

JOB COMPLETION REPORT

As required by

FEDERAL AID IN FISHERIES RESTORATION ACT

TEXAS

Federal Aid Project No. F-6-R-11

FISHERIES INVESTIGATIONS AND SURVEYS OF THE WATERS OF REGION 5-B

Job No. B-20 Fisheries Reconnaissance

Project Leader: Charles T. Menn

J. Weldon Watson
Executive Director
Parks and Wildlife Department
Austin, Texas

Marion Toole
D-J Coordinator

Eugene A. Walker
Director, Program Planning

January 6, 1964

ABSTRACT

Seven public lakes and portions of two rivers in Region 5-B were visited during this segment to see if any appreciable changes in the fish population had occurred since previous surveys.

Game fish species including channel and blue catfish, white bass, largemouth bass and white and black crappie comprised 22.54 per cent of the total number and 3.64 per cent of the total weight of fish taken in nets in Harlingen City Lake. There appeared to be a relative decrease in the game fish, both in numbers and in weight.

In Bentsen State Park Lake, rough fish species including alligator and longnose gars, gizzard shad, carp, smallmouth buffalo, bluegill and Rio Grande perch were dominant both in numbers and in weight with 86.84 per cent and 73.45 per cent, respectively.

Fort Brown Lake in Brownsville was recently drained and restocked with largemouth bass, channel catfish and green sunfish.

Rough fish species including alligator, spotted and longnose gars, threadfin and gizzard shad, carp, black bullhead and Rio Grande perch comprised 96.30 per cent of the total number and 95.80 per cent of the total weight of fish taken in Llano Grande Lake.

Game fish species showed a relative decrease both in numbers and in weight in Campacuas Lake.

In Delta Orchards Lake, near Monte Alto in Hidalgo County, game fish species including channel and blue catfish, warmouth, white crappie and freshwater drum showed a relative increase in numbers, but a relative decrease in weight.

Rough fish species including longnose gar, gizzard shad, smallmouth buffalo, gray redhorse, bluegill and Rio Grande perch were dominant both in total numbers and in total weight in the San Antonio River.

There was no significant change in the fish population of Lake Corpus Christi since the 1962 reconnaissance survey. Rough fish species comprised 58.81 per cent of the total number and 72.86 per cent of the total weight of fish netted.

Channel and blue catfish, largemouth bass, white crappie, black drum and spotted seatrout are the principal game fish species in the Aransas River. Collectively, they comprised 7.20 per cent of the total number and 3.48 per cent of the total weight of the fish netted.

Other than continued water hyacinth control work on Lake Corpus Christi, no recommendations are made in this report for developmental work on the waters visited during the year.

JOB COMPLETION REPORT

State of Texas

Project No. F-6-R-11

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

Job No. B-20

Title: Fisheries Reconnaissance

Period Covered: January 1, 1963 through December 31, 1963

Objectives:

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

Techniques Used:

Standard, 125-foot long, gill nets and common sense minnow seines were used to sample fish populations. The gill nets consisted of nylon webbing, 8 feet deep, with five 25-foot long sections of 1-, 1½-, 2-, 2½- and 3-inch square mesh. Nets were set overnight at previously established netting stations and fish specimens were taken from them the following morning. The netted specimens were weighed in grams and measured in millimeters in the field. Sex and sexual development and the occurrence of parasites in the individual specimens were recorded. Seined specimens were preserved and taken to project headquarters at Mathis for identification. A list of the common and scientific names of fish species taken during this study is included as Table 1.

Routine water quality analyses were made on the various lakes and a limited check was made of the surrounding area of each lake to determine land usage and possible sources of pollution.

The water level data for Lake Corpus Christi were obtained from officials at Wesley Seale Dam.

Fisherman usage of the various lakes was determined by talking to camp owners, game wardens and sometimes to fishermen. Public access is available to all the lakes and rivers studied in this segment.

Findings:

Harlingen City Lake

This 20-acre lake is located in downtown Harlingen and is the city's water supply reservoir. Water in the lake originates from the Rio Grande River and reaches the lake through a system of gravity flow irrigation canals.

Table 1. Checklist of species referred to in text and tables.

Common name	Scientific name
Alligator gar	<u>Lepisosteus spatula</u> Lacépède
Spotted gar	<u>L. oculatus</u> (Winchell)
Longnose gar	<u>L. osseus</u> (Linnaeus)
Tarpon	<u>Megalops atlanticus</u> Valenciennes
Threadfin shad	<u>Dorosoma petenense</u> (Günther)
Gizzard shad	<u>D. cepedianum</u> (LeSueur)
Mexican tetra	<u>Astyanax mexicanus</u> (Filippi)
Smallmouth buffalo	<u>Ictiobus bubalus</u> (Rafinesque)
Gray redhorse	<u>Moxostoma congestum</u> (Baird and Girard)
Carp	<u>Cyprinus carpio</u> Linnaeus
Pugnose minnow	<u>Opsopoeodus emiliae</u> Hay
Red shiner	<u>Notropis lutrensis</u> (Baird and Girard)
Bullhead minnow	<u>Pimephales vigilax</u> (Baird and Girard)
Sea catfish	<u>Galeichthys felis</u> (Linnaeus)
Channel catfish	<u>Ictalurus punctatus</u> (Rafinesque)
Blue catfish	<u>I. furcatus</u> (LeSueur)
Yellow bullhead	<u>I. natalis</u> (LeSueur)
Flathead catfish	<u>Pylodictus olivaris</u> (Rafinesque)
Gulf pipefish	<u>Syngnathus scovelli</u> (Evermann and Kendall)
Gulf killifish	<u>Fundulus grandis</u> Baird and Girard
Blackstripe topminnow	<u>F. notatus</u> (Rafinesque)
Sheepshead minnow	<u>Cyprinodon variegatus</u> Lacépède
Mosquitofish	<u>Gambusia affinis</u> (Baird and Girard)
Sailfin molly	<u>Mollienisia latipinna</u> LeSueur
Amazon molly	<u>M. formosa</u> (Girard)
Striped mullet	<u>Mugil cephalus</u> Linnaeus
Tidewater silverside	<u>Menidia beryllina</u> (Cope)
White bass	<u>Roccus chrysops</u> (Rafinesque)
Largemouth bass	<u>Micropterus salmoides</u> (Lacépède)
Warmouth	<u>Chaenobryttus gulosus</u> (Cuvier)
Redear sunfish	<u>Lepomis microlophus</u> (Günther)
Bluegill	<u>L. macrochirus</u> Rafinesque
Longear sunfish	<u>L. megalotis</u> (Rafinesque)
White crappie	<u>Pomoxis annularis</u> Rafinesque
Black crappie	<u>P. nigromaculatus</u> (LeSueur)
Freshwater drum	<u>Aplodinotus grunniens</u> Rafinesque
Black drum	<u>Pogonias cromis</u> (Linnaeus)
Spotted seatrout	<u>Cynoscion nebulosus</u> (Cuvier)
Rio Grande perch	<u>Cichlasoma cyanoguttatum</u> (Baird and Girard)

Public angling is permitted on this lake without restrictions or limitations, but little fishing is done due to the preponderance of rough fish species.

