SEGMENT COMPLETION REPORT

FILE

ATE OF TEXAS

Project No. F4R3 Name Fisheries Investigations and Surveys of the Waters of Region 4-B.

Job No. B-17 Title Basic Survey and Inventory of Fish Species in the Trinity River Watershed Lying in the Following Counties: Parker, Tarrant, Dallas, Rockwall, Kaufman, Van Zandt, Johnson, Leon, Ellis, Navarro, Henderson, Freestone, Anderson, Houston, Trinity, Madison, Walker, San Jacinto, Polk, Liberty, and Chambers.

Period Covered: November 1, 1955 - October 31, 1956

ABSTRACT

1. The Trinity River is formed by the union of three major tributaries: West Fork, Elm Fork, and East Fork. The watershed is 455 miles long and drains 17,600 square miles.

2. The cities of Dallas and Fort Worth contribute the majority of the industrial waste and municipal sewage pollution but smaller cities are contribution factors.

3. Oil field pollution by salt water also limits the fish production.

4. The Trinity River is a navigable stream from the mouth to Fort Worth but ·cess is limited to entry at public road crossings except for those areas where land ·ners permit entry by way of their property.

5. Seines and gill nets were used to collect 1897 specimens representing 39 species. These collections were made at 12 seine stations and 3 net stations.

6. The most numerous species taken was the red shiner but bluegill sunfish were taken at more seine stations. Gizzard shad were most numerous in net catches but the alligator gar provided the greatest poundage.

7. Rough fish dominated the net catch since they made up 77.3 percent of the number and 95.66 percent of the weight taken.

OBJECTIVES

To gather fundamental data on the above waters in regard to their physical, chemical and biological aspects. To determine the distribution of fish species present, their relative abundance, and the ecological factors influencing their distribution.

DESCRIPTION

The Trinity River Watershed extends from the Red River to the Gulf of Mexico (Map 1). It is composed of three major tributaries: West Fork, Elm Fork, and East Fork. The West Fork is joined by the Clear Fork in Fort Worth and joins with the Elm Fork at Dallas. The East Fork joins the Trinity at Rosser some 453 river miles above the mouth.

The upper part of the watershed has been controlled by the construction of

2.

