

JOB COMPLETION REPORT

As required by

FEDERAL AID IN FISHERIES RESTORATION ACT

TEXAS

Federal Aid Project No. F-7-R-10

FISHERIES INVESTIGATIONS AND SURVEYS OF THE WATERS OF REGION I-A

Job No. B-18 Fisheries Reconnaissance

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ABSTRACT

Reconnaissance surveys were made at Lakes Pauline, Childress, Baylor, Buffalo and Buffalo Springs to determine changes in fish populations, to note specific fisheries problems, and to recommend development or management measures. Surveys at Lakes Fryer, Tulia, and Aspermont were made to provide basic data, since no previous survey data were available.

Survey data from Lake Pauline substantiated previous data which indicated a need for a complete renovation of the fishery. An F-14-D job description for this lake is being submitted. Lakes Baylor and Childress still have high bullhead populations, but both lakes were stocked with flathead catfish as a control measure. The black bullhead is the only undesirable species recorded from Lake Childress, while Lake Baylor has both bullheads and carp. Tulia Lake is far out of balance and will receive a total kill. Lake Fryer has high bullhead and stunted crappie populations, and will need some development work. Extensive development will not be done, however, until the spillway is modified to prevent fish from entering the lake from downstream areas.

Buffalo Springs Lake was found to have an excessive bullhead population and was stocked with 1200 to 1500 flathead catfish fingerlings to help alleviate the problem. Aspermont Lake has a fairly well balanced fish population, but needs a selective kill to remove shad and stunted crappie. Aspermont Lake also needs spraying for bulrush control.

JOB COMPLETION REPORT

State of Texas

Project No. F-7-R-10 Name: Fisheries Investigations and Surveys of the
Waters of Region 1-A

Job No. B-18 Title: Fisheries Reconnaissance

Period Covered January 1, 1962 - December 31, 1962

Objectives:

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

Techniques Used:

In most cases, seine samples were collected with twenty-foot one-eighth inch mesh minnow seines, but in some cases where the twenty-foot seines were not effective or where additional data were needed, 200 and 300 foot, one-half inch mesh seines were used. Samples were taken from different ecological areas and were preserved in 10 per cent formalin for laboratory identification and counting. Gill nets ranging in mesh size from one inch to three inches were used to collect samples of larger fish. From netting collections; percentage composition, K factors, average weights, and food habits of game species were determined. K factors were determined from standard length measurements using the alignment chart method.

Physical data collected during each survey included water and air temperatures, wind speed and direction, and weather conditions. Other data concerning vegetation, cover, fishing pressure, chemical analysis, etc. were collected where pertinent to the fishery problems involved. Table 51 at the end of this report is a checklist of fish species taken from the waters surveyed during this segment.

Findings:

During this segment, reconnaissance work was done at Lakes Fryer, Pauline, Childress, Baylor, Buffalo, Buffalo Springs, Aspermont, and Tulia, Lakes Fryer, Aspermont, and Tulia, all fairly small impoundments, were surveyed to obtain basic information. The remaining lakes have been surveyed in the past.

Lake Pauline

A survey of Lake Pauline in April 1961, revealed a fish population consisting of less than 10 per cent game fish species. Gizzard shad, carp, and carpsucker accounted for 75 per cent of the population. Carpsucker alone comprised 45.44 per cent. All game species and most rough species were in poor condition due to the overcrowded condition existing. A recommendation was made to eradicate the entire fish population and to restock with adequate numbers of game and forage species.

During May 1962, a similar survey was made using eight gill nets each consisting of 25 feet of 1, 1½, 2, 2½, and 125 feet of 3-inch mesh. The gill net results of this survey are given in Table 1. A comparison with the gill net results of the survey made in 1961 (Table 2) shows a similar rough fish to game fish ratio.

Table 1. Percentage Composition by Number and Weight, and Average Weight of Fish Species Taken by Gill Nets from Lake Pauline. April 1962.

Species	Number	Per Cent by Number	Total Weight	Per Cent by Weight	Average Weight
Channel Catfish	7	2.09	4.05	1.14	.58
White Bass	7	2.10	8.46	2.39	1.21
Bluegill Sunfish	4	1.19	.35	.10	.09
Shad	155	46.41	30.63	8.67	.20
Carp	73	21.86	105.30	29.80	1.44
Carp sucker	81	24.25	196.55	55.61	2.43
Largemouth Bass	2	.60	3.89	1.10	1.95
Freshwater Drum	4	1.20	4.04	1.14	1.01
Green Sunfish	1	.30	.15	.05	.15
Totals	334	100.00	353.42	100.00	
Game Fish	21	6.28			
Rough Fish	313	93.72			

Table 2. Lake Pauline Netting Results, April 26-27, 1961, Using 1,625 Feet Gill Net with 1- to 3-inch Mesh.

Species	Number	Per Cent by Number	Total Weight	Per Cent by Weight	Average Weight
Longnose Gar	1	0.25	4.22	0.75	4.22
Gizzard Shad	54	13.70	15.71	2.83	0.29
Carp sucker	179	45.44	452.78	81.34	2.64
Carp	68	17.25	30.34	5.45	0.45
Channel Catfish	14	3.56	12.96	2.33	0.93
Black Bullhead	42	10.66	7.16	1.28	0.17
White Bass	10	2.54	13.25	2.38	1.33
Largemouth Bass	6	1.52	4.69	0.85	0.78
White Crappie	4	1.01	2.08	0.37	0.52
Freshwater Drum	11	2.80	13.16	2.36	1.20
Spotted Sunfish	3	0.76	0.15	0.03	0.05
Bluegill Sunfish	2	0.51	0.13	0.03	0.07
Totals	394	100.00	556.63	100.00	
Game Fish	39	9.90			
Rough Fish	355	90.10			

During this segment, 334 fish were taken by gill nets, of which only 21 (6.28 per cent) were game species. Channel catfish and white bass each accounted for 2.09 per cent while bluegills and drum each accounted for 1.20 per cent. Two largemouth bass and one green sunfish were taken. The remainder were shad (46.41 per cent), carp (21.86 per cent), and river carpsucker (24.25 per cent).

Average weights for game species ranged from 0.09 pounds for bluegill to 1.95 pounds for largemouth bass. Channel catfish averaged 0.58 pounds and white bass 1.21 pounds. The game fish population comprised only 4.78 per cent of the total weight, while the river carpsucker alone accounted for 55.61 per cent.

The physical condition of game species, as revealed by K factors shown in Table 3, continues to be poor. Channel catfish had K factors ranging from 1.2 to 1.9 and averaging 1.5. White bass showed a decrease from 3.1 last year to 3.0 this year. Largemouth bass, however, increased to 3.3 from a 2.6 average last year. This is based on two individuals, however.

Table 3. K Factor Range and Average for Fish Species Taken by Gill Net From Lake Pauline, April 1962.

Species		Range	Average
Channel Catfish	(7)	1.2 - 1.9	1.5
White Bass	(7)	2.5 - 3.4	3.0
Bluegill Sunfish	(4)	4.3 - 5.0	4.5
Gizzard Shad	(19)	1.6 - 2.4	1.9
Carp	(9)	2.5 - 3.2	2.8
Carpsucker	(24)	2.5 - 4.0	3.2
Largemouth Bass	(2)	2.9 - 3.7	3.3
Freshwater Drum	(4)	2.3 - 3.2	2.7
Green Sunfish	(1)	4.4	4.4

Stomach analysis, shown in Table 4, show that white bass and largemouth bass fed on fish, primarily, while channel catfish, drum, and black bullheads fed on vegetation, fish, and insects.

Table 4. Frequency of Occurrence Food Items of Predaceous Species Taken From Lake Pauline, April 1962.