Netting - Four gill netting collections were made on this lake in February. All told, 71 fish of 11 species were taken (Table 2). The game fish species taken included channel and blue catfish, white bass, largemouth bass and white and black crappie.

On the basis of limited netting data, game fish showed a relative decrease both in numbers and in weight. In 1962 game fish species comprised 23.47 per cent of the number and 5.96 per cent of the weight as compared to 22.54 per cent of the number and 3.64 per cent of the weight in 1963.

Longnose gar, smallmouth buffalo, gizzard shad and spotted gar, in that order, are the most abundant rough fish species. Collectively, they comprised 70.42 per cent of the total number and 94.80 per cent of the total weight of the fish netted.

The length-weight statistics of the fish taken in nets are shown in Table 3. The average "K" factors are in line with those of the 1962 reconnaissance.

Table 4. Seining results, Harlingen City Lake, February 1963

Species	Numbers Taken	Per Cent of Total Number
Threadfin shad	16	42.10
Gizzard shad	1	2.63
Red shiner	11	28.95
Mosquitofish	3	7.90
Tidewater silverside	4	10.53
Bluegill	2	5.26
Rio Grande perch	1	2.63
Total	38	100.00

Seining - Two seining collections were made at two stations. All told, 38 fish of 7 species were taken in the seining collections (Table 4). Threadfin

Table 2. Results of gill netting, Harlingen City Lake, February 1963

Species	Numbers Taken	Per Cent of Total Number	Weights (pounds)	Per Cent of Total Weight
Spotted gar	7	9.86	28.4	12.33
Longnose gar	24	33.80	145.9	63.32
Gizzard shad	8	11.27	1.3	0.57
Smallmouth buffalo	11	15.49	42.8	18.58
Channel catfish*	2	2.82	0.7	0.30
Blue catfish*	8	11.27	5.4	2.34
White bass*	1	1.41	0.5	0.22
Largemouth bass*	1	1.41	1.4	0.61
White crappie*	3	4.22	0.3	0.13
Black crappie*	1	1.41	0.1	0.04
Freshwater drum	5	7.04	3.6	1.56
Totals	71	100.00	230.4	100.00
Per Cent Game Fish		22.54		3.64
Per Cent Rough Fish		77.46		96.36

*Indicates game fish

Table 3. Length-weight statistics of fish taken with gill nets,
Harlingen City Lake, February 1963

Species	Standard Length (mm.)		Weight (grams)		"K" factors	
	Range	Average	Range	Average	Range	Average
Spotted gar	530-674	619	964-2410	1842	0.64-0.64	0.75
Longnose gar	642-1079	790	1332-7059	2758	0.44-0.60	0.50
Gizzard shad	129-200	148	42-152	76	1.90-2.43	2.13
Smallmouth buffalo	289-492	351	794-4706	1765	3.28-3.99	3.70
Channel catfish	264-279	271	312-312	312	1.43-1.43	1.43
Blue catfish	185-375	263	94-765	305	1.40-1.68	1.49
White bass	195-195	195	218-218	218	2.94-2.94	2.94
Largemouth bass	260-260	260	652-652	652	3.70-3.70	3.70
White crappie	110-132	118	41-62	51	2.69-3.53	3.09
Black crappie	115-115	115	49-49	49	3.22-3.22	3.22
Freshwater drum	195-255	219	211-539	328	2.67-3.25	2.95

shad, red shiners and tidewater silversides, in that order, comprised 81.58 per cent of the total number. On the basis of these limited data, there appears to be a relative increase of approximately 16 per cent in the threadfin shad population and a 26 per cent increase in the red shiner population since the survey of 1962.

Stomach Analyses - Unidentifiable fish remains, crappie and bluegills were found in many spotted and longnose gar stomachs. Insect remains and snails were found in two blue catfish stomachs.

Stomachs of the gizzard shad, smallmouth buffalo and freshwater drum were not examined.

Lake Conditions- Submerged vegetation is lacking in the lake due to the high turbidity. Shoreline vegetation, however, consists mainly of bulrushes mixed with a few cattails.

Secchi disc readings of light penetration ranged from 7 to 9 inches. It is believed that the turbidity is caused largely by bottom feeding fishes which keep silt in suspension rather than the prevailing southeasterly wind.

Recommendations - Anglers should be encouraged to fish for catfish and crappie. An annual reconnaissance survey should be made to determine changes in the status of the fish population.

Bentsen State Park Lake

Netting - Five gill netting collections were made on this lake in March 1963. A total of 152 fish of 8 species was taken and rough fish species, including alligator and longnose gars, gizzard shad, smallmouth buffalo, carp, bluegill and Rio Grande perch, were dominant both in number and in weight (Table 5). Blue catfish, the only game fish species represented in the netting collections, comprised 13.16 per cent of the total number and 26.55 per cent of the total weight. Though no largemouth bass were taken in the nets, one fisherman reported that he had taken several "nice" bass recently.

This lake was chemically treated for a complete kill of fish in January 1960 (see Job Completion Report for Job 16a25, Project F-14-D-4) and restocked with largemouth bass in March 1960. Efforts in June 1960 to screen native fish from the incoming water of the Rio Grande River were unsuccessful (see Supplementary Report for Job 16a25, Project F-14-D-4).

The length-weight statistics of the netted specimens are presented in Table 6. No appreciable changes were noted for any species.

Seining - The single seining collection was comprised of 152 fish of 5 species. Table 7 shows the seining results on Bentsen State Park Lake. Threadfin and gizzard shad and bluegill, in that order, comprised 78.95 per cent of the total number. Mosquitofish, dominant the previous two years, comprised less than 7 per cent of the total number. No largemouth bass were taken in the collections, indicating poor spawning success.

