

JOB COMPLETION REPORT

As required by

FEDERAL AID IN FISHERIES RESTORATION ACT

TEXAS

Federal Aid Project No. F-7-R-9

Fisheries Investigations and Surveys of the Waters of Region 1-A

Job No. B-18 Fisheries Reconnaissance

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ABSTRACT

Buffalo Springs Lake, near Lubbock, was resurveyed on two occasions to determine condition and growth rate of species stocked following a total-kill treatment in September 1959, and to determine possible effects of periodic fish-kills caused by pollution on the immediate watershed. Although all of the game fish collected were in good condition, they had not grown at the expected rate. The number of game species collected was insufficient, and there was little indication of reproduction. The lake was restocked with 95,000 bass fry in May 1961.

Lakes Eddleman and Graham were resurveyed to determine, primarily, the condition and changes in the fishery that may have occurred since the selective rotenone treatments in 1959. Since these lakes are connected by a circulating ditch, factors affecting the fishery of one lake probably affects the other. With the exception of white bass, there were indications of successful reproduction of all game fish species, whereas reproduction of rough fish species has been limited, at least during the two spawning seasons prior to the resurveys. Black bullhead catfish are abundant in Lake Graham and are reproducing successfully. The selective-kill treatments in 1959 have apparently suppressed the populations of shad and drum. If future resurveys indicate an excessive increase of these species, additional introductions of white bass may be considered as a biological control.

Fisheries surveys were conducted at Lakes Baylor and Childress to determine relative abundance of species present, problems and factors influencing the fisheries and remedial management practices. All species collected were in good condition. Carp, present only in Baylor Lake, comprised 14.09 per cent of the total number taken and 67.8 per cent of the total weight. Bullhead catfish were present in both lakes, comprising 73.8 per cent of the total number and 58 per cent of the total weight. Black bass reproduced successfully in both lakes, whereas crappie failed to reproduce in either lake. Water quality was good in both lakes, however, water clarity causes some vegetation problems.

Fisheries investigations at Lake Pauline, near Quanah, disclosed that it was a typical "old-lake" fishery. Game fish comprised only 8.6 per cent of the collection and only 5.9 per cent of the total weight. Gizzard shad, carpsucker and carp combined made up 75 per cent of the collections. Carpsucker alone accounted for 45.4 per cent. There was no evidence of successful reproduction of any game fish species during the past several years. Overabundance of rough fish species and excessive turbidity is probably responsible for this lack of reproduction. The fish population was stunted and in poor condition. Recommendations included a total-kill treatment and restocking with a proper ratio of game fish species.

JOB COMPLETION REPORT

State of Texas

Project No. F-7-R-9

Name: Fisheries Investigations and Surveys
of the Waters of Region 1-A

Job No. B-18

Title: Fisheries Reconnaissance

Period Covered: January 1, 1961, to December 31, 1961

Objectives:

To conduct limited investigations to obtain current information concerning gross changes in fishing conditions and factors influencing fish populations.

Techniques Used:

Techniques of investigations varied according to the nature of the data needed. When a reconnaissance which constituted a limited survey was made, fish collections were made with gill nets ranging from 1- to 3-inch mesh, and with 20-foot one-eighth-inch mesh minnow seines. All fish were weighed, measured and sexed, and game fish species were examined for stomach contents. Condition factors were determined and abnormalities were noted. Tabulation of data collected in the field showed the percentage composition of the gill net catch in terms of numbers and weight, average weights of each species, and K factor ranges and averages for each species. Minnow collections were preserved and saved for laboratory identification and counting. The percentage composition of minnow samples were tabulated. Vegetation checks and water analyses were made when they were not available from previous surveys.

Findings:

Buffalo Springs Lake

Two reconnaissance surveys were made at Buffalo Springs Lake to determine growth and condition of species present.

Buffalo Springs Lake was given a total-kill rotenone treatment on September 27, 1959. The data concerning the treatment and the immediate results of the treatment are given in the job completion report for Project No. F-14-D-4, Job No. 16a-19. Following the kill, the lake was restocked with largemouth bass (Micropterus salmoides), channel catfish (Ictalurus punctatus), and white crappie (Pomoxis annularis). Restocking data is given in the job completion report for Project No. F-14-D-4, Job No. 18a-10.