Species	Number Examined	Number Containing Food	Food Items	Frequency Occurrence
Freshwater Drum	4	1	Vegetation	1
			Insect Larvae	1
Black Bullhead	7	4	Fish Remains	3
			Insect Larvae	1
			Vegetation	2
			Mud	1
Bluegill Sunfish	4	2	Fish Remains	2
			Crayfish	1
White Bass	7	3	Shad	2
			Fish Remains	1

Table 4 (continued)

Species	Number Examined	Number Containing Food	Food Items	Frequency Occurrence
Channel Catfish	7	6	Fish Remains	6
			Vegetation	2
			Insect Remains	2
			Wood Bits	1
Largemouth Bass	2	2	Fish Remains	2

Seining with a 20-foot minnow seine produced 496 fish of which 392 were red shiners, and 78 were fathead minnows. Other species taken were green sunfish, largemouth bass, plains killifish, shad, and carp. Table 5 gives the minnow seining results. Two drags were made with a 200-foot 1/2-inch mesh seine, producing 66 shad, 22 carp, and 11 green sunfish.

Table 5. Percentage Composition of Fish Species Taken with a Twenty-foot Minnow Seine from Lake Pauline, April 1962.

Species	Number	Per Cent
Green Sunfish	11	2.21
Largemouth Bass	1	.20
Plains Killifish	7	1.42
Red Shiner	392	79.03
Fathead Minnow	78	15.72
Gizzard Shad	5	1.01
Carp	2	.41
Totals	496	100.00

In view of the poor condition of the Lake Pauline fishery, an F-14-D job description for the eradication of the present fish population is being submitted. Approval of landowners to treat watershed pot-holes, tanks, and tributaries has been obtained, and this project will be carried out in early 1963 if approved. The lake will be restocked with game species immediately following treatment and the lake probably will be reopened to fishing in the fall of 1964.

Lake Childress

Netting results from June 1961 revealed a high population of black bullheads (73.81 per cent) but no other rough species present. Channel catfish comprised 16.66 per cent, largemouth bass 4.76 per cent, and bluegill 4.77 per cent of the total number. Recommendations for fertilization and bullhead control were made.

During this segment, the lake was again netted with the results being similar to those of last year. Table 6 gives the percentage composition by number and weight and average weights. Channel catfish showed a decrease from 16.66 per cent to 10.16 per cent, but largemouth bass increased from 4.76 to 11.87 per cent. The percentage of bullheads remained high at 67.80 per cent. Since largemouth bass are ordinarily difficult to net in lakes

having extremely clear water, it is felt that the bass population in this lake is considerably higher than indicated by the gill net results. A check of fishing success revealed that bass fishermen consistently caught good strings of bass ranging from two to three pounds in weight during this year.

Table 6. Percentage Composition by Number and Weight and Average Weights of Species Taken from Gill Nets from Childress Lake, May 1962.

Species	Number	Per Cent by Number	Total Weight	Per Cent by Weight	Average Weight
Channel Catfish	6	10.16	17.84	25.95	2.97
Largemouth Bass	7	11.87	8.03	11.69	1.15
Black Bullhead	40	67.80	40.51	58.94	1.01
Redear Sunfish	2	3.39	1.62	2.35	.81
Bluegill Sunfish	1	1.69	.31	.45	.31
Green Sunfish	3	5.09	.42	.62	.14
Totals	59	100.00	68.73	100.00	
Game Fish	19	32.20			
Rough Fish	40	67.80			

In an effort to control the bullhead population in the future, this lake was stocked with flathead catfish at the rate of one per surface acre. If these flatheads survive and grow normally, they should provide considerable predation on bullheads within two years.

Seining with a twenty-foot seine produced no fish in eight drags. Limited seinable areas, thick vegetation, and water clarity were responsible. Two drags with a 200-foot seine produced 765 fish of which 697 (91.11 per cent) were bullheads. Table 7 gives the 200-foot seine results.

Table 7. Percentage Composition of Fish Taken With a Two-Hundred-Foot Seine From Lake Childress, May 1962.

Species	Number	Per Cent
Largemouth Bass	12	1.57
Black Bullheads	697	91.11
Bluegill Sunfish	46	6.01
Redear Sunfish	10	1.31
Totals	765	100.00

Tabulation of K factors revealed all species to be in good condition. Channel catfish at 2.1 were exceptionally fat. Table 8 gives the K factor range and average for both sexes of the species taken by gill nets.

Table 8. K Factor Range and Average for Species Taken by Gill Nets from Lake Childress, May 1962.

Species	Range	Average
Channel Catfish		
Male	1.5 - 3.0	2.1
Female	2.0 - 2.3	2.1
Largemouth Bass		
Male	2.7	2.7
Female	2.5 - 3.4	2.8
Black Bullheads		
Male	2.2 - 3.5	2.9
Female	2.5 - 3.8	2.9
Redear Sunfish		
Female	4.2 - 6.0	5.1
Bluegill Sunfish		
Male	5.0	5.0
Green Sunfish		
Male	4.3	4.3
Female	4.2 - 5.0	4.6

Results of stomach analysis, Table 9, revealed that two species had fed on black bullheads. Seven largemouth bass stomachs were examined. Six contained food, with fish remains occurring five times, black bullheads three times, and dragonflies once. Five channel catfish stomachs contained food, with fish and vegetation each occurring in three individuals. Twenty-five bullhead stomachs were checked, and seventeen contained food. Most common was insect larvae (11 times), followed by vegetation (7 times), and fish remains (4 times). Cannibalism by bullheads was noted by the occurrence of small bullheads in the stomachs of larger bullheads on two occasions.

Table 9. Frequency of Occurrence of Food Items of Predaceous Species Taken From Lake Childress, May 1962.

Species	Number Examined	Number Containing Food	Food Items	Frequency Occurrence
Black Bullhead	25	17	Insect Larvae	11
			Vegetation	7
			Fish Remains	4
			Black Bullheads	2
			Snails	1
Channel Catfish	6	5	Maize	1
			Vegetation	3
			Sand	1
			Insect Larvae	1
			Insects	1
Largemouth Bass	7	6	Fish Remains	3
			Dragon Fly	1
			Fish Remains	5
			Black Bullheads	3

Baylor Lake

Gill netting at Baylor Lake in 1961 produced 149 fish, the composition of which was similar to the adjacent Lake Childress. Both lakes have high bull-head populations, however, Baylor Lake contains white bass and carp which were not recorded from Lake Childress. Lake Baylor carp are mostly large, indicating little or no reproduction within the past two to three years.

During April of this segment, 141 fish were taken by gill nets. The only great difference between this sample and the one from last year was that bullheads show an 11 per cent increase, while carp show an 11 per cent decrease. Other species were taken in about the same relative numbers. Table 10 gives the percentage composition by number and weight and the average weight of gill netted fish. The average weights of channel catfish (1.56 pounds) and white bass (1.19 pounds) were about one-fourth pounds heavier than last year, while carp with an average weight of 3.73 pounds were about 1½ pounds lighter. One largemouth bass was taken this year, as compared to none last year. Again water clarity was involved, and bass are considered more abundant than figures indicate. Fishermen at Baylor Lake caught many bass during this year, but practically all were four pounds or larger. The lack of yearling bass is puzzling, since in 1961 the seine sample of 162 fish contained 148 bass fingerlings. Perhaps few small bass survive in the face of heavy predation from the larger bass and sunfish present. A lack of adequate forage species has been noted, and this would undoubtedly increase predation on the young bass.

Table 10. Percentage Composition by Number and Weight and Average Weight of Fish Species Taken by Gill Nets From Baylor Lake, May 1962.