Table 5. Results of gill netting, Bentsen State Park Lake, March 1963

Species	Numbers Taken	Per Cent of Total Number	Weights (pounds)	Per Cent of Total Weight
Alligator gar	18	11.84	63.5	26.34
Longnose gar	7	4.61	21.2	8.79
Gizzard shad	78	51.31	17.6	7.30
Smallmouth buffalo	7	4.61	58.9	24.43
Carp	1	0.66	13.4	5.56
Blue catfish*	20	13.16	64.0	26.55
Bluegill	17	11.18	1.5	0.62
Rio Grande perch	4	2.63	1.0	0.41
Total	152	100.00	241.1	100.00
Per Cent Game Fish		13.16		26.55
Per Cent Rough Fish		86.84		73.45

*Indicates game fish

Table 6. Length-weight statistics of fish taken with gill nets,
Bentsen State Park Lake, March 1963

Species	Standard Length (mm.)		Weight (grams)		"K" Factors	
	Range	Average	Range	Average	Range	Average
Alligator gar	306-970	517	173-11340	1600	0.46-0.96	0.70
Longnose gar	585-789	668	877-2013	1373	0.40-0.50	0.44
Gizzard shad	128-260	170	45-317	104	1.28-2.26	1.91
Smallmouth buffalo	420-492	465	2750-4763	3815	3.50-4.44	3.76
Carp	549-549	549	6067-6067	6067	3.66-3.66	3.66
Blue catfish	308-551	417	510-3317	1452	1.61-2.10	1.80
Bluegill	91-117	102	30-65	43	3.31-4.60	4.01
Rio Grande perch	111-145	131	66-124	104	4.06-4.87	4.52

Table 7. Seining results, Bentsen State Park Lake, March 1963

Species	Numbers Taken	Per Cent of Total Number
Threadfin shad	64	42.11
Gizzard shad	28	18.42
Pugnose minnow	8	5.26
Mosquitofish	10	6.58
Tidewater silverside	14	9.21
Bluegill	28	18.42
Total	152	100.00

Lake Conditions- The water level has been extremely low all year. The upper portion, or bend, of this oxbow lake is dry, but a total of approximately 10 acres of water still remain in the lake.

A new irrigation canal, completed in July 1961, was built immediately north of the state park to provide more water for farmers in Hidalgo County Water Control and Improvement District Numbers 7 and 14. Water is pumped directly from the Rio Grande River to supply the canal. At one time it seemed as though an agreement would be reached whereby the park lake would get its water from the irrigation canal. However, no such agreement has as yet been reached.

Recommendations - Periodic netting and seining checks should be continued to check changes and developments in the fish population. An annual reconnaissance survey should be adequate. No further developmental work is planned because of the unfavorable water supply.

Fort Brown Lake

This 33-acre lake, located in downtown Brownsville, was drained in the spring of 1962, dredged in the summer and refilled in the fall of that same year. The water used in refilling the lake came from the Rio Grande River and contained numerous undesirable fishes. Therefore, the lake was treated with rotenone to remove all fishes. The state fish hatchery near Brownsville stocked a large number of largemouth bass fingerlings in December 1962.

Netting - Four gill netting collections were made in February 1963 and took a total of 25 fish of 3 species (Table 8). Of the three species, all were classed as game fishes (channel catfish, largemouth bass and green sunfish). Stomach analyses showed insect remains in all bass stomachs.

The length-weight statistics of the netted specimens are presented in Table 9. No appreciable change occurred regarding the various species.

Table 8. Results of gill netting, Fort Brown Lake, February 1963

Species	Numbers Taken	Per Cent of Total Number	Weights (pounds)	Per Cent of Total Weight
Channel catfish*	1	4.00	0.2	4.08
Largemouth bass*	23	92.00	4.5	91.84
Green sunfish*	1	4.00	0.2	4.08
Totals	25	100.00	4.9	100.00

*Indicates game fish

Table 9. Length-weight statistics of fish taken from Fort Brown Lake, February 1963

Species	Standard length (mm.)		Weight (grams)		"K" Factors	
	Range	Average	Range	Average	Range	Average
Channel catfish	156-156	156	80-80	80	2.10-2.10	2.10
Largemouth bass	133-162	146	67-111	88	2.55-3.24	2.79
Green sunfish	118-118	118	74-74	74	4.44-4.44	4.44

Seining - One seining collection was made but no fish were taken. The steep banks made seining very difficult.

Lake Conditions- Secchi disc readings ranged from 60 to 82 inches, which is very good for this comparatively shallow oxbow lake. Despite the recent dredging, submerged vegetation remains a problem in this lake. As yet, no summer kill of fish due to the abundance of vegetation has been observed or reported.

Recommendations - An annual check should be adequate to keep abreast of changes in the fish population and factors affecting it.

Llano Grande Lake

Llano Grande Lake, approximately 250 acres in size, is located 5 miles south of Weslaco in Hidalgo County, Texas. Formerly it was an old stream bed of the Rio Grande River. Reconnaissance surveys were made in April, August and October 1963. Each survey consisted of six gill netting collections and one seining collection. Generally, public access is limited to the road crossings, but public angling is permitted without additional local restrictions.

Netting - Eighteen gill netting collections were made on this lake. A total of 408 fish of 10 species was taken in the netting collections (Table 10). The game fish species taken included channel catfish and warmouth.

Of the total fish netted, game fish showed a relative decrease both in numbers and in weight. In 1960 the game fish species comprised 11.20 per cent of the number and 13.08 per cent of the weight as compared to 3.70 per cent of the number and 4.20 per cent of the weight in 1963.

Carp, gizzard shad and Rio Grande perch are the most abundant rough fish present. Collectively, they comprised 87.10 per cent of the total number and 87.40 per cent of the total weight of the fish netted. These findings are in line with those of the surveys made three years ago.

Game fish species, primarily blue and channel catfish, largemouth bass and white crappie are definitely lacking. Such was also the case three years ago.

The length-weight statistics are presented in Table 11. Both alligator and spotted gars showed slight decreases in "K" factors, but gizzard shad, carp, channel catfish, warmouth and Rio Grande perch showed increases in "K" factors.

Seining - The seining results from Llano Grande Lake are presented in Table 12. Mosquitofish and threadfin shad comprised 96.74 per cent of the total numbers taken. Both Mexican tetra and red shiners were abundant in the 1960 collections but showed a sharp decline in 1963.

Lake Conditions- Eighteen Secchi disc readings were taken on Llano Grande; they ranged from 6 to 13 inches, with a mean average of 9 inches. This comparatively shallow lake coupled with the thick silt bottom and numerous rough fish keep the turbidity high.