On March 3, 1961, approximately 1½ years after restocking, 500 feet of experimental gill nets were set and two drags were made with a 200-foot one-half-inch mesh seine. The gill nets took only 1 game fish, a channel catfish, which weighed 0.83 pounds, and 62 black bullhead catfish (Ictalurus melas). The two seine drags took one bullhead and four golden shiners (Notemigenus crysoleucas).

Extremely cold water was the cause of the small number of fish collected.

The lake was again checked some four months later on June 27, 1961, with 10 experimental gill nets, and with 4 hoop nets specially designed to take bullhead catfish. This collection produced 7 channel catfish averaging 1.05 pounds, 1 white bass (Roccus chrysops) weighing 0.75 pounds, 2 black bass (Micropterus sp.) averaging 0.69 pounds, and 4 crappie averaging 0.21 pounds. An additional four crappie were partially eaten by turtles and could not be processed. K factors showed game fish to be in good condition. The single channel catfish taken on March 3 had a K factor of 2.5. Average K factors of game fish taken on June 27 were: channel catfish 2.0, black bass 2.6, crappie 3.0, and white bass 3.5. Although in good condition, these fish had not grown at the expected rate. At the time of the last check, the largest game fish, all of which were about two years old, weighed less than 1½ pounds. The slow growth rate of game fish at Buffalo Springs Lake is attributed to a short "growing season" due to early cooling of the lake in the fall of the year.

Buffalo Springs Lake was stocked with 95,000 bass fry in May 1961.

Lakes Eddleman and Graham

Objectives:

To determine the condition of the fish population of these lakes, to note management practices that could be used to improve the fishery, and to determine the extent to which shad and drum have repopulated these lakes since the selective rotenone treatment in 1959.

Procedure:

Field work done on July 10-14, 1961, and on October 17-18, 1961, included seining with 20-foot one-eighth-inch mesh nylon minnow seine, netting with experimental gill nets and 3-inch mesh gill nets, and a vegetation check.

Lake Description: Both lakes are situated approximately three miles north of the city of Graham. Lake Eddleman was impounded by a rock and earth dam across Flint Creek in 1928. Lake Graham was impounded by a rock and earth dam across Salt Creek in 1959.

Lake Eddleman has a capacity of 12,000 acre-feet and covers 700 acres at spillway level. Lake Graham has a capacity of 39,000 acre-feet and will cover 1,800 acres at spillway level. At the time of these surveys, the lakes were 12 feet below spillway level.

Water is pumped from Lake Eddleman to supply water to the city of Graham. An electric company uses water from Lake Graham for cooling purposes. It is pumped through the plant and emptied into Lake Eddleman where it circulates and returns to Lake Graham through a large connecting ditch. Both lakes are open to free public fishing, waterfowl hunting and boating. Skiing and swimming are permitted in Lake Graham. Numerous access points are located on both lakes.

Findings:

Vegetation: The following plants were found in the noted abundance:

<u>Species</u>	<u>Lake Graham</u>	<u>Lake Eddleman</u>
Black Willow	Frequent	Frequent
Salt Cedar	Rare	Common
Lotus	-	Abundant
Cattail	Common	Common
Sedges (Five species)	Frequent	Frequent
Bulrush	Rare	Common
<u>Chara</u> sp.	Abundant	Frequent
Smartweed	Common	Common
<u>Potamogeton</u> sp.	Common	Rare
Water Primrose	Abundant	Frequent

Fish Collections: The following species were taken by either gill netting or by seining on July 11-13, 1961, and the results are shown in Tables 1 through 3:

<u>Common Name</u>	<u>Scientific Name</u>
Shortnose Gar	<u>Lepisosteus platostomus</u>
Longnose Gar	<u>Lepisosteus osseus</u>
Gizzard Shad	<u>Dorosoma cepedianum</u>
Smallmouth Buffalo	<u>Ictiobus bubalus</u>
River Carpsucker	<u>Carpiodes carpio</u>
Carp	<u>Cyprinus carpio</u>
Golden Shiner	<u>Notemigonus crysoleucas</u>
Blacktail Shiner	<u>Notropis venustus</u>
Red Shiner	<u>Notropis lutrensis</u>
Mimic Shiner	<u>Notropis volucellus</u>
Bullhead Minnow	<u>Pimephales vigilax</u>
Channel Catfish	<u>Ictalurus punctatus</u>
Black Bullhead	<u>Ictalurus melas</u>
Blackstripe Topminnow	<u>Fundulus notatus</u>
Mosquitofish	<u>Gambusia affinis</u>
Largemouth Bass	<u>Micropterus salmoides</u>
Warmouth	<u>Chaenobryttus gulosus</u>
Green Sunfish	<u>Lepomis cyanellus</u>
Spotted Sunfish	<u>Lepomis punctatus</u>
Bluegill Sunfish	<u>Lepomis macrochirus</u>
Orangespotted Sunfish	<u>Lepomis humilis</u>
White Crappie	<u>Pomoxis annularis</u>
Freshwater Drum	<u>Aplodinotus grunniens</u>