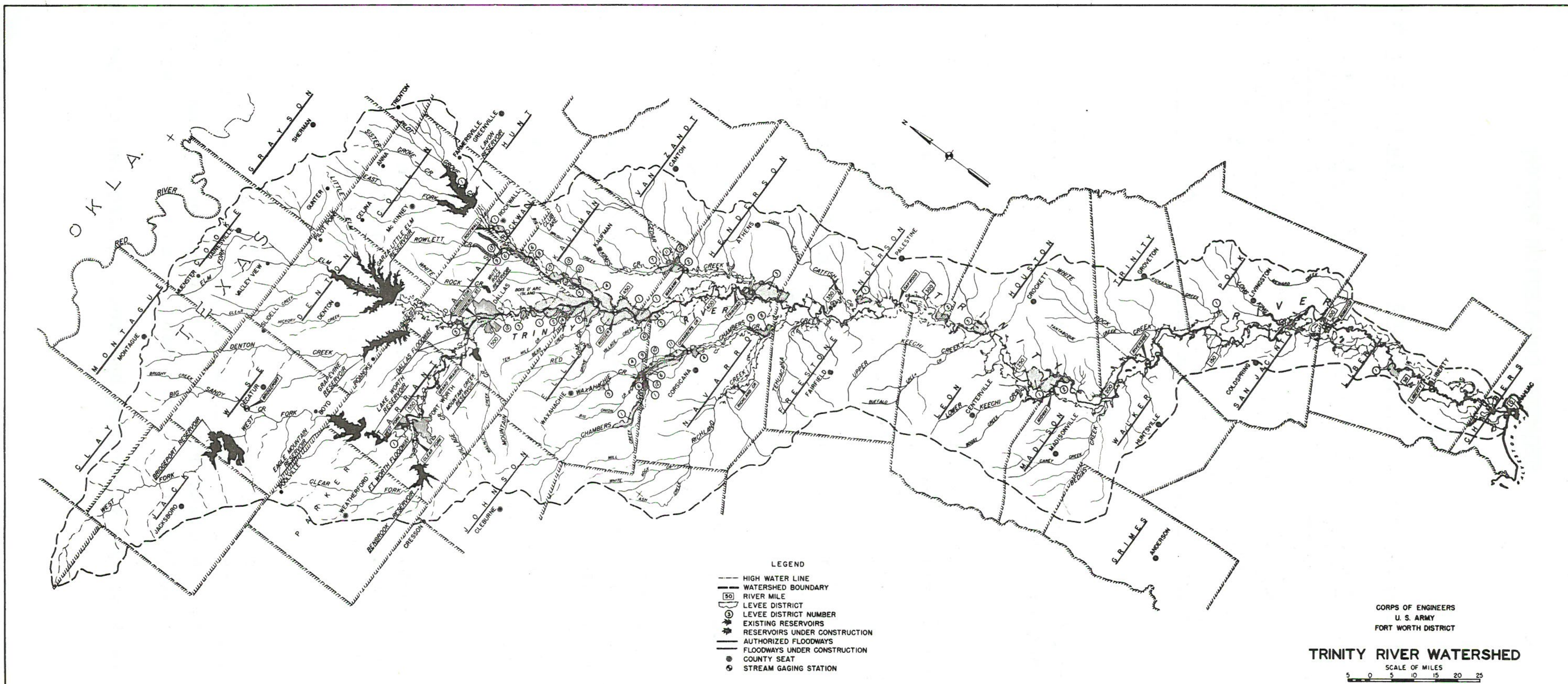
LEGEND
HIGH WATER LINE
WATERSHED BOUNDARY
RIVER MILE
LEVEE DISTRICT
LEVEE DISTRICT NUMBER
EXISTING RESERVOIRS
RESERVOIRS UNDER CONSTRUCTION
AUTHORIZED FLOODWAYS
FLOODWAYS UNDER CONSTRUCTION
COUNTY SEAT
STREAM GAGING STATION
CORPS OF ENGINEERS
U. S. ARMY
FORT WORTH DISTRICT
TRINITY RIVER WATERSHED
SCALE OF MILES
5 0 5 10 15 20 25
OKLA.
TEXAS
RED RIVER
TRINITY RIVER

Exhibit 7

lakes on the major tributaries. Lake Benbrook is located on the Clear Fork Southwest of Fort Worth. The West Fork is controlled by three dams: Lake Bridgeport, Lake Eagle Mountain and Lake Worth. Grapevine Lake on Denton Creek and Garza-Little Elm Dam control the Elm Fork while Lavon Dam controls the East Fork. There are numerous small dams on the tributaries that will be worked during the next segments. The reservoirs are augmented by many river bottom lakes that are usually formed by a change in the river channel that forms an oxbow cutoff. These cutoff lakes have afforded very good fishing in the past but have declined as the tendency of the river to overflow became less.

The watershed of the Trinity River is roughly triangular with a maximum width of 131 miles and a length of 455 miles. The drainage area is about 17,600 square miles. The watershed is largely flat with few deep valleys. The lakes formed on the tributaries are generally broad and shallow. The upper part of the watershed is largely farmland with some ranching but the valley narrows as it progresses toward the Gulf of Mexico and the land use tends toward cattle raising and rice growing.

Silting is not the major limiting factor in this watershed. The cities of Dallas and Fort Worth have combined population of approximately 1,500,000 people, together with many industries that add to the waste disposal problem. The sewage disposal of both these cities has failed to keep up with the population increase and has placed an added burden on the Trintiy River. This river has suffered from lowered rainfall and a pollution problem has ensued. This pollution has been further complicated by the entry of salt water from oil production operations below the mouth of the East Fork at Rosser.