Table 10. Results of gill netting, Llano Grande Lake, 1963

Species	Numbers Taken	Per Cent of Total Number	Weights (pounds)	Per Cent of Total Weight
Alligator gar	3	0.74	13.2	2.01
Spotted gar	14	3.43	37.0	5.64
Longnose gar	1	0.24	2.4	0.37
Threadfin shad	18	4.41	0.9	0.14
Gizzard shad	121	29.66	44.0	6.71
Carp	124	30.39	505.7	77.10
Channel catfish*	6	1.47	25.6	3.90
Black bullhead	2	0.49	1.8	0.27
Warmouth*	9	2.21	2.0	0.31
Rio Grande perch	110	26.96	23.3	3.55
Total	408	100.00	655.9	100.00
Per Cent Game Fish		3.70		4.20
Per Cent Rough Fish		96.30		95.80

*Indicates game fish

Table 11. Length-weight statistics of fish taken with gill nets,
Llano Grande Lake, 1963

Species	Standard Length (mm.)		Weight (grams)		"K" Factors	
	Range	Average	Range	Average	Range	Average
Alligator gar	940-940	940	3090-3090	3090	0.10-0.11	0.10
Spotted gar	470-575	525	851-1446	1098	0.64-0.87	0.74
Longnose gar	*	*	*	*	*	*
Threadfin shad	119-119	119	37-37	37	2.19-2.19	2.19
Gizzard shad	57-270	180	2-510	150	1.13-2.95	2.12
Carp	205-397	317	238-2155	1163	2.57-4.97	3.18
Channel catfish	410-465	445	1446-2381	2003	2.09-2.36	2.23
Black bullhead	239-240	239	267-454	410	2.68-3.28	2.98
Warmouth	110-145	124	57-125	88	4.10-4.79	4.50
Rio Grande perch	86-144	105	37-158	68	4.03-6.42	5.24

*No measurements recorded

Table 12. Seining results, Llano Grande Lake, 1963

Species	Numbers Taken	Per Cent of Total Number
Threadfin shad	1225	23.71
Gizzard shad	2	0.04
Mexican tetra	12	0.23
Tamaulipas shiner	7	0.14
Red shiner	2	0.04
Sheepshead minnow	116	2.25
Mosquitofish	3773	73.03
Amazon molly	3	0.06
Tidewater silverside	9	0.17
Rio Grande perch	17	0.33
Total	5166	100.00

Bulrushes and cattails are numerous around the perimeter of the lake. However, these plants are not considered a problem. A few scattered water hyacinths were seen during the 1960 survey, but none were found this year.

Recommendations - Large numbers of channel catfish and white crappie should be stocked in this lake. Even though there is little fishing in the summer, winter tourists in the Valley would utilize these species in the fall, winter and spring months.

Efforts should be made to prevent indiscriminate use of pesticides in the area.

Campacuas Lake

Campacuas Lake is located in the same floodway as Llano Grande and covers an area of approximately 120 acres. The lake is located between Weslaco and Mercedes in Hidalgo County, Texas. Public access is not limited or restricted.

Netting - Four gill netting collections were made on this lake in April. A total of 80 fish of 9 species was taken in the netting collections (Table 13). The game fish species included channel catfish and warmouth.

Of the total fish netted, game fish showed a relative decrease in both numbers and in weight. In 1960 the game fish species comprised 14.58 per cent of the number and 10.06 per cent of the weight as compared to 3.75 per cent of the number and 1.11 per cent of the weight in 1963. This relative decrease is consistent with the findings of Llano Grande Lake.

Table 13. Results of gill netting, Campacus Lake, April 1963

Species	Numbers Taken	Per Cent of Total Number	Weights (pounds)	Per Cent of Total Weight
Alligator gar	11	13.75	59.7	36.72
Spotted gar	32	40.00	70.2	43.17
Gizzard shad	4	5.00	0.3	0.18
Smallmouth buffalo	2	2.50	0.7	0.43
Carp	20	25.00	18.7	11.50
Channel catfish*	2	2.50	1.7	1.05
Striped mullet	1	1.25	2.1	1.29
Warmouth*	1	1.25	0.1	0.06
Freshwater drum	7	8.75	9.1	5.60
Total	80	100.00	162.6	100.00
Per Cent Game Fish		3.75		1.11
Per Cent Rough Fish		96.25		98.89

*Indicates game fish

The length-weight statistics are presented in Table 14. Alligator and spotted gars and channel catfish showed slight decreases in "K" factors; however, gizzard shad, smallmouth buffalo and carp showed increased "K" factors.

Seining - The seining results for Campacuas Lake are presented in Table 15. Mexican tetra, threadfin shad and mosquitofish, in that order, comprised 72.36 per cent of the total numbers taken.

Table 15. Seining results, Campacuas Lake, April 1963

Species	Numbers Taken	Per Cent of Total Number
Threadfin shad	34	27.64
Gizzard shad	5	4.07
Mexican tetra	39	31.71
Carp	4	3.25
Pugnose minnow	1	0.81
Tamaulipas shiner	1	0.81
Red shiner	3	2.44
Sheepshead minnow	4	3.25
Mosquitofish	16	13.01
Amazon molly	4	3.25
Tidewater silverside	9	7.32
Bluegill	3	2.44
Total	123	100.00

Lake Conditions- Four Secchi disc readings were taken on the lake; all were 6 inches. Strong, southeasterly winds, coupled with the thick silt bottom and numerous rough fish, keep the turbidity high.

Shoreline vegetation consists of bulrushes and cattails. No submerged aquatics were found.

Recommendations - An annual reconnaissance survey should be made to check changes in the fish populations.

Delta Orchards Lake

Delta Orchards Lake, a 2,200-acre surface irrigation reservoir near Monte Alto, is a part of the Hidalgo and Willacy Counties Water Control and Improvement District No. 1. The reservoir contains approximately 20,000 acre feet of water which is used to irrigate nearly 70,000 acres of farm land. Most of the water comes from the Rio Grande River via a system of gravity flow irrigation canals.

Table 14. Length-weight statistics of fish taken with gill nets, Campacuas Lake, April 1963

Species	Standard Length (mm.)		Weight (grams)		"K" Factors	
	Range	Average	Range	Average	Range	Average
Alligator gar	432-880	587	624-4876	2463	0.72-1.11	0.92
Spotted gar	423-642	490	595-2410	994	0.70-0.99	0.81
Gizzard shad	128-152	137	50-64	55	1.82-2.43	2.12
Smallmouth buffalo	160-164	162	140-162	151	2.01-3.67	2.84
Carp	115-583	173	46-5557	424	2.53-4.09	3.05
Channel catfish	265-268	266	378-403	390	1.96-2.16	2.06
Striped mullet	330-330	330	936-936	936	2.60-2.60	2.60
Warmouth	107-107	107	52-52	52	4.24-4.24	4.24
Freshwater drum	186-281	249	158-879	591	2.45-4.13	3.33

Public angling is permitted for a 25-cent fee per person per day. Trotline fishing, however, is prohibited except to certain persons who are issued special permission.