Food Habits: Stomach contents of the game species are illustrated in Tables 4 and 5.

Condition Factors: K factors of species collected during these surveys are exhibited in Tables 6 and 7. All game fish were in good condition.

Spawning Success: Seining results indicate a large spawn of bluegill, and a satisfactory spawn of largemouth bass. Few fingerling crappie and no fingerling channel catfish were taken by seining. However, gill net results indicate excellent reproduction of crappie and good reproduction of channel catfish and bass last year. Only a few fingerlings or fry of any rough fish species were taken. Inspection of river carpsuckers showed that they have not, and will not, spawn

successfully this year. Similarly, carp apparently have not successfully spawned thus far this year. Only one spent female was taken, and all but a small part of the remaining female carp had begun to reabsorb their eggs. Slowly but steadily dropping water levels during the spawning season probably account for this. In general, spawning of game fish has been successful while spawning of rough fish has been limited, at least for the past two spawning seasons. Not a single young-of-the-year, or 1-year old carpsucker, carp or buffalo was taken, however, some spent female buffalo were taken. White bass, reported as present but rare in April 1958 apparently have failed to reproduce. (See Fisheries Survey of Lake Eddleman, F-7-R-5.) None were taken during this survey, and several fishermen reported that they know of none being taken in the past year. Black bullhead catfish are abundant in Lake Graham, and the presence of many spent female bullheads in the gill net catch indicates successful reproduction of this species.

Discussion: Since Lakes Graham and Eddleman are connected by a large ditch through which fish can easily pass from one lake to the other, and through which water circulates from one lake to the other, conditions affecting the fishery of one lake must necessarily affect the other. Water passing through the electric plant is heated considerably, and the large amount of water pumped through the plant creates a strong current at the outlet and in the connecting ditch. The effect of the inflow of warm water and currents on the distribution and movements of fish in these lakes has not been determined. It seems logical, however, that fish would respond markedly to these conditions, especially during colder months. Water passing through the electric plant warms about 5° or 6° F., and the water flow was reported to be 150,000 gallons per minute. These conditions would be ideal for a study of the seasonal effects of inflowing warm water on the distribution of fish species. It is possible that some type of rough fish control project for these lakes could be evolved from such a study. It certainly is worthy of further investigation.

During the July survey, for some unknown reason, the bullhead population was concentrated in the new lake. Possibly food was more abundant there or perhaps the netting of Lake Eddleman failed to show the true bullhead population of that lake. At any rate, the gill net catch in Lake Graham consisted of 30.18 per cent bullheads, while none were taken in Lake Eddleman. Lake Graham was rechecked on October 18, and this collection showed only 3.68 per cent bullheads, which is probably more accurate.

The percentages of game fish consisting of channel catfish, black bass and crappie taken during July were:

	<u>Per Cent by Number</u>	<u>Per Cent by Weight</u>
Lake Graham	21.57	13.85
Lake Eddleman	59.53	16.64

The numerical difference was due to a large catch of small crappie in Lake Eddleman, and a large catch of bullheads in Lake Graham. The difference in weight percentage was due to the catch of several large smallmouth buffalo and carp in Lake Eddleman.

The selective control of shad and drum (1959) seems to have suppressed these two species considerably. In 1958 the population of shad in Lake Eddleman was reported to be 9.5 per cent of the total population as determined from the gill

net catch. Shad were recorded as "very abundant" from the seine samples. During the July survey, shad accounted for only 3.02 per cent of the gill net catch from Lake Eddleman, and they were scarce in seine samples. In Lake Graham, 79 shad were taken in gill nets which constituted 13.86 per cent of the total, but only 4 out of 740 fish taken by seining were shad. Drum accounted for less than 3 per cent of the gill net catch in both lakes, and no drum were taken by seining.