Species	Number	Per Cent	Total Weight	Per Cent	Average Weight
		by Number		by Weight	
Largemouth Bass	1	.70	4.41	5.12	4.41
White Bass	5	3.55	5.96	6.93	1.19
Channel Catfish	18	12.77	28.00	32.55	1.56
Carp	5	3.54	18.65	21.67	3.73
Bluegill Sunfish	1	.71	.25	.29	.25
Black Bullhead	110	78.02	28.60	33.25	.26
Orangespotted Sunfish	1	.71	.16	.19	.16
Totals	141	100.00	86.03	100.00	
Game Fish	26	18.43			
Rough Fish	115	81.57			

Fertilization was recommended in 1961 to increase production of forage as well as to help control submerged vegetation. However, since Lake Baylor water is used as a municipal water supply for the city of Childress and since there are no facilities for filtering the water, the production of plankton through fertilization would be undesirable in this case. Shallow protected areas conducive to production of forage species, are very limited in Baylor Lake; therefore, the minnow population will probably remain low.

The lack of forage fish is reflected in the diet of predaceous species. Table 11, which lists the frequency of occurrence of food items, reveals that vegetation, insects, insect larvae, and crayfish were much more important than fish in the diet of all fish except largemouth bass. The average largemouth in Baylor Lake is large enough to eat the average size bullhead, crappie, or sunfish; and thus is not faced with the shortage of forage which smaller predators are.

Table 11. Frequency of Occurrence of Food Items of Predaceous Species Taken From Baylor Lake, May 1962.

Species	Number Examined	Number Containing Food	Food Items	Frequency Occurrence
Channel Catfish	18	17	Vegetation	13
			Earthworm	1
			Insect Larvae	6
			Insect Remains	1
			Insect	2
			Dragon Fly Larvae	6
			Seeds	1
			Fish Remains	2
			Grain	1
			Crayfish	1
Black Bullheads	25	20	Dragon Fly Larvae	5
			Vegetation	12
			Insect Larvae	5
			Crayfish	3
			Insect Remains	2
White Bass	5	4	Dragon Fly Larvae	3
			Fish Remains	1
Bluegill Sunfish	1	1	Insect Larvae	1
Largemouth Bass	1	1	Fish Remains	1

Seining with a twenty-foot seine produced 442 fish in 15 drags. Table 12 which gives the percentage composition of the seine collections, shows that green sunfish (202) and bullheads (104) were the most common. Bluegills and fathead minnows were common with 78 and 47 respectively. Other species recorded were red shiners, golden shiners, mosquitofish, and orangespotted sunfish.

A comparison of K factors shows a decrease in channel catfish and bullheads, but increases in carp and white bass. The one largemouth bass taken was in good condition with a K factor of 3.1. Table 13 gives the K factor range and averages.

Table 12. Percentage Composition of Fish Species Taken by Twenty-Foot Seine from Baylor Lake, May 1962.

Species	Number	Per Cent
Black Bullhead	104	23.52
Fathead Minnow	47	10.64
Red Shiner	2	0.45
Golden Shiner	2	0.45
Mosquitofish	1	0.23
Green Sunfish	202	45.70
Orangespotted Sunfish	6	1.36
Bluegill Sunfish	78	17.65
Totals	442	100.00

Table 13. K Factor Range and Average for Species Taken by Gill Nets From Baylor Lake, May 1962.

Species		Range	Average
Largemouth Bass	(1)	3.1	3.1
White Bass	(5)	2.6 - 2.8	2.7
Channel Catfish	(18)	1.4 - 2.0	1.6
Carp	(5)	1.4 - 3.3	2.5
Bluegill Sunfish	(1)	5.1	5.1
Black Bullhead	(25)	1.9 - 3.3	2.4
Orangespotted Sunfish	(1)	4.2	4.2

In an effort to provide control of bullheads, Baylor Lake was also stocked with flathead catfish fingerlings at the rate of one per surface acre. One flathead catfish weighing 1000 grams was netted in this lake in October. This fish is probably an offspring of the fingerling flatheads originally stocked in 1955. Several flatheads have been taken since 1955, and the variation in size of those recently taken suggests that there has been at least limited spawning by this species. If the 580 fingerlings stocked this year survive and grow normally, one would expect to have a fairly good population established within a few years. If flathead catfish can control the bullhead population, the fishery of Baylor Lake will be in good condition unless the carp population increases greatly. Carp, although healthy and fairly common, apparently have recently failed to reproduce successfully and may not increase appreciably.

One survey was made in October using about 1200 feet of 3½ inch mesh gill net to determine the abundance of large carp and to determine the feasibility of netting as a control for carp in this lake. The results of two nights of netting are given in Table 14. A total of 85 fish was taken of which 73 (85.88 per cent) were carp. Eight of the remaining were bullheads, and only four game fish were taken. The average weight of the carp taken was 8.06 pounds with 589 pounds being removed. This method of netting, therefore, was quite selective on carp and could be used as an effective control without damaging the game fish population.

Table 14. Results of Gill Netting at Baylor Lake with Twelve Hundred Feet of Three and One-Half Inch Mesh Gill Net in October, 1962.

Species	Number	Per Cent	Total Weight	Per Cent	Average Weight
		by Number		by Weight	
Flathead Catfish	1	1.17	2.20	.35	2.20
Carp	73	85.88	589.00	95.12	8.06
Largemouth Bass	2	2.36	15.00	2.43	7.50
Black Bullheads	8	9.41	4.00	0.64	.50
Channel Catfish	1	1.18	9.00	1.46	9.00
Totals	85	100.00	619.20	100.00	
Game Fish	4	4.70		4.24	
Rough Fish	81	95.30		95.76	

Lake Fryer

Lake Fryer is located in Ochiltree County about 16 miles southeast of Perryton, Texas. This lake located on Wolf Creek covers about 175 surface acres. It is maintained by Ochiltree County for the purpose of fishing and boating. The lake was originally built in the late 1930's. The spillway washed out in 1957 but was replaced in 1958 after Ochiltree County obtained the lake.

No management records are available, but the lake was stocked with hatchery channel catfish and largemouth bass.

Two surveys were made, one on May 9 and one on August 20. The gill netting results of these surveys, shown in Tables 15 and 16, show the lake to have high bullhead and stunted crappie populations. The May survey produced 299 fish of which 90.30 per cent (270) were bullheads. The population of desirable fish, channel catfish and largemouth bass, comprised only 3.35 per cent of the total number. Similarly, in August 434 fish were taken of which 38.01 per cent were bullheads and 54.61 per cent were stunted crappie (average weight 0.11 pounds). Only about one out of 30 crappie were "keepers", and the population of channel catfish and bass together totaled only 2.07 per cent of the total number of fish taken.

Table 15. Percentage Composition by Number and Weight and Average Weight of Fish Species Taken From Lake Fryer, May 9, 1962.

Species	Number	Per Cent	Total Weight	Per Cent	Average Weight
		by Number		by Weight	
Largemouth Bass	4	1.34	13.24	16.40	3.31
Channel Catfish	6	2.01	11.79	14.61	1.96
White Crappie	9	3.01	1.42	1.76	.15
Carp	7	2.34	11.13	13.79	1.59
Bluegill Sunfish	2	.66	.19	.24	.09
Redear Sunfish	1	.34	.24	.30	.24
Black Bullhead	270	90.30	42.69	52.90	.15
Totals	299	100.00	80.70	100.00	
Game Fish	22	7.35			
Rough Fish	277	92.65			

Table 16. Percentage Composition by Number and Weight and Average Weight of Fish Species Taken From Lake Fryer, August 20, 1962.