The year 1962 saw a decrease of some 4,000 fishing permits since the previous year. Only 16,000 permits were sold as compared to 20,000 in 1961.

This decrease in number of permits sold is not attributed to poor fishing, but rather to the decreasing number of fishermen in the area. In 1962 a nearby Air Force base closed, thus affecting the usual number of anglers.

Netting - In March, October and December 1963, 13 gill netting collections took a total of 172 fish of 14 species (Table 16). The game fish species taken in the nets included channel and blue catfish, warmouth, white crappie and freshwater drum. Normally the drum is considered a rough fish species, but is classed as a game fish in this case because anglers at Delta Orchards Lake harvest them in large numbers the year around.

Of the total fish taken in the nets, game fish species comprised 52.91 per cent of the number and 34.24 per cent of the weight. A year previously, game fish comprised 71.43 per cent and 32.14 per cent by number and weight, respectively. On the basis of these data, it appears that game fish species are increasing in numbers but decreasing in weight.

The most outstanding changes concerning the game fish species are the relative decreases in the white crappie and freshwater drum populations. Crappie comprised 21.21 per cent of the number of fish netted in 1962, but only 4.07 per cent in 1963. Likewise, freshwater drum "decreased" from 33.77 per cent in 1962 to 17.44 per cent in 1963. This apparent decline is not understood; however, no crappie were taken in the reconnaissance surveys of nearby Llano Grande and Campacuas Lakes either. No other significant changes were noted in the fish populations.

The average "K" factors, or indices of physical condition, of all fish remained about the same. The length-weight statistics are presented in Table 17.

Seining - Five seining collections took a total of 3,334 fish of 14 species (Table 18). Tidewater silversides, mosquitofish, Tamaulipas shiners and thread-fin shad, in that order, comprised 93.97 per cent of the total number. The most significant changes concerned the tidewater silverside and the Mexican tetra. The former showed a relative decrease in numbers and the latter showed a relative increase in numbers.

Lake Conditions- Other than thick growths of algae, aquatic vegetation is scarce in the lake. This may be attributed to the fact that the prevailing, strong, southeasterly winds keep silt in suspension in this shallow lake.

Recommendations - Since wild fish from the Rio Grande River have constant access to Delta Orchards Lake, population control work would be ineffective and therefore is not recommended. It is recommended, however, that commercial fishing with nets be permitted in order to harvest as many rough fish as possible.

Sizable numbers of largemouth bass and white crappie should be stocked in an effort to re-establish these species.

Table 16. Results of gill netting, Delta Orchards Lake, March, October and December 1963

Species	Numbers Taken	Per Cent of Total Number	Weights (pounds)	Per Cent of Total Weight
Alligator gar	5	2.91	7.1	3.71
Spotted gar	19	11.05	3.6	1.88
Longnose gar	24	13.95	45.1	23.58
Gizzard shad	8	4.65	2.7	1.41
Smallmouth buffalo	13	7.56	42.7	22.32
Carp	5	2.91	3.1	1.62
Channel catfish*	9	5.23	12.9	6.74
Blue catfish*	44	25.58	34.7	18.14
Striped mullet	4	2.33	21.2	11.08
Warmouth*	1	0.58	0.2	0.11
Bluegill	2	1.16	0.2	0.11
White crappie*	7	4.07	1.7	0.89
Freshwater drum*	30	17.44	16.0	8.36
Rio Grande perch	1	0.58	0.1	0.05
Total	172	100.00	191.3	100.00
Per Cent Game Fish		52.91		34.24
Per Cent Rough Fish		47.09		65.76

*Indicates game fish

Table 17. Length-weight statistics of fish taken with gill nets, Delta Orchards Lake, March, October and December 1963

Species	Standard Length (mm.)		Weight (grams)		"K" Factors	
	Range	Average	Range	Average	Range	Average
Alligator gar	425-559	484	482-1361	808	0.62-0.65	0.63
Spotted gar	397-494	430	420-794	549	0.65-0.68	0.67
Longnose gar	408-910	608	250-3941	1136	0.30-0.56	0.45
Gizzard shad	155-225	201	66-225	158	1.66-2.09	1.90
Smallmouth buffalo	325-414	351	1219-2296	1489	3.06-3.93	3.43
Carp	126-259	198	59-539	280	2.74-3.49	3.13
Channel catfish	286-437	350	364-1191	651	1.23-1.63	1.45
Blue catfish	180-562	327	87-2183	584	1.22-1.73	1.45
Striped mullet	433-492	461	2013-2778	2403	2.33-2.54	2.44
Warmouth	122-122	122	72-72	72	3.96-3.96	3.96
Bluegill	99-105	102	39-46	43	3.97-4.02	4.00
White crappie	120-169	148	52-155	108	2.56-3.85	3.13
Freshwater drum	112-349	201	42-1233	242	2.21-2.99	2.51
Rio Grande perch	100-100	100	46-46	46	4.60-4.60	4.60

Table 18. Seining results, Delta Orchards Lake, March, October and December 1963

Species	Numbers Taken	Per Cent of Total Number
Threadfin shad	458	13.74
Gizzard shad	49	1.47
Mexican tetra	76	2.28
Pugnose minnow	11	0.33
Speckled chub	1	0.03
Tamaulipas shiner	620	18.60
Red shiner	9	0.27
Longnose killifish	1	0.03
Sheepshead minnow	42	1.26
Mosquitofish	755	22.64
Amazon molly	8	0.24
Tidewater silverside	1300	38.99
Bluegill	1	0.03
Rio Grande perch	3	0.09
Total	3334	100.00

San Antonio River

Netting - Four gill netting collections were made on the San Antonio River and Cibolo Creek in September 1963. One of the original stations was dry and could not be netted. A total of 49 fish of 10 species was taken and rough fish species, including longnose gar, gizzard shad, smallmouth buffalo, gray redhorse, bluegill and Rio Grande perch, were dominant both in number and weight (Table 19). Of the four game fish species taken, flathead catfish and largemouth bass are the most important sport fishes; however, their numbers are limited. The gray redhorse was limited to Cibolo Creek, but the other species were uniformly distributed throughout the river basin. Two specimens of smallmouth buffalo were taken at Conquista Park on the San Antonio River; but, again, no carp were taken. There was no significant change in the fish population since the basic survey of 1962 (see completion report for Job B-18, Project F-6-R-10).

The length-weight statistics are presented in Table 20. The average "K" factors are in line with those of the 1962 basic survey.

Seining - Table 21 shows the results of the 10 seining collections. Red shiners and mosquitofish were again the most abundant species taken. Collectively, they comprised 91.97 per cent of the seining collections.