Recommendations:

Chara is abundant in Lake Graham, but does not constitute a problem at present. Small areas of cattail and bulrush were noted in shallow areas of the upper section of the lake. These patches should be killed out next spring provided that they are not covered by the expected 10-foot rise in water level. The control of some 10 to 15 acres of lotus will likewise be necessary next spring if they are not inundated before that time.

Whether or not white bass should be introduced into these lakes in an effort to establish a white bass fishery should depend on the concensus of local fishermen. There is a difference of opinion among fishermen regarding the desirability of white bass as a desirable game fish. It seems questionable whether white bass would help to control shad, sunfish, drum and other rough fish without becoming serious competitors to crappie and largemouth bass. If shad start increasing in the future, it would probably be wise to introduce white bass as a control.

Table 1. Netting results, Lake Graham, July 11-13, 1961, using experimental nets and 1,400 feet of 3-inch mesh gill net

<u>Species</u>	<u>Number</u>	<u>Per Cent by Number</u>	<u>Weight</u>	<u>Per Cent by Weight</u>	<u>Average Weight</u>
Shortnose Gar	4	.70	13.28	2.19	3.32
Longnose Gar	5	.87	16.89	2.77	3.38
Shad	79	13.86	11.71	1.92	.15
Smallmouth Buffalo	38	6.67	125.67	20.67	3.31
Carp sucker	70	12.28	150.94	24.82	2.16
Carp	40	7.02	151.70	24.94	3.79
Golden Shiner	1	.18	.13	.03	.13
Channel Catfish	61	10.70	57.32	9.43	.94
Black Bullhead	172	30.18	38.47	6.32	.22
Warmouth	1	.18	.14	.02	.14
Black Bass	12	2.10	18.30	3.01	1.53
Longear Sunfish	7	1.22	.54	.09	.08
Bluegill	23	4.04	2.00	.33	.09
White Crappie	50	8.77	8.60	1.41	.17
Drum	<u>7</u>	<u>1.23</u>	<u>12.46</u>	<u>2.05</u>	<u>1.78</u>
Totals	570	100.00	608.15	100.00	

Table 2. Netting results, Lake Graham, October 18, 1961, using seven gill nets, 1- to 3-inch mesh

<u>Species</u>	<u>Number</u>	<u>Per Cent by Number</u>	<u>Weight</u>	<u>Per Cent by Weight</u>	<u>Average Weight</u>
Shad	28	17.17	3.40	3.16	.12
Carp sucker	13	7.98	35.82	33.29	2.76
Carp	7	4.29	21.35	19.85	3.05
Channel Catfish	15	9.21	25.64	23.84	1.71
Bullhead	6	3.68	1.09	1.01	.18
Black Bass	5	3.06	10.11	9.40	2.02
Crappie	<u>89</u>	<u>54.61</u>	<u>10.16</u>	<u>9.45</u>	<u>.11</u>
Totals	163	100.00	107.57	100.00	

Table 3. Seining results, Lake Graham and Lake Eddleman, July 11-13, 1961

	<u>Lake Eddleman</u>		<u>Lake Graham</u>	
	<u>Number</u>	<u>Per Cent</u>	<u>Number</u>	<u>Per Cent</u>
Gizzard Shad	15	3.77	4	0.54
Golden Shiner	0	0	4	0.54
Blacktail Shiner	3	0.76	54	7.29
Red Shiner	3	0.75	109	14.73
Mimic Shiner	18	4.54	1	0.14
Bullhead Minnow	29	7.30	40	5.40
Blackstripe Topminnow	96	24.18	101	13.65
Mosquitofish	42	10.58	195	26.35
Largemouth Bass	14	3.53	13	1.76
Warmouth	0	0	1	0.14
Green Sunfish	6	1.51	7	0.94
Spotted Sunfish	54	13.60	63	8.52
Bluegill	116	29.22	142	19.18
Orangespotted Sunfish	0	0	3	0.41
White Crappie	<u>1</u>	<u>0.26</u>	<u>3</u>	<u>0.41</u>
Totals	397	100.00	740	100.00

Table 4. Stomach analysis of fish taken from Lake Graham

<u>Species</u>	<u>Number</u>	<u>With Food</u>	<u>With Plant Material</u>	<u>With Algae</u>	<u>With Insects</u>	<u>With Insect Larvae</u>	<u>With Fish Remains</u>	<u>With Insect Eggs</u>
Channel Catfish	36	28	7	7	12	2	7	0
Black Bass	18	7	0	0	2	0	6	0
Crappie	8	7	0	0	0	4	3	1

*Size of remains indicate that the fish were not eaten whole. The remains consisted of large fish scales or large fish bones.