This watershed is primarily located in the Coastal Plains Physiographic Region but the Elm Fork and West Fork extend into the North Central Plains Region. The West Fork arises in the West Cross Timbers Belt and extends across the Grand Prairie and Eastern Cross Timbers Belt. This juncture is made in the Blackland Prairie Belt and the resulting river flows southeastward to unite with the East Fork near the edge of the Post Oak Belt. The East Fork lies entirely within the Blackland Prairie. The Trinity River continues toward the Gulf of Mexico across the Pine Belt and the Coastal Prairie to enter Trinity Bay near Anahuac.

The soils of the Cross Timbers Belt are largely sand or sandy loam with grayish soils. The surface is generally hilly and interspersed with stretches of prairie. The dominant vegetation is the blackjack oak and post oak with pecan, elm, and other hardwoods along the streams.

Thin limestone soil characterizes the Grand Prairie Belt with rolling hills giving way at times to cedar covered mountains. The dominant vegetation is generally grasses with pecan and other hardwoods along the streams.

The Blackland Prairie has deep black limestone soils with few trees. Streams are heavy with silt and remain muddy for long periods after rains. Post Oak and Blackjack Oak comprise the dominant vegetation of the narrow band that separates the Blackland Prairie from the Pine Belt. The soil changes gradually from the black limestone produced clay to a red sandy soil containing much iron. The vegetation is dominated by the Pine along with tall hardwoods. Streams carry less silt and clear more rapidly after rains.

The Coastal Prairie part of the Trintiy Watershed is very narrow and is generally covered with trees of the alluvial flood plain type of valley that makes up this portion of the watershed.

ACCESSIBILITY

The Trinity River is a navigable stream from the mouth to the confluence of the West Fork with the Clear Fork. The Elm Fork and the East Fork are not of sufficient size to be considered navigable. The state retains ownership of all navigable streams. The extent of this ownership has been defined by the Texas Supreme Court and the United States Supreme Court to be that part of the stream that is normally covered by water and extending one-half the way up the cut banks on either side. This part of a public stream is open to the fishing public but entry to this area is provided only at highway crossings unless the landowner will permit ingress over his land.

The Trinity River once provided much commercial and sport fishing but the construction of reservoirs on the tributaries and the lack of sufficient rainfall have combined to reduce the flow to the point where low water and pollution have greatly reduced the catch for both sport and commercial fishermen.

METHODS

Seine samples were collected by means of bag seines, 26 by 6 feet of $\frac{1}{4}$ inch mesh and common sense seines having 1/8 inch mesh and a depth of four feet. The common sense seines were 10 feet in length. The specimens taken were usually preserved in 10% formalin and transported to the laboratory for identification and tabulation. At times large numbers of easily identified specimens were taken. These were counted and returned to the water after identification.

Gill net collections were made with nylon nets 100 by 8 feet and of $1\frac{1}{2}$ inch mesh. These nets were used in small lakes and deep portions of the river. Specimens taken in gill nets were identified, weighed, measured and opened to check the food habits and physical condition. The findings were recorded on the forms devised for recording data from the basic survey and inventory of lakes.

RESULTS OF FISH COLLECTION

Fish collections were made by both seines and gill nets. The seines were used where the water was shallow enough to permit wading but in deeper water and in small lakes on the watershed gill nets were employed.

Many small streams in this watershed were dry throughout this investigation and the majority of them contained only small quantities of water for a short period following rains. Those seine stations that were established represented as many habitats as could be located that contained water on a permanent basis. Seine stations extend from the vicinity of Fort Worth to a point near Livingston where the river becomes too deep for seining (Table 1). Net collections were made from Red Lake near Fairfield and Stanmire Lake near Oakwood as well as the Trinity River near Moss Bluff (Table 1).

A checklist of the thirty-nine species taken from this watershed is given in Table 2 and includes both the seined and net samples made during this investigation. There are other species that have been reported from this watershed but were not taken