Table 19. Results of gill netting, San Antonio River, September 1963

Species	Numbers Taken	Per Cent of Total Number	Weights (pounds)	Per Cent of Total Weight
Longnose gar	7	14.29	20.8	37.48
Gizzard shad	13	26.53	11.4	20.54
Smallmouth buffalo	2	4.08	5.7	10.27
Gray redhorse	8	16.33	10.2	18.38
Flathead catfish*	1	2.04	4.1	7.39
Largemouth bass*	2	4.08	0.4	0.72
Warmouth*	2	4.08	0.5	0.90
Bluegill	2	4.08	0.2	0.36
Longear sunfish*	1	2.04	**	0.00
Rio Grande perch	11	22.45	2.2	3.96
Total	49	100.00	55.5	100.00
Per Cent Game Fish		12.24		9.01
Per Cent Rough Fish		87.76		90.99

*Indicates game fish
 **Weighed less than 1/10 pound

Table 20. Length-weight statistics of fish taken with gill nets,
San Antonio River, September 1963

Species	Standard Length (mm.)		Weight (grams)		"K" Factors	
	Range	Average	Range	Average	Range	Average
Longnose gar	559-873	679	624-2495	1345	0.33-0.57	0.40
Gizzard shad	121-320	242	34-737	398	1.91-2.59	2.19
Smallmouth buffalo	274-385	330	765-1843	1304	3.22-3.71	3.47
Gray rehorse	223-354	296	223-907	578	2.01-2.21	2.08
Flathead catfish	479-479	479	1843-1843	1843	1.67-1.67	1.67
Largemouth bass	147-162	155	86-101	94	2.37-2.70	2.54
Warmouth	110-160	135	57-169	113	4.12-4.28	4.20
Bluegill	98-114	106	38-66	52	4.03-4.45	4.24
Longear sunfish	86-86	86	30-30	30	4.71-4.71	4.71
Rio Grande perch	90-150	114	42-173	90	4.36-5.75	4.70

Recommendations - Every reasonable effort should be made to prevent industrial, municipal and soil pollution in the river. This, of course, would require the combined efforts of many people and agencies.

The sportsmen will be limited to catfish angling in the river. Cibolo Creek has a moderate population of largemouth bass in addition to a good catfish population. Since the catfish is one of the principal game fish species in the San Antonio River, commercial fishermen should not be allowed to take them and every effort should be made to protect and propagate them.

No developmental work is presently proposed or recommended.

Table 21. Seining results, San Antonio River, September 1963

Species	Numbers Taken	Per Cent of Total Number
Gizzard shad	6	0.14
Mexican tetra	1	0.02
Pugnose minnow	7	0.16
Red shiner	2654	62.14
Bullhead minnow	96	2.25
Channel catfish	47	1.10
Blackstripe topminnow	44	1.03
Mosquitofish	1274	29.83
Amazon molly	85	1.99
Bluegill	32	0.75
Longear sunfish	11	0.26
Rio Grande perch	14	0.33
Total	4271	100.00

Lake Corpus Christi

Netting - A total of 40 gill netting collections was made on Lake Corpus Christi during January, April, July and October 1963. All told, these nets took 1719 fish of 18 species (Table 22).

Rough fish species including alligator, spotted and longnose gars, gizzard shad, smallmouth buffalo, carp, bluegill and freshwater drum comprised 58.81 per cent of the number of fish netted and 72.86 per cent of the total weight. There was no significant change noted in the fish population since the 1962 reconnaissance survey.

Table 22. Results of gill netting, Lake Corpus Christi, January through October 1963

Species	Numbers Taken	Per Cent of Total Number	Weights (pounds)	Per Cent of Total Weight
Alligator gar	12	0.70	69.7	4.75
Spotted gar	104	6.05	248.3	16.94
Longnose gar	80	4.65	345.7	23.58
Gizzard shad	620	36.07	235.8	16.08
Smallmouth buffalo	1	0.06	9.7	0.66
Carp	9	0.52	21.4	1.46
Channel catfish*	159	9.25	53.2	3.63
Blue catfish*	315	18.32	168.6	11.50
Flathead catfish*	3	0.17	12.1	0.83
White bass*	46	2.68	73.9	5.04
Largemouth bass*	7	0.41	9.5	0.65
Warmouth*	1	0.06	0.2	0.01
Redear sunfish*	14	0.81	2.7	0.18
Bluegill	14	0.81	1.7	0.12
Longear sunfish*	2	0.12	0.6	0.04
White crappie*	87	5.06	41.6	2.84
Black crappie*	74	4.31	35.5	2.42
Freshwater drum	171	9.95	135.9	9.27
Total	1719	100.00	1466.1	100.00
Per Cent Game Fish		41.19		27.14
Per Cent Rough Fish		58.81		72.86

*Indicates game fish

Table 23. Length-weight statistics of fish taken with gill nets,
Lake Corpus Christi, January through October 1963

Species	Standard Length(mm.)		Weight (grams)		"K" Factors	
	Range	Average	Range	Average	Range	Average
Alligator gar	421-929	639	539-8391	3253	0.44-1.04	0.77
Spotted gar	291-956	503	143-8505	1082	0.37-0.87	0.71
Longnose gar	417-1052	701	304-6803	1919	0.31-0.84	0.49
Gizzard shad	95-295	195	15-680	175	1.09-3.09	2.05
Smallmouth buffalo	458-458	458	4422-4422	4422	4.68-4.68	4.68
Carp	177-500	278	177-3742	1085	2.79-3.43	3.10
Channel catfish	40-353	197	12-822	149	1.19-2.07	1.62
Blue catfish	143-548	236	45-2495	243	1.06-1.99	1.50
Flathead catfish	426-453	442	1219-2211	1824	1.57-2.37	2.07
White bass	201-350	271	308-1418	728	2.83-5.14	3.36
Largemouth bass	210-336	277	260-964	616	2.54-2.96	2.77
Warmouth	113-113	113	70-70	70	4.75-4.75	4.75
Redear sunfish	105-146	123	45-131	85	3.11-6.76	4.33
Bluegill	91-150	104	35-138	54	3.01-5.31	4.43
Longear sunfish	111-160	135	56-210	133	4.09-5.12	4.60
White crappie	114-243	183	43-567	220	2.25-4.36	3.17
Black crappie	99-305	178	33-567	218	1.69-5.22	3.42
Freshwater drum	120-390	220	51-1899	360	2.25-3.75	2.97

Crappie fishing remained about average during the year but largemouth bass fishermen had less than good fishing. This was attributed to the extremely low water level during the spring. Bass fishing picked up a little in the fall but was still off.