Table 5. Stomach analysis of fish taken from Lake Eddleman

<u>Species</u>	<u>Number</u>	<u>With Food</u>	<u>With Algae</u>	<u>With Insects</u>	<u>With Insect Larvae</u>	<u>With Crustaceans</u>	<u>With Caddis-fly Case</u>	<u>With Fish</u>
Channel Catfish	14	6	3	2	1	0	0	0
Black Bass	3	0	0	0	0	0	0	0
Crappie	18	13	0	1	6	3	1	3

Lakes Baylor and Childress

Objectives:

To determine fish populations, problems and factors influencing the fisheries, and management practices needed to improve the fishery.

Procedure:

Field work done June 8-9, 1961, included a vegetation check, seining with 20-foot one-eighth-inch mesh minnow seine, gill netting with 1,175 feet of 1- to 3-inch mesh gill net in Baylor Lake, and 675 feet of 1- to 3-inch mesh gill net in Childress. Water analyses were made at both lakes.

Lake Description and Background Information: These lakes are located in Childress County, nine miles west of the city of Childress. Baylor Lake is normally about 600 acres with a maximum depth of 45 feet. Childress Lake is normally 175 acres with a maximum depth of 22 feet.

Baylor Lake was built in 1950 by the construction of an earthen dam across Baylor Creek approximately one mile below the confluence of Cox and Baylor Creeks. Childress Lake was built in 1923 by the construction of an earthen dam across a tributary of Baylor Creek.

Baylor Lake is used for water supply for the city of Childress, for fishing, waterfowl hunting, and for boating. Skiing is restricted to an area along the dam. Childress Lake is also used for water supply, waterfowl hunting, and fishing. Skiing and boating are not allowed.

Baylor Lake has been stocked yearly since its construction with black bass, white bass, bluegill and redear sunfish, white crappie, channel catfish and flathead catfish. The flathead catfish (96) were stocked as fingerlings in 1955. Childress Lake has been stocked frequently in the past 10 years with white crappie, black bass and channel catfish. A small number of flathead catfish were stocked in 1955.

Baylor Lake receives heavy fishing pressure from Panhandle fishermen which has been the reason for repeated stockings of game fish. Fishing is limited to three months per year. No other management practices have been attempted. Childress Lake has been drained and restocked twice; first in 1948 and again in 1955. Copper sulphate has been used to control algae. Fishing is limited to three months per year.

Findings:

Vegetation: The following plants were found in the noted abundance:

Salt Cedar	Frequent
Green algae	Abundant
Bushy Pondweed	Frequent
<u>Chara</u>	Abundant
Smartweed	Frequent
Black willow	Frequent
Sedge	Frequent

Fish Collections: The following fish species were taken by either gill nets or by seines on June 8-9, 1961. (Tables 8 through 11.)

<u>Common Name</u>	<u>Scientific Name</u>
*Carp	<u>Cyprinus carpio</u>
Red Shiner	<u>Notropis lutrensis</u>
Channel Catfish	<u>Ictalurus punctatus</u>
Black Bullhead	<u>Ictalurus melas</u>
**Flathead Catfish	<u>Pilodictus olivaris</u>
Plains Killifish	<u>Fundulus kansae</u>
White Bass	<u>Roccus crysops</u>
Largemouth Bass	<u>Micropterus salmoides</u>
Green Sunfish	<u>Lepomis cyanellus</u>
Spotted Sunfish	<u>Lepomis punctatus</u>
Redear Sunfish	<u>Lepomis microlophus</u>
Bluegill	<u>Lepomis macrochirus</u>
White Crappie	<u>Pomoxis annularis</u>

*Not found in Childress Lake

**Stocked by hatchery, but not taken by nets or seines

Food Habits: Stomach analyses of game fish were performed to determine food habits, and the results are shown in Tables 12 and 13.