Species	Number	Per Cent	Total	Per Cent	Average
		by Number	Weight	by Weight	Weight
Largemouth Bass	2	.46	3.05	2.14	1.52
Channel Catfish	7	1.61	11.12	7.81	1.58
White Crappie	237	54.61	26.17	18.39	.11
Carp	22	5.07	73.68	51.77	3.34
Redear Sunfish	1	.23	.29	.20	.29
Black Bullhead	165	38.01	28.01	19.69	.16
Totals	434	100.00	142.32	100.00	
Game Fish	247	56.91	(54.61% of this figure were stunted crappie)		
Rough Fish	187	43.09			

Examination of the contents of fish stomachs, the results of which are shown in Tables 17 and 18, revealed that channel catfish were feeding mostly on bluegills and crappie. Also recorded were crayfish, algae, bullhead catfish, and insects. In two of the three bass stomachs which contained food, bullheads were found. The most commonly occurring item in crappie stomachs were small crustaceans; while a majority of bullheads had also eaten crustaceans, and several were noted to contain algae.

Table 17. Frequency of Occurrence of Food Items of Fish Taken From Lake Fryer May 9, 1962.

Species	Number Examined	Number Containing Food	Food Items	Frequency Occurrence
Largemouth Bass	4	2	Black Bullheads	2
			Algae	1
			Wood Bits	1
			Vegetation	2
Channel Catfish	6	4	Crayfish	1
			Algae	2
			Fish Remains	2
			Bluegill Sunfish	3
White Crappie	7	6	Crustaceans	6
			Vegetation	2
			Fly Larvae	1
			Fish Remains	1
Black Bullheads	25	18	Algae	14
			Crustaceans	15
			Vegetation	6
			Sand	2
			Wood Bits	3
			Insect Larvae	2
			Water Bugs	1
			Fly Larvae	3
			Blood Worms	2

Table 18. Frequency of Occurrence of Food Items of Fish Taken From Lake Fryer August 21, 1962.

Species	Number Examined	Number Containing Food	Food Items	Frequency Occurrence
Channel Catfish	5	4	Black Bullheads	1
			Insect	1
			Crayfish	1
			White Crappie	3
Largemouth Bass	2	1	Crayfish	1
White Crappie	25	21	Crustaceans	13
			Black Bullheads	1
			Mosquito Larvae	1
			Larvae	1
			Fish Remains	2
			Insect Larvae	2
			Dragon Fly Remains	1
			Mussels	1
			Insect Remains	1
Redear Sunfish	1	1	Mussels	1
Black Bullheads	13	10	Insect Remains	3
			Vegetation	5
			Corn	1
			Insect Larvae	1
			Mud	3
			Mussels	1
			Wood Bits	1

Twenty-foot seine results, shown in Tables 19 and 20, show the red shiner to have been dominant in August, while the fathead minnow and the sand shiner were most abundant in the May collection. There was no evidence of reproduction by largemouth bass, and only two small channel catfish were taken in August.

Table 19. Percentage Composition of Fish Taken by Twenty-Foot Minnow Seine. From Lake Fryer, May 9, 1962.

Species	Number	Per Cent
Fathead Minnow	89	45.40
Sand Shiner	71	36.23
Golden Shiner	9	4.59
Suckermouth Minnow	3	1.53
White Crappie	3	1.53
Orangespotted Sunfish	11	5.61
Bluegill Sunfish	8	4.08
Plains Minnow	2	1.03
Totals	196	100.00

Table 20. Percentage Composition of Fish Taken by Twenty-Foot Minnow Seine From Lake Fryer, August 21, 1962.

Species	Number	Per Cent
White Crappie	11	.46
Channel Catfish	2	.08
Black Bullheads	2	.09
Carp	1	.04
Golden Shiner	3	.13
Bluegill Sunfish	1	.04
Longear Sunfish	11	.46
Orangespotted Sunfish	3	.13
Plains Minnow	1	.04
Small Sunfish	63	2.65
Mimic Shiner	52	2.19
Fathead Minnow	80	3.37
Mosquitofish	4	.17
Suckermouth Minnow	5	.21
Red Shiner	2136	89.94
Totals	2375	100.00

K factors indicate that most species were in fair condition, however, in August, male and female crappie averaged 2.8 and 2.9 respectively, which is a reflection of the overabundant and stunted crappie population. The condition of channel catfish - 1.7, carp - 2.5, and bullheads - 2.5, was about average for these species. Tables 21 and 22 give the K factor range and averages for both sexes.

Table 21. K Factor Range and Average for Fish Taken from Lake Fryer, May 9, 1962

Species	Range	Average
Largemouth Bass		
Male	2.9 - 3.0	3.95
Female	2.4 - 3.8	3.6
Channel Catfish		
Female	1.5 - 2.0	1.8
White Crappie		
Male	2.6 - 3.4	2.9
Female	1.7 - 2.8	2.4
Carp		
Male	1.0 - 2.7	2.3
Female	2.5	2.5
Bluegill Sunfish		
Male	4.8	4.8
Female	3.7	3.7
Redear Sunfish		
Female	3.8	3.8
Black Bullheads		
Male	2.2 - 2.8	2.5
Female	1.9 - 3.0	2.4

Table 22. K Factor Range and Average for Fish Taken From Lake Fryer, August 20, 1962

Species	Range	Average
Largemouth Bass		
Female	2.6 - 2.7	2.65
Channel Catfish		
Male	1.3 - 2.0	1.7
Female	1.5 - 1.8	1.7
White Crappie		
Male	2.5 - 3.1	2.8
Female	2.5 - 3.6	2.9
Carp		
Male	2.2 - 2.8	2.5
Female	2.2 - 2.8	2.5
Redear Sunfish		
Male	3.6	3.6
Black Bullhead		
Male	2.1 - 2.6	2.4
Female	2.2 - 2.7	2.5

Table 23 gives the results of tests for oxygen, carbon dioxide, and pH in May.

Table 23. Oxygen, Carbon Dioxide and pH of Lake Fryer, May 9, 1962.

	<u>Top</u>	<u>Bottom</u>
Temperature	22° C	21° C
O ₂	6 ppm.	4.6 ppm.
CO ₂	22 ppm.	20 ppm.
pH	8.3	8.5

The slope of the spillway at Lake Fryer is such that during periods of overflow, fish can enter the lake from Wolf Creek below the spillway. Recommendations were made to modify the spillway to prevent this. Since the lake overflows several times each year and since it would not be practical to eradicate rough fish from Wolf Creek below the lake, modification of the spillway should preclude any extensive developmental work on this lake. This matter will be discussed with Ochiltree County officials in early 1963.

Buffalo Lake

Two surveys were made at Buffalo Lake during this segment. The first, in April, produced 767 fish, 10.04 per cent of which were game fish. Black bullheads comprised 64.67 per cent of the total number, and carp accounted for an additional 14.73 per cent. The second survey, in November, produced 1,436

fish, 75.42 per cent of which were game fish. This great increase in relative abundance of game fish was due to the relative increase of white crappie from 4.57 per cent in April to 66.09 per cent in December. One net alone, which happened to be set near the dam where crappie were thickly concentrated, took 407 crappie. Another net, also located in deep water, took 372 crappie. Therefore, the results of these two nets greatly influenced the relative percentages on this survey. Tables 24 and 25 give the percentage composition by number, weight, and average weight for each survey. On both surveys carp comprised about 60 per cent of the total weight.

Table 24. Percentage Composition by Number and Weight, and Average Weight of Fish Taken from Buffalo Lake, April 1962.