The length-weight statistics are presented in Table 23. No significant changes were noted.

Seining - Forty seining collections took a total of 23,013 fish of 21 species (Table 24). Tidewater silversides, red shiners and mosquitofish, in that order, were the most frequently encountered fishes. All told, these three species comprised 84.51 per cent of the fish seined. Threadfin shad comprised only 1.19 per cent of the collection in 1963 as compared to 17.90 per cent in 1962. It must be noted, however, that only one reconnaissance survey was made in the fall of 1962.

Table 24. Seining results, Lake Corpus Christi, January through October 1963

Species	Numbers Taken	Per Cent of Total Number
Spotted gar	6	0.03
Threadfin shad	273	1.19
Gizzard shad	756	3.29
Mexican tetra	2	0.01
Smallmouth buffalo	7	0.03
Carp	51	0.22
Pugnose minnow	362	1.57
Red shiner	4411	19.17
Bullhead minnow	369	1.60
Channel catfish	1	0.01
Tadpole madtom	1	0.01
Sheepshead minnow	318	1.38
Mosquitofish	4010	17.42
Amazon molly	576	2.50
Tidewater silverside	11028	47.92
Largemouth bass	2	0.01
Green sunfish	3	0.01
Redear sunfish	21	0.09
Bluegill	773	3.36
Longear sunfish	5	0.02
Rio Grande perch	38	0.16
Total	23013	100.00

Stomach Analyses - Unidentifiable fish remains were found in the stomachs of both alligator and spotted gars. Shad were found in many white bass stomachs when food was present but many stomachs were empty.

Lake Conditions- The water level varied from 1 to 8 feet below the 88-foot crest of the dam during the year (Table 25). In early July the lake rose nearly 7 feet but began dropping again in mid-July. Undoubtedly the fluctuating water level affected the spawning of centrarchids, especially largemouth bass and crappies.

Chemical control of water hyacinths in the upper portions of Lake Corpus Christi was continued under Job 15a4, Project F-15-D-5. Such work is necessary in order to maintain access for fishermen.

Secchi disc readings of light penetration ranged from 6 to 28 inches. The water was consistently clearer in the lower reaches of the lake. Water analyses were made at two stations and all values were normal for this region.

Recommendations - Quarterly checks should be made to maintain current information on the status of the fish population.

Water hyacinth control work should be continued.

Aransas River

Netting - Twelve gill netting collections took a total of 389 fish of 18 species. Rough fish species including alligator, spotted and longnose gars, tarpon, gizzard shad, smallmouth buffalo, sea catfish, yellow bullhead, striped mullet, bluegill, freshwater drum and Rio Grande perch comprised 92.80 per cent of the number of fish netted and 96.52 per cent of the total weight. No significant changes in the fish population were noted since the basic survey was made in 1956. The results of gill netting are presented in Table 26.

The length-weight statistics are presented in Table 27. No significant changes were noted.

Seining - Twelve seining collections took a total of 7,575 fish of 15 species (Table 28). Mosquitofish and bluegill, in that order, were the most frequently encountered fishes. All told, these two species comprised 90.01 per cent of the fish seined. The presence of largemouth bass, crappie, bluegill, red shiners and Rio Grande perch in the upper reaches of the river shows that where the salinity is reduced the water is suitable for freshwater species. The invasion of salt water from the bay apparently prevents their distribution in fishable numbers farther downstream.

Stomach Analyses - Unidentifiable fish remains were found in the gars' stomachs. Insect and/or fish remains were found in catfish and sunfish stomachs.

Recommendations - Since public access is limited on the river, no developmental work is proposed. The river is of an intermittent nature and, under present conditions, would not support a good sports fishery.

Table 25. Lake Corpus Christi water levels, December 1962 through November 1963

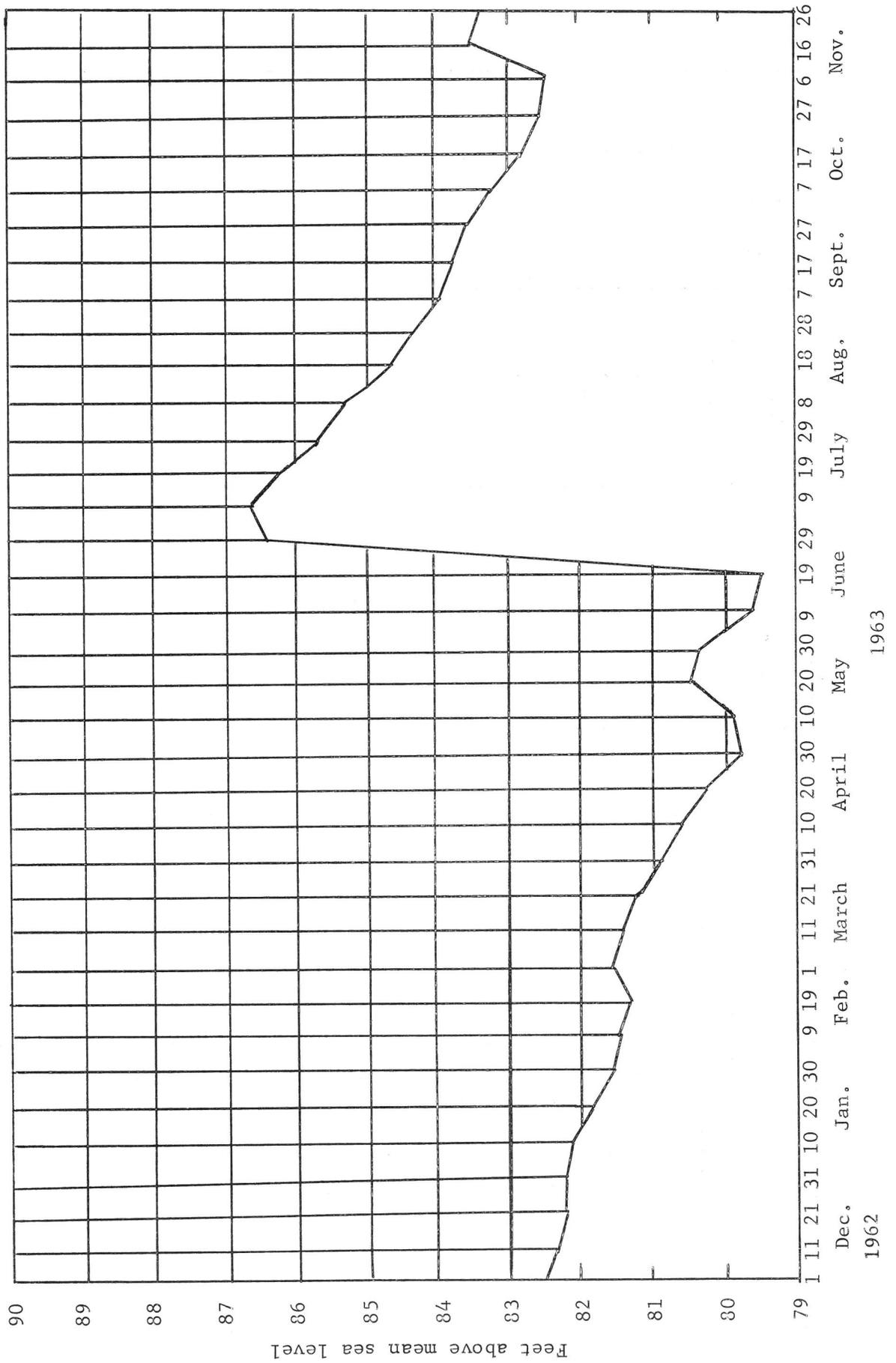


Table 26. Results of gill netting, Arkansas River, May and August 1963

Species	Numbers Taken	Per Cent of Total Number	Weights (pounds)	Per Cent of Total Weight
Alligator gar	19	4.88	266.0	31.83
Spotted gar	41	10.54	51.5	6.16
Longnose gar	70	17.99	227.5	27.22
Tarpon	3	0.77	0.5	0.06
Gizzard shad	128	32.90	38.9	4.65
Smallmouth buffalo	82	21.08	213.5	25.54
Sea catfish	4	1.03	0.5	0.06
Channel catfish*	9	2.31	16.2	1.94
Blue catfish*	9	2.31	6.6	0.79
Yellow bullhead	3	0.77	2.3	0.28
Striped mullet	4	1.03	3.4	0.41
Largemouth bass*	2	0.52	1.1	0.13
Bluegill	1	0.26	0.8	0.10
White crappie*	4	1.03	1.7	0.20
Freshwater drum	5	1.29	1.7	0.20
Black drum*	3	0.77	3.1	0.37
Spotted seatrout*	1	0.26	0.4	0.05
Rio Grande perch	1	0.26	0.1	0.01
Total	389	100.00	835.8	100.00
Per Cent Game Fish		7.20		3.48
Per Cent Rough Fish		92.80		96.52

*Indicates game fish

Table 27. Length-weight statistics of fish taken with gill nets, Arkansas River, May and August 1963

Species	Standard Length (mm.)		Weight (grams)		"K" Factors	
	Range	Average	Range	Average	Range	Average
Alligator gar	697-1045	924	2835-8278	6702	0.69-1.46	0.89
Spotted gar	308-621	443	185-2268	631	0.31-0.94	0.63
Longnose gar	460-1110	675	275-7518	1638	0.24-0.76	0.41
Tarpon	273-273	273	210-210	210	1.03-1.03	1.03
Gizzard shad	80-278	219	10-482	200	1.06-2.29	1.74
Smallmouth buffalo	218-449	321	328-2523	1196	2.73-3.98	3.34
Sea catfish	165-192	181	74-105	93	1.48-1.64	1.56
Channel catfish	293-457	351	380-1701	706	1.51-1.91	1.73
Blue catfish	195-390	286	109-851	376	1.12-1.65	1.38
Yellow bullhead	221-242	233	281-441	342	2.35-3.11	2.69
Striped mullet	330-373	352	709-851	780	1.63-1.97	1.80
Largemouth bass	184-225	205	155-325	240	2.48-2.85	2.67
Bluegill	87-87	87	36-36	36	5.47-5.47	5.47
White crappie	155-190	172	132-270	189	3.31-3.93	3.61
Freshwater drum	125-265	172	64-624	251	3.25-3.35	3.29
Black drum	218-280	246	294-680	476	2.83-3.28	3.07
Spotted seatrout	220-220	220	163-163	163	1.53-1.53	1.53
Rio Grande perch	100-100	100	44-44	44	4.40-4.40	4.40

Table 28. Seining results, Aransas River, May and August 1963

Species	Numbers Taken	Per Cent of Total Number
Threadfin shad	34	0.45
Gizzard shad	20	0.26
Pugnose minnow	1	0.01
Red shiner	20	0.26
Gulf pipefish	1	0.01
Gulf killifish	105	1.39
Sheepshead minnow	157	2.07
Mosquitofish	5981	78.96
Amazon molly	8	0.11
Striped mullet	18	0.24
Tidewater silverside	315	4.16
Largemouth bass	1	0.01
Bluegill	905	11.95
White crappie	1	0.01
Rio Grande perch	8	0.11
Total	7575	100.00

Regulatory Authority

The 58th Texas Legislature placed six counties in this region under Regulatory Authority to the Parks and Wildlife Department. In August 1963 the proposed fishing regulations for the six counties were reviewed and discussed with area game wardens in Rockport. In September the project leader attended four public hearings and the Inland Fisheries Supervisor, Region V, attended the other two.

Since sufficient data were unavailable to justify any changes, the current regulations were kept in force.

Recommendations - In future segments this work will be conducted under Job B-19, Project F-6-R.

For information purposes a comparison of netting success is included as Table 29.

Prepared by Charles T. Menn
Project Leader

Approved by Marion Toole
Coordinator

Date January 6, 1964

Kenneth C. Jurgens
Regional Supervisor

Table 29. Success of gill netting in terms of number and pounds of fish caught

Body of Water	Number of Nets	Number of Feet of Nets	Number of Fish Caught	Average Number of Fish/Net	Average Number of Fish/Foot of Net	Pounds of Fish Caught	Average Pounds of Fish/Net	Average Pounds of Fish/Foot of Net
Lake Corpus Christi Jan. thru Oct. 1963	40	5,000	1,719	43.0	0.344	1,466.1	36.7	0.293
Delta Orchards Lake Mar., Oct. & Dec. 1963	13	1,625	172	13.2	0.106	191.3	14.7	0.118
Bentsen State Park Lake Mar. 1963	5	625	152	30.4	0.243	241.1	48.1	0.386
Campacuas Lake April 1963	4	500	77	19.3	0.154	162.6	40.7	0.325
Fort Brown Lake Feb. 1963	4	500	25	6.3	0.050	4.9	1.2	0.098
Harlingen City Lake Feb. 1963	4	500	71	17.8	0.142	230.4	57.6	0.461
Llano Grande Lake 1963	18	2,250	480	26.7	0.213	655.9	36.4	0.292
San Antonio River Sept. 1963	4	500	49	12.2	0.098	55.5	13.8	0.111
Aransas River May & Aug. 1963	12	1,500	389	32.4	0.259	835.8	69.7	0.557

100