Water Condition: A water analysis was performed by the Soils Laboratory of Midwestern University, Wichita Falls, Texas. (Table 14.) Water quality is considered good in both lakes; however, the clarity of the water causes some vegetation problems. Baylor Lake is very deep in most of the lower areas.

Condition Factors: All fish were in good condition. The K factors are given in Tables 15 and 16.

Spawning Success: The 21 carp (14.09 per cent) taken in Baylor Lake were all large indicating little reproduction of this species. The carp weighed an average of 5.28 pounds each, and comprised 67.82 per cent of the total weight of fish taken. Black bass evidently have spawned quite well in both lakes this year. Crappie have failed to reproduce successfully in either lake.

Recommendations:

Both Baylor and Childress Lakes should be stocked with adequate fingerling crappie next fall. As Baylor Lake does not have an adequate minnow population, it should be stocked with bullhead minnows and red shiners.

Both lakes should be fertilized in the spring of 1962 with 150 pounds of 16-20-0 per acre in order to increase production and to shade out vegetation.

An attempt should be made to remove black bullheads and carp. Large hoop nets baited with stale bread should be used for removal of carp, and smaller (three-fourths-inch mesh) hoop nets baited with meat scraps or cottonseed cake should be used to remove bullheads.

Table 8. Netting results from Childress Lake, June 8-9, 1961

<u>Species</u>	<u>Number</u>	<u>Per Cent</u>	<u>Weight</u>	<u>Per Cent by Weight</u>	<u>Average Weight</u>
Channel Catfish	7	16.66	14.89	35.93	2.13
Black Bullhead	31	73.81	24.04	58.01	0.78
Black Bass	2	4.76	1.96	4.73	0.98
Bluegill	<u>2</u>	<u>4.77</u>	<u>0.55</u>	<u>1.33</u>	0.28
Totals	42	100.00	41.44	100.00	

Table 9. Netting results from Baylor Lake, June 8-9, 1961

<u>Species</u>	<u>Number</u>	<u>Per Cent</u>	<u>Weight</u>	<u>Per Cent by Weight</u>	<u>Average Weight</u>
Carp	21	14.09	110.78	67.82	5.28
Channel Catfish	19	12.75	24.03	14.71	1.26
Black Bullhead	100	67.11	24.86	15.22	0.25
White Bass	3	2.02	2.52	1.54	0.84
Bluegill	1	0.67	0.44	0.27	0.44
Green Sunfish	1	0.67	0.24	0.15	0.26
White Crappie	<u>4</u>	<u>2.69</u>	<u>0.47</u>	<u>0.29</u>	0.12
Totals	149	100.00	163.34	100.00	

Table 10. Seining results, Childress Lake, June 8-9, 1961

<u>Species</u>	<u>Number</u>
Largemouth Bass	60
Red Shiner	119
Plains Killifish	9
Green Sunfish	6

Table 11. Seining Results, Baylor Lake, June 8-9, 1961

<u>Species</u>	<u>Number</u>
Red Shiner	1
Green Sunfish	7
Spotted Sunfish	4
Bluegill	1
Plains Killifish	1
Largemouth Bass	148

Table 12. Stomach analysis - Baylor Lake

<u>Species</u>	<u>Number</u>	<u>With Food</u>	<u>With Grain</u>	<u>With Insects</u>	<u>With Fish</u>	<u>With Algae</u>	<u>With Snails</u>
Black Bullhead	15	11	-	8	-	4	-
White Bass	4	4	-	4	1	-	-
White Crappie	4	2	-	2	-	-	-
Channel Catfish	19	9	9	3	1	1	-

Table 13. Stomach analysis - Childress Lake

<u>Species</u>	<u>Number</u>	<u>With Food</u>	<u>With Grain</u>	<u>With Insects</u>	<u>With Fish</u>	<u>With Algae</u>	<u>With Snails</u>
Black Bullhead	15	8	-	3	-	4	7
Channel Catfish	7	6	-	6	1	4	-
Black Bass	2	2	-	2	-	-	-

Table 14. Results of water analysis of Baylor Lake and Childress Lake

	<u>Baylor</u>	<u>Childress</u>
Calcium	316	152
Magnesium	65	65
Sodium	11	17
Chloride	18	28
Sulfate	758	510
Carbonate	0	0
Bicarbonate	98	146
Total Soluble Salts	1266	918
pH	7.7	7.7
Conductivity	1800	1224

