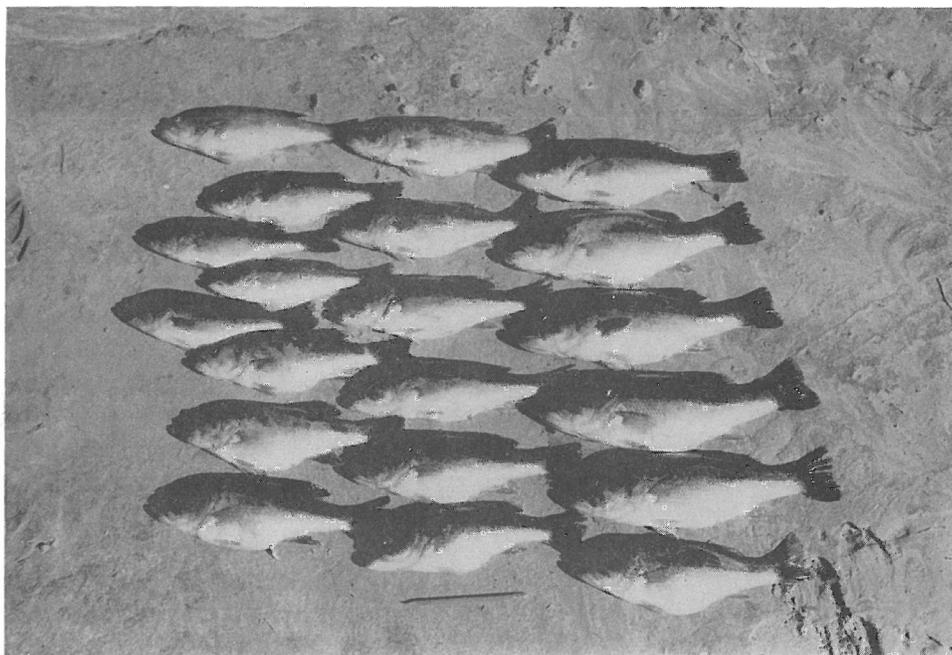


Figure 7. Seven Months Old Bass Taken From the November 1958 Netting Collection. These Bass Average  $1\frac{1}{4}$  Pounds in Weight. Note Size Compared to Pencil at Bottom.

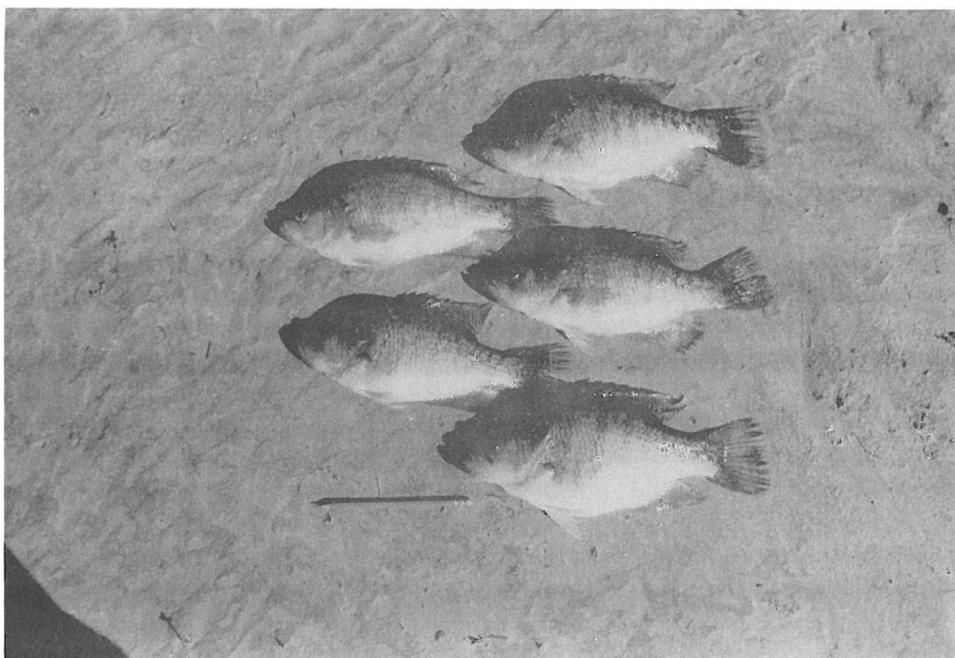


Figure 8. "Barn Door" Crappie Taken From Lake Murvaul in the November 1958 Netting Collection. Pencil is for Size Comparison.



Figure 9. Hatchery Bass Were Taken From the Trucks and Put in Tubs of Water in a Boat .....



Figure 10. .... From Which They Were Scooped up in a Bucket .....



Figure 11. .... and Released in the Lake at Different Locations.



Figure 12. Later Seining Collections Were Made in an Attempt to Determine the Growth of the Bass Fry as Well as to Make an Inventory of Species.

## Objectives: Part II

To gather additional information regarding the fish population in Lake Murvaul concerning numbers and condition of fish. This work stems from the fact that the lake will be closed to fishing through two spawning seasons and that bullhead catfish are being removed commercially, and further that the lake is being heavily stocked with flathead catfish as they are available.

## Procedure:

During this period data was collected bimonthly. As before, there were six gill net sets made each time at randomly selected locations. Only general limnological data was recorded. Seining collections were also made each time.

### 1. Netting Collections

Experimental type gill nets were set in the same manner as in Part I. Only 18 sets made up of 24 nets have been set during this period.

Fish caught in the nets were weighed collectively by species and individual game fish were weighed and measured for both standard and total lengths. Spot checks were made on stomach contents and sexual developments.

### 2. Seining Collections

Seining collections were made in the same manner as before.

### 3. Limnological Data

The only limnological data collected during this period were surface water temperature, air temperature, turbidity (Secchi disk), color of the water, cloud conditions, wind and time of net sets.

## Findings:

Insufficient data has been collected thus far to determine any population trends. The growth of the largemouth bass (as determined by averaging the weights of those caught) has tapered off momentarily. The bass were ready to spawn and some had already spawned in April. The rough fish species, excluding the bullhead catfishes were ripe and flowing in February, however, no fry have been taken by seining as of yet. Specimens taken by seining have been very few even compared to the same period during the first part. Perhaps the late cold weather has been responsible for this.

## Additional Stocking Record:

Through the cooperation of the U. S. Corps of Engineers and Game and Fish Commission personnel of Region 2-B, fish were obtained from the draft tubes at the Denison Dam Powerhouse. In all, there were 103 flathead catfish taken from these tubes and transferred to Lake Murvaul. The fish ranged from an estimated 2 to 40 pounds and averaged an estimated 5 to 6 pounds. In addition, there were 46 blue catfish averaging about 2 pounds transferred. This makes a total of over 450 adult flathead catfish stocked in the lake as part of the bullhead control program.

## Conclusions and Recommendations:

Insufficient data was collected during this second part of the project to evaluate fully. This period will be evaluated and reported fully at the end of the next segment because of the fact that the work done on the lake is being timed by the lake's anniversaries. The project periods overlap the anniversary periods. At the end of the lake's second anniversary (November 30, 1959) the second period will end and a new period will start whereby data will be taken quarterly for another year. Effects of public fishing (which began May 30, 1959) on the fish population will be determined.

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Approved by Marion Toole  
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Date September 25, 1959