Species	Number	Per Cent	Total Weight	Per Cent	Average Weight
		by Number		by Weight	
Carp	113	14.73	532.56	58.49	4.71
Goldfish	2	0.26	4.03	0.45	2.02
Carp X Goldfish	19	2.48	56.68	6.22	2.98
Carp sucker	1	0.13	2.93	0.33	2.93
Channel Catfish	37	4.82	31.01	3.40	0.84
Black Bullheads	496	64.67	261.45	28.72	0.53
White Bass	2	0.26	0.38	0.04	0.19
Largemouth Bass	3	0.39	5.07	0.56	1.69
Green Sunfish	10	1.30	1.33	0.15	0.13
Longear Sunfish	12	1.57	1.33	0.13	0.10
Bluegill Sunfish	37	4.82	4.44	0.49	0.12
White Crappie	35	4.57	9.23	1.02	0.26
Totals	767	100.00	910.36	100.00	1.19
Game Fish	77	10.04			
Rough Fish	690	89.96			

Table 25. Percentage Composition by Number and Weight and Average Weight of Fish Taken from Buffalo Lake, November 29, 1962.

Species	Number	Per Cent	Total Weight	Per Cent	Average Weight
		by Number		by Weight	
White Crappie	949	66.09	232.43	18.40	.247
Largemouth Bass	10	.70	15.36	1.22	1.54
Green Sunfish	15	1.04	1.99	.16	.133
Bluegill Sunfish	27	1.88	6.54	.52	.242
Hybrid Sunfish	58	4.04	10.20	.81	.176
White Bass	20	1.39	22.70	1.80	1.13
Black Bullhead	196	13.65	108.43	8.58	.55
Channel Catfish	4	.28	12.94	1.02	3.24
Golden Shiner	2	.14	.32	.03	.16
Carp	126	8.77	776.84	61.51	6.7
Goldfish	8	.56	15.79	1.25	1.97
Carp X Goldfish	21	1.46	59.42	4.70	2.83
Totals	1,436	100.00	1,262.96	100.00	
Game Fish	1,083	75.42 (includes sunfish)			
Rough Fish	353	24.58			

It was encouraging to note that white bass showed substantial gains in numbers and average weight. In the April survey white bass average 0.19 pounds, whereas, in the November survey they averaged 1.13 pounds. White bass spawned in 1961, but no evidence was found of a spawn during 1962.

Seining results with a 200-foot seine, shown in Tables 26 and 27, show that carp spawned very successfully this year. Seining with a 200-foot seine in April produced only 1.01 per cent carp; whereas, in November a 300-foot seine produced 87.16 per cent carp. Following a rise in lake level in July, which flooded a large weed covered area in the upper end of the lake, spawning of carp was witnessed. A vast number of carp ranging from 3 to 10 pounds were observed depositing their eggs on the flooded weeds. The results of seining with a 20-foot minnow seine are given in Tables 28 and 29. The predominant species in the April collection were fathead minnows and red shiners. The only other species taken were plains minnows, green and longear sunfish. In November, 1,264 fish were taken by 20-foot seine. Thirteen species and one cross were represented. The dominant species were red shiners, fathead minnows, and carp.

Table 26. Percentage Composition of Fish Taken by Two Hundred Foot Seine From Buffalo Lake, April 1962.

Species	Number	Per Cent
Carp	1	1.01
Goldfish	28	28.28
Black Bullheads	15	15.15
Largemouth Bass	2	2.02
Sunfish Sp.	42	42.42
Golden Shiner	1	1.01
White Bass	7	7.07
White Crappie	3	3.04
Totals	99	100.00

Table 27. Percentage Composition of Fish Taken by Three Hundred Foot Seine From Buffalo Lake, November 1962.

Species	Number	Per Cent
Carp	292	87.16
Fathead Minnow	1	.30
White Crappie	13	3.88
Green Sunfish	9	2.68
Orangespotted Sunfish	6	1.80
Bluegill Sunfish	13	3.88
Longear Sunfish	1	.30
Totals	335	100.00

Table 28. Percentage Composition of Fish Taken by Twenty Foot Minnow Seine From Buffalo Lake, April 1962.

Species	Number	Per Cent
Fathead Minnow	361	41.44
Red Shiner	496	56.95
Green Sunfish	4	.46
Longear Sunfish	8	.92
Plains Minnow	2	.23
Totals	871	100.00

Table 29. Percentage Composition of Fish Taken by Twenty Foot Minnow Seine From Buffalo Lake, November 1962.

Species	Number	Per Cent
Carp	239	18.90
Plains Killifish	51	4.04
Mosquitofish	6	.47
Plains Minnow	6	.48
Black Bullhead	11	.87
Green Sunfish	89	7.04
Orangespotted Sunfish	19	1.50
Bluegill Sunfish	50	3.96
Golden Shiner	2	.16
Red Shiner	476	37.65
Fathead Minnow	297	23.50
Bullhead Minnow	1	.08
White Crappie	13	1.03
Carp X Goldfish	4	.32
Totals	1,264	100.00

A comparison of K factors for the two collections, Tables 30 and 31, reveals a puzzling decrease from April to November. Every species except bluegill and goldfish had lower K factors in November. In spite of this decrease, K factors were still about average for channel catfish and white crappie; and white bass (3.1) were in very good condition.

Table 30. K Factor Range and Average of Fish Taken From Buffalo Lake, April 5, 1962.

Species	Range	Average
Carp (49)	2.8 - 3.8	3.3
Goldfish (2)	4.9 - 5.4	5.2
Carp sucker (1)	2.8	2.8
Carp X Goldfish (17)	3.4 - 4.7	3.9
Largemouth Bass (3)	2.7 - 3.8	3.3
White Bass (2)	3.2	3.2
White Crappie (34)	2.8 - 4.1	3.4
Channel Catfish (35)	1.6 - 2.5	1.9
Green Sunfish (10)	3.5 - 5.0	4.3
Longear Sunfish (13)	4.6 - 6.5	5.3
Bluegill Sunfish (35)	3.8 - 6.2	4.8
Black Bullhead (48)	2.5 - 3.2	2.8

Table 31. K Factor Range and Average of Fish Taken From Buffalo Lake,
November 29, 1962.

Species		Range	Average
White Crappie			
Male	(21)	2.4 - 3.8	3.1
Female	(18)	2.6 - 3.4	3.0
Largemouth Bass			
Male	(4)	2.7 - 3.0	2.8
Female	(6)	1.7 - 3.5	2.9
Green Sunfish			
Male	(2)	3.5 - 3.6	3.5
Female	(13)	3.3 - 3.9	3.6
Bluegill			
Male	(7)	4.5 - 5.1	4.7
Female	(7)	4.2 - 7.5	5.3
Hybrid Sunfish			
Male	(1)	3.9	3.9
Female	(10)	4.1 - 5.2	4.5
White Bass			
Male	(12)	2.7 - 3.6	3.0
Female	(8)	2.9 - 4.0	3.2
Black Bullhead			
Male	(12)	1.4 - 2.7	2.4
Female	(13)	2.0 - 3.2	2.5
Golden Shiner			
Male	(2)	2.3 - 2.9	2.6
Channel Catfish			
Male	(1)	1.7	1.7
Female	(3)	1.4 - 1.9	1.7
Carp			
Male	(27)	2.4 - 3.5	2.8
Female	(64)	2.5 - 3.5	2.9
Goldfish			
Male	(1)	5.3	5.3
Female	(7)	4.4 - 8.0	6.3
Carp X Goldfish			
Male	(9)	3.2 - 4.1	3.6
Female	(5)	3.5 - 4.2	3.8

Examination of fish stomachs revealed that bullheads and white crappie had fed heavily on small crustaceans, most of which were Daphnia. Channel catfish were feeding on fish, insect larvae, and plant material in April; but only fish were recorded in November. White bass taken in November had eaten mostly fish. Crappie occurred in 6 of 15 white bass stomachs. Other food items of white bass included three species of sunfish, carp, and insects. On both surveys, largemouth bass were noted to have eaten bullheads. Carp and fish remains each occurred four times in the nine bass stomachs containing food in November. Tables 32 and 33 give the frequency of occurrence of food items.

Table 32. Frequency of Occurrence of Food Items of Fish Taken from Buffalo Lake, April 5, 1962.

Species	Number Examined	Number Containing Food	Food Items	Frequency Occurrence
Black Bullheads	50	40	Crustaceans	39
			Insect Larvae	7
			Fly	1
			Vegetation	2
			Insect Remains	2
			Worm	2
			Fly Larvae	1
White Crappie	33	33	Insect Remains	3
			Crustaceans	33
			Insect Larvae	17
			Minnow	2
			Sunfish	1
			Feather	1
			Fish Remains	2
			Wood Bits	4
Channel Catfish	28	26	Fish Remains	13
			Insect Larvae	15
			Insect Remains	1
			Vegetation	18
			Feather	1
			Wood	1
			Crustaceans	7
			Blood Worm	1
			Goldfish	1
Largemouth Bass	2	2	Crustaceans	1
			Bluegill Sunfish	1
			Black Bullhead	1
White Bass	2	2	Crustaceans	2
			Vegetation	1
			Insect Larvae	1
Longear Sunfish	13	12	Vegetation	8
			Crustaceans	4
			Insect Larvae	4

Table 32(continued)

Species	Number Examined	Number Containing Food	Food Items	Frequency Occurrence
Green Sunfish	11	10	Insect Larvae	1
			Crustaceans	8
			Vegetation	2
Bluegill Sunfish	36	31	Vegetation	17
			Insect Larvae	9
			Crustaceans	18
			Insect	1
			Insect Remains	2

Table 33. Frequency of Occurrence of Food Items of Fish Taken from Buffalo Lake, November 29, 1962.

Species	Number	Number Containing Food	Food Items	Frequency Occurrence
Black Bullheads	19	16	Daphnia	14
			Wood	1
			Channel Catfish	1
			Insect Remains	1
			Carp	1
			Fish Remains	1
Channel Catfish	4	3	Fish Remains	2
			Goldfish Scales	1
Green Sunfish	15	6	Daphnia	6
Bluegill Sunfish	13	10	Crustaceans	10
Largemouth Bass	10	9	Black Bullhead	2
			Carp	4
			Crayfish	2
			Fish Remains	4
White Crappie	37	32	Daphnia	32
			Carp	1
			Back-Swimmers	1
			Insect Remains	1
			Fly Larvae	1
			Fish Remains	1
White Bass	20	15	Fish Remains	8
			Carp	1
			White Crappie	6
			Orangespotted Sunfish	1
			Green Sunfish	1
			Bluegill	1
			Insect Remains	2

On July 24, a total of 24 hatchery reared flathead catfish was stocked in Buffalo Lake. At the time they were released, they ranged from 27 to 63 mm in length. Flathead catfish should thrive in Buffalo Lake and could be valuable in helping to control both carp and bullheads. Additional flathead catfish should be stocked next year if they become available.

Buffalo Springs Lake

Two surveys made at Buffalo Springs Lake, in April and December, revealed a fish population greatly dominated by bullhead catfish. During the April survey, 1,354 fish were taken by gill nets, Table 34. Black bullheads (1,004) comprised 74.15 per cent of this total. The December survey was even worse. Out of 512 fish taken, 98.24 per cent (503) were bullheads, Table 35.

Table 34. Percentage Composition by Number and Weight and Average Weight of Fish Taken from Buffalo Springs Lake, April 24, 1962.

Species	Number	Per Cent	Total Weight	Per Cent	Average Weight
		by Number		by Weight	
Golden Shiner	272	20.08	38.54	6.65	0.14
Black Bullhead	1,004	74.15	505.24	87.31	0.50
Longear Sunfish	1	0.08	1.04	0.18	1.04
Bluegill Sunfish	3	0.22	1.58	0.28	0.53
White Crappie	1	0.08	0.63	0.10	0.63
Channel Catfish	13	0.96	9.63	1.67	0.74
Largemouth Bass	60	4.43	22.03	3.81	0.37
Totals	1,354	100.00	578.69	100.00	
Game Fish	78	5.77			
Rough Fish	1,276	94.23			

Table 35. Percentage Composition by Number and Weight and Average Weight of Fish Taken from Buffalo Springs Lake, December 18, 1962.

Species	Number	Per Cent	Total Weight	Per Cent	Average Weight
		by Number		by Weight	
Black Bullhead	503	98.24	259.53	98.70	0.52
Bluegill Sunfish	4	0.78	0.63	0.24	0.16
Golden Shiner	3	0.58	0.41	0.16	0.14
White Crappie	1	0.20	0.67	0.25	0.67
White Bass	1	0.20	1.71	0.65	1.71
Totals	512	100.00	262.95	100.00	
Game Fish	6	1.17			
Rough Fish	506	98.83			

Although Buffalo Springs Lake was stocked with about 5,000 white crappie in 1959 and with an additional 1,500 "hand-sized" crappie in 1962, only two white crappie were taken on these two surveys. It was encouraging to note that 60 largemouth bass were taken in April. However, none were taken in December. One white bass was taken which weighed 1.71 pounds. It was probably included with a vat of white crappie transferred to Buffalo Springs from Lake McClellan in 1959 or 1960. Water clarity might be blamed for a poor catch of white crappie and largemouth bass. In fact, visual observations indicate a fairly good bass population.

Twenty-foot seine results, shown in Tables 36 and 37, show that the fathead minnow was abundant in April; whereas, gambusia and bluegill were most abundant in December. It was interesting to note that the golden shiner was uncommon in the 20-foot seine collections for both surveys. In April, several drags were made with a 300-foot seine producing 906 fish, Table 38; and in contrast to the 20-foot seine results, 77.04 per cent were golden shiners. Because of extreme water clarity and thick vegetation, shiners were able to escape being caught by the shorter seine. Golden shiners taken during April were heavily infested with anchor worms (Lernaea sp.). This infestation may explain the absence of golden shiners from the gill net collection in December. Following a heavy infestation of Lernaea at Rita Blanca Lake in 1961, netting and seining failed to produce a single large golden shiner. Prior to this infestation, gill netting at Rita Blanca produced as high as 70 per cent golden shiners, most of which were in excess of 8 inches in length.

Table 36. Percentage Composition of Fish Taken by Twenty Foot Seine From Buffalo Springs Lake, April 24, 1962.

Species	Number	Per Cent
Fathead Minnow	633	97.08
Red Shiner	9	1.38
Largemouth Bass	1	0.15
Bluegill Sunfish	6	0.92
Golden Shiner	2	0.31
Mosquitofish	1	0.16
Totals	652	100.00

Table 37. Percentage Composition of Fish Taken by Twenty-Foot Seine From Buffalo Springs Lake, December 17, 1962.

Species	Number	Per Cent
Channel Catfish	32	0.97
Black Bullhead	87	2.64
Fathead Minnow	107	3.25
Green Sunfish	195	5.92
Bluegill Sunfish	676	20.53
Red Shiner	489	14.85
Mosquitofish	1,696	51.50
Golden Shiner	11	0.34
Totals	3,293	100.00

Table 38. Percentage Composition of Fish Taken by Three-Hundred-Foot Seine From Buffalo Springs Lake, April 24, 1962.

Species	Number	Per Cent
Golden Shiners	698	77.04
Black Bullhead	55	6.07
Sunfish Sp.	23	2.54
Bluegill	4	0.44
Carp X Goldfish	1	0.11
Fathead Minnow	48	5.30
Red Shiner	10	1.10
Largemouth Bass	67	7.40
Totals	906	100.00

The results of stomach analysis, shown in Tables 39 and 40, show that bullheads were feeding on a variety of items, but mostly on crustaceans, insect larvae, and vegetation. In April, 45 of the 60 largemouth bass stomachs examined contained food. Eight items were noted, but most common were insect larvae (44) and crustaceans (11). It was surprising that fish occurred only 5 times, but this may be a reflection of a lack of adequate forage fish available. Although seining results revealed a fair number of forage fish, the availability of this forage may be an important factor. The water clarity plus abundant cover would make it easy for small fish to escape predation by the bass population. This is a problem which may be partially alleviated next year when an underwater weed cutter will be used to keep vegetation under control. The only submerged plant noted was sago pondweed, but it is very thick in shallow areas and serves as an anchor for filamentous algae which in late summer entirely covered the surface of a large portion of the upper lake.

Table 39. Frequency of Occurrence of Food Items of Fish Taken From Buffalo Springs Lake, April 25, 1962.

Species	Number Examined	Number Containing Food	Food Items	Frequency Occurrence
Largemouth Bass	60	45	Insect Remains	4
			Insect Larvae	44
			Dragon Fly Remains	1
			Vegetation	3
			Golden Shiner	1
			Crustaceans	11
			Fish Remains	3
			Bluegill Sunfish	1
Black Bullhead	136	108	Crustaceans	64
			Insect Larvae	75
			Vegetation	43
			Algae	24
			Wood Bit	1
			Snails	1
			Insect	3
			Rock	1
Fish Scales	1			

Table 39 (continued)

Species	Number Examined	Number Containing Food	Food Items	Frequency Occurrence
Golden Shiner	86	31	Crustaceans	14
			Vegetation	1
			Insect Remains	4
			Algae	20
			Insect Larvae	10
Longear Sunfish	1	1	Insect Larvae	1
Bluegill Sunfish	1	1	Insect Larvae	1
White Crappie	1	1	Insect Larvae	1
			Algae	1
			Crustaceans	1
Channel Catfish	12	9	Insect Larvae	9
			Algae	5
			Vegetation	4
			Wood Bits	2
			Snails	2
			Earth Worms	1

Table 40. Frequency of Occurrence of Food Items of Fish Taken From Buffalo Springs Lake, December 19, 1962

Species	Number Examined	Number Containing Food	Food Items	Frequency Occurrence
Black Bullheads	50	43	Crustaceans	32
			Vegetation	8
			Algae	26
			Insect Larvae	11
			Mussel	2
			Snails	1
			Small Sunfish	1
			Mud	1
			Blood Worms	4
Bluegill Sunfish	4	4	Crustaceans	4
			Insect Larvae	2
			Mussels	1

Eighty-six golden shiner stomachs were examined from the April collection, and six food items were noted. Algae, crustaceans, and insect larvae were most common. Insect larvae were found in all nine channel catfish stomachs which contained food. Algae and other vegetation occurred 5 and 4 times respectively. The one white crappie taken in April had eaten insect larvae, algae, and crustaceans.

K factors of bullheads were high in April but only average in December. The April average was 3.0, while in December males averaged 2.3 and females 2.4. This is similar to Buffalo Lake data which also show K factors of bullheads as well as other species to have dropped considerably from April to November. Channel catfish were also in good condition (2.1) in April, and largemouth bass were above average at 3.0. Tables 41 and 42 give K factor ranges and averages for fish netted in April and December respectively.

Table 41. K Factor Range and Average for Fish Taken from Buffalo Springs Lake, April 1962,

Species		Range	Average
Golden Shiners	(100)	2.2 - 4.1	2.9
Black Bullheads	(104)	1.9 - 4.0	3.0
Longear Sunfish	(1)	5.0	5.0
Bluegill Sunfish	(3)	5.1 - 5.4	5.2
White Crappie	(1)	1.1	1.1
Channel Catfish	(12)	1.9 - 2.3	2.1
Largemouth Bass	(40)	2.5 - 4.0	3.0

Table 42. K Factor Range and Average for Fish Taken From Buffalo Springs Lake, December 1962.

Species		Range	Average
Black Bullheads			
Male	(21)	1.9 - 2.8	2.3
Female	(30)	2.0 - 2.8	2.4
Bluegill Sunfish			
Male	(2)	4.3 - 5.7	5.0
Female	(2)	3.7 - 5.7	4.7
Golden Shiners			
Male	(3)	2.2 - 3.1	2.5
White Bass			
Male	(1)	3.6	3.6
White Crappie			
Male	(1)	3.6	3.6

In an effort to provide bullhead control, this lake was also stocked with flathead catfish. A total of about 1,500 was stocked. The first fingerlings were stocked in July at the rate of 1 per acre, and later in the summer an additional 1,000 to 1,200 were added. It was reported that some of the latter flatheads were observed attacking a "swarm" of black bullhead fry as soon as they were released. The school of bullhead fry moved near the shore in the area where the flathead fingerlings were being released; and, as related, several flatheads swam slowly up to the school then suddenly darted into its midst, obviously with the intent of eating the young bullheads. It is earnestly hoped

that the flatheads stocked in Buffalo Springs Lake will survive and carry out their intended role of controlling the greatly overabundant bullhead population.

Aspermont Lake

Aspermont Lake is a fairly small, city-owned impoundment located about three miles southwest of the town of Aspermont, in Stonewall County. The lake was formed by the construction of an earthen dam across Tonk Creek, a tributary of the Double Mountain Fork of the Brazos River. At the time of the survey, the lake level was about 10 to 12 feet below spillway elevation. When full, the lake covers about 75 surface acres and has a maximum depth of about 22 feet. For unexplained reasons, this lake is known to some local residents as "Seller's Lake", but most people refer to it as the Aspermont Lake.

Gill netting results, shown in Table 43, indicate a fairly good balance. Rough species taken included bullheads 25.89 per cent, and shad 19.47 per cent. White crappie comprised 30.97 per cent of the total number taken in nets but were mostly stunted, as only a few of the 140 crappie taken were large enough to be listed as "keepers". The average weight of white crappie was only 0.11 pounds. This lake had an excellent population of channel catfish. Thirty-nine were taken which averaged 2.26 pounds each. They comprised 8.62 per cent of the total number and 46.87 per cent of the total weight. About 14 per cent of the catch was sunfish.

Table 43. Percentage Composition by Number and Weight and Average Weight of Fish Species Taken by Gill Nets from Aspermont Lake, July 20, 1962.

Species	Number	Per Cent	Total	Per Cent	Average
		by Number	Weight	by Weight	Weight
Channel Catfish	39	8.62	88.51	46.97	2.26
Black Bullheads	117	25.89	44.17	23.44	0.37
White Crappie	140	30.97	16.77	8.90	0.11
Gizzard Shad	88	19.47	23.42	12.43	0.26
Largemouth Bass	4	0.89	3.59	1.90	0.89
Bluegill Sunfish	39	8.62	4.55	2.42	0.11
Redear Sunfish	25	5.54	7.42	3.94	0.29
Totals	452	100.00	188.43	100.00	
Game Fish *	247	54.64			
Rough Fish	205	45.36			

* The crappie population is mostly stunted and is of little value to the sports fisherman.

Black bullheads (84) were most abundant in the seine sample as shown in Table 44; however, as a group, sunfish were dominant totaling 133. Other species seined were shad, black bass, mosquitofish, crappie, and the bullhead minnow.

Table 44. Percentage Composition of Fish Taken by Twenty-Foot Seine From Aspermont Lake, July 20, 1962

Species	Number	Per Cent
Gizzard Shad	7	2.86
Black Bullhead	84	34.43
Largemouth Bass	6	2.46
Redear Sunfish	32	13.11
Green Sunfish	14	5.74
Bluegill Sunfish	49	20.08
Mosquitofish	7	2.87
White Crappie	4	1.64
Longear Sunfish	38	15.58
Bullhead Minnow	3	1.23
Totals	244	100.00

Stomach analysis of channel catfish and white crappie are given in Table 45. Channel catfish had fed heavily on fish and insect larvae; while white crappie stomachs contained a variety of items including insects, insect larvae, algae, crustaceans, and fish remains.

Table 45. Frequency of Occurrence of Food Items of Fish Taken From Lake Aspermont, July 20, 1962.

Species	Number Examined	Number Containing Food	Food Items	Frequency Occurrence
Channel Catfish	15	11	Fish Remains	5
			White Crappie	2
			Sunfish	1
			Insect Larvae	6
			Mussel	1
White Crappie	7	4	Insect Larvae	1
			Insect Remains	2
			Algae	2
			Crustaceans	1
			Fish Remains	1

Table 46, which gives K factor ranges and averages shows that the condition of all species was about average with the exception of gizzard shad, which had a low average of 1.9.

Table 46. K Factor Range and Average for Fish Taken From Aspermont Lake, July 20, 1962.

Species		Range	Average
Channel Catfish	(25)	1.7 - 2.5	1.8
Black Bullheads	(21)	2.2 - 3.0	2.4
White Crappie	(12)	2.2 - 3.7	2.8
Gizzard Shad	(12)	1.5 - 2.5	1.9
Largemouth Bass	(4)	2.5 - 2.9	2.6
Redear Sunfish	(10)	4.0 - 4.4	4.2

A large portion of the shallow area of this lake is covered by bulrush. The exact acreage covered is not known but probably exceeds five acres. The bullrush was reported to have spread quite rapidly in the last few years and should be controlled as soon as possible.

A selective kill on shad, which would also probably eradicate a considerable portion of the stunted crappie population, is recommended for the fall of 1963 in addition to bullrush control.

Tulia Lake

Tulia Lake situated on Tule Creek, a tributary of the Prairie Dog Town Fork of the Red River, is located in Swisher County about six miles northeast of the town of Tulia, Texas. This lake, which is fed by run-off water, normally covers about 75 surface acres.

Gill netting in August 1962, produced 442 fish of which 44.12 per cent were black bullheads, 21.04 per cent were carp, and 33.26 per cent were stunted crappie. No channel catfish were taken, but bass comprised 1.35 per cent by number and 9.57 per cent by weight. Carp alone comprised 62.21 per cent of the total weight. Table 47 gives the percentage composition of the gill netting catch.

Table 47. Percentage Composition by Number and Weight and Average Weight of Fish Taken From Tulia Lake, August 29, 1962.

Species	Number	Per Cent		Per Cent	
		by Number	Total Weight	by Weight	Average Weight
Carp	93	21.04	107.78	62.21	1.15
Largemouth Bass	6	1.35	16.57	9.57	2.76
Goldfish	1	0.23	1.21	0.70	1.21
Black Bullhead	195	44.12	31.23	18.02	0.16
White Crappie	147	33.26	16.44	9.50	0.11
Totals	442	100.00	173.23	100.00	
Game Fish *	153	34.61			
Rough Fish	289	65.39			

* The crappie population is mostly stunted and is of little value to the sports fisherman.

Seining results, given in Table 48, did not reveal evidence of reproduction by either largemouth bass or channel catfish. The most common fish in the seine sample was the red shiner.

Table 48. Percentage Composition of Fish Taken by Twenty-Foot Seine From Tulia Lake, August 28, 1962.

Species	Number	Per Cent
Black Bullhead	11	7.91
Largemouth Bass	1	0.72
Carp	3	2.16
White Crappie	5	3.59
Fathead Minnow	3	2.16
Red Shiner	116	83.46
Totals	139	100.00

K Factors, Table 49, show the average for carp and bullheads to be below normal, while the largemouth bass and crappie were in fairly good condition. Crappie and bullheads were found to be feeding on crustaceans mostly. Two largemouth bass stomachs contained food, one a bullhead, the other unidentifiable fish remains. Table 50 gives the food items of species examined.

Table 49. K Factor Range and Average For Fish Taken From Tulia Lake, August 29, 1962.

Species		Range	Average
Carp	(25)	2.1 - 3.1	2.6
Largemouth Bass	(6)	2.8 - 3.8	3.1
Goldfish	(1)	4.4	4.4
Black Bullheads	(25)	1.6 - 2.5	1.9
White Crappie	(25)	2.6 - 4.4	3.1

Table 50. Frequency of Occurrence of Food Items of Fish Taken From Tulia Lake, August 29, 1962.

Species	Number Examined	Number Containing Food	Food Items	Frequency Occurrence
White Crappie	25	15	Crustaceans	14
			Insect Remains	2
			Fish Remains	1
Black Bullheads	25	16	Crustaceans	8
			Algae	1
			Mud	3
			Fish Remains	5
			Insect Larvae	1
Largemouth Bass	6	2	Fish Remains	1
			Black Bullhead	1

Fishing success has been poor at Tulia Lake for the past several years. Channel catfish, it was reported, are seldom taken; and crappie, while more common, are seldom large enough to keep. An occasional fair size bass is taken, but as a rule bass fishing is also very poor.

In view of the conditions existing at Tulia Lake, a total kill of the fish population is recommended, to be followed by restocking with channel catfish, bass, red shiners, and fathead minnows. Restocking with crappie is not recommended.

Recommendations:

Fisheries reconnaissance surveys should be continued in effort to keep abreast of changes in fish populations in each of the concerned waters. Specific recommendations for each lake are given under the heading for each lake respectively.

Prepared by Lonnie Peters
Project Leader

Date March 22, 1963

Approved by Marion Toole
Coordinator

Leo D. Lewis
Regional Supervisor

Table 51. A Checklist of Fish Species Taken From Lakes Worked on Reconnaissance Survey.

<u>Scientific Name</u>	<u>Common Name</u>
<u>Dorosoma cepedianum</u>	Gizzard Shad
<u>Carpiodes carpio</u>	Carp sucker
<u>Cyprinus carpio</u>	Carp
<u>Cyprinidae</u>	Carp X Goldfish
<u>Carassius auratus</u>	Goldfish
<u>Notemigonus crysoleucas</u>	Golden Shiner
<u>Phenacobius mirabilis</u>	Suckermouth Minnow
<u>Notropis lutrensis</u>	Red Shiner
<u>N. stramineus</u>	Sand Shiner
<u>N. volucellus</u>	Mimic Shiner
<u>Hybognathus placita</u>	Plains Minnow
<u>Pimephales vigilax</u>	Bullhead Minnow
<u>P. promelas</u>	Fathead Minnow
<u>Ictalurus punctatus</u>	Channel Catfish
<u>I. melas</u>	Black Bullhead
<u>Pylodictus olivaris</u>	Flathead Catfish
<u>Fundulus kansae</u>	Plains Killifish
<u>Gambusia affinis</u>	Mosquitofish
<u>Roccus chrysops</u>	White Bass
<u>Micropterus salmoides</u>	Largemouth Bass
<u>Lepomis cyanellus</u>	Green Sunfish
<u>L. microlophus</u>	Redear Sunfish
<u>L. macrochirus</u>	Bluegill Sunfish
<u>L. humilis</u>	Orangespotted Sunfish
<u>L. megalotis</u>	Longear Sunfish
<u>L. species</u>	Hybrid Sunfish
<u>Pomoxis annularis</u>	White Crappie
<u>Aplodinotus grunniens</u>	Freshwater Drum