Table 15. Condition Factors for Childress Lake

<u>Species</u>	<u>Number</u>	<u>Range</u>	<u>Average</u>
Channel Catfish	7	1.6 - 2.1	1.8
Black Bullhead	15	2.2 - 3.1	2.6
Black Bass	2	2.6 - 2.9	2.7
Bluegill	2		4.9

Table 16. Condition Factors for Baylor Lake

<u>Species</u>	<u>Number</u>	<u>Range</u>	<u>Average</u>
Carp	21	2.4 - 3.9	2.7
Channel Catfish	19	1.6 - 2.4	1.9
Black Bullhead	15	2.3 - 2.9	2.6
White Bass	3	2.5 - 2.7	2.6
Bluegill	1		5.0
Green Sunfish	1		4.5
White Crappie	4	2.8 - 3.3	3.0

Lake Pauline

Objective:

To determine species present, fisheries problems, and management practices needed to improve the fishery.

Procedure:

Field work done on April 26-27, 1961, included netting using 1,625 feet of gill net, with 1- to 3-inch mesh, seining with 20-foot one-eighth-inch mesh nylon minnow seine, a vegetation check and water analysis.

Lake Description: Lake Pauline is located in Hardeman County approximately five miles southeast of Quanah, Texas, and covers about 600 surface acres with a maximum depth of about 25 feet.

It was built in the 1920's by the construction of an earthen dam across Wanders, about two miles below the confluence of Wanders Creek with South Wanders Creek. An electric company which controls the lake uses the water for cooling purposes.

Records of any management practices could not be found, and no stocking records were available.

Vegetation: The following plants were found in the noted abundance:

<u>Species</u>	<u>Abundance</u>
Black Willow	Abundant
Cottonwood	Frequent
Salt Cedar	Abundant
Green Algae	Frequent
Smartweed	Frequent
Sedge	Frequent
Bluegreen Algae	Common

Fish Collections: The following species were taken by gill net or by seining, and the results are shown in Tables 17 and 18:

<u>Common Name</u>	<u>Scientific Name</u>
Longnose Gar	<u>Lepisosteus osseus</u>
Shad	<u>Dorosoma cepedianum</u>
Carp sucker	<u>Carpionodes carpio</u>
Carp	<u>Cyprinus carpio</u>
Channel Catfish	<u>Ictalurus punctatus</u>
Black Bullhead	<u>Ictalurus melas</u>
White Bass	<u>Roccus chrysops</u>
Black Bass	<u>Micropterus salmoides</u>
White Crappie	<u>Pomoxis annularis</u>
Freshwater Drum	<u>Aplodinotus grunniens</u>
Plains Killifish	<u>Fundulus kansae</u>
Bullhead Minnow	<u>Pimephales vigilax</u>
Red Shiner	<u>Notropis lutrensis</u>
Redspot Sunfish	<u>Lepomis punctatus</u>
Green Sunfish	<u>Lepomis cyanellus</u>
Bluegill Sunfish	<u>Lepomis macrochirus</u>
Mosquitofish	<u>Gambusia affinis</u>

Condition Factors: An overabundance of fish is causing serious competition for space and food, and is responsible for lower than average K factors and stunted fish. (Table 19.)

Water Quality: The water quality of Lake Pauline is suitable for fish life. A water analysis report, prepared by the Soils Laboratory of Midwestern University, Wichita Falls, Texas, is contained in Table 21.

Spawning Success: No evidence was found from either netting or seining that there has been good spawns of game fish last year or in recent years. Overcrowded conditions and turbidity probably limit the spawning of bass, while poor physical condition is responsible for the unsuccessful reproduction of channel catfish.

Findings:

Lake Pauline is an old lake which was built in the 1920's, and has a typical "old lake" fish population. Game fish (black bass, white bass, channel catfish, and crappie) comprised only 8.63 per cent of the gill net catch, and only 5.93 per cent of the total weight. Gizzard shad, carp sucker and carp together comprised 75 per cent of the catch, and carp sucker alone accounted for 45.44 per cent. There is little cover present.

Recommendations:

In view of the extremely low game fish population and the large and varied population of rough fish species present, the present fishery of Lake Pauline should be eliminated. Restocking with white crappie, black bass, and channel catfish should follow.

Cover for crappie, in the form of brush piles, should be installed which, in addition to supplying cover, would provide fishing places for late winter and spring fishing.

Toxephene should be used for a fish toxicant in order to insure a complete kill on bullheads, carpsucker and other rotenone-resistant species which are present.

Care should be taken to treat completely all areas of both creeks entering the lake and all watershed ponds and tanks. This will prolong reinfestation by rough fish.

If the recommendation for total eradication of present population can not be carried out, a selective-kill treatment using rotenone powder should be applied, followed by a program for the removal of carpsucker and carp. This could be effected by use of baited hoop nets. Due to the large size of carpsucker in Lake Pauline, whose average weight is 2.63 pounds, 3-inch mesh gill nets would be effective and quite selective for their removal, but this should be attempted only during fall or winter, and only by an experienced commercial fisherman.

Prepared by _____
(Project Leader)

Approved by Marion Toole
(Coordinator)

Date January 22, 1962

Leo D. Lewis
(Regional Supervisor)

Table 17. Lake Pauline seining results using 20-foot one-eighth-inch mesh minnow seine, April 27, 1961

<u>Species</u>	<u>Number</u>
Shad	1
Plains Killifish	7
Bullhead Minnow	22
Mosquitofish	80
Red Shiner	1,047
Redspot Sunfish	23
Green Sunfish	2
Bluegill Sunfish	9

Table 18. Lake Pauline netting results, April 26-27, 1961, using 1,625 feet gill net with 1- to 3-inch mesh

<u>Species</u>	<u>Number</u>	<u>Per Cent</u>	<u>Weight</u>	<u>Per Cent by Weight</u>	<u>Average Weight</u>
Longnose Gar	1	0.25	4.22	0.75	4.22
Gizzard Shad	54	13.70	15.71	2.83	0.29
Carp	179	45.44	452.78	81.34	2.64
Channel Catfish	68	17.25	30.34	5.45	0.45
Black Bullhead	14	3.56	12.96	2.33	0.93
White Bass	42	10.66	7.16	1.28	0.17
Black Bass	10	2.54	13.25	2.38	1.33
White Crappie	6	1.52	4.69	0.85	0.78
Drum	4	1.01	2.08	0.37	0.52
Redspot	11	2.80	13.16	2.36	1.20
Bluegill	3	0.76	0.15	0.03	0.05
	2	0.51	0.13	0.03	0.07
Totals	394	100.00	556.63	100.00	

Table 19. Lake Pauline Coefficient of Condition, April 27, 1961

<u>Species</u>	<u>Number</u>	<u>Range</u>	<u>Average</u>
Longnose Gar	1		0.5
Shad	10	1.8 - 2.2	2.0
Carp	15	2.8 - 3.5	3.0
Channel Catfish	15	2.3 - 3.2	2.7
Black Bullhead	10	1.5 - 1.9	1.7
White Bass	10	2.3 - 3.0	2.6
Black Bass	10	2.9 - 3.7	3.1
Crappie	6	2.5 - 2.7	2.6
Drum	4	2.8 - 3.3	3.0
	11	2.1 - 2.8	2.5

Table 20. Stomach Analysis, Lake Pauline, April 27, 1961

<u>Species</u>	<u>Number Examined</u>	<u>Number With Food</u>	<u>Food Items</u>	<u>Fre. Occ.</u>	<u>Number Identified</u>
Charmel Catfish	9	7	Fish remains	4	4
			Plant material	2	-
			Algae	4	-
			Fly larvae	1	3
White Bass	10	3	Fish remains	2	2
			Shad	1	1
Crappie	4	3	Fish remains	2	2
			Shad	1	2
Black Bass	5	2	Fish remains	2	2
Black Bullhead	7	4	Fish scales (lg.)	3	61
			Plant material	2	-
			Fly larvae	1	1
			Fly larvae	2	11
Drum	9	3	Crawfish	1	1
			Fish remains	1	1

Table 21. Results of water analysis, Lake Pauline

Calcium	244
Magnesium	84
Sodium	90
Chloride	178
Sulfate	629
Carbonate	0
Bicarbonate	<u>134</u>
Total Soluble Salts	1359
pH	7.5
Conductivity	1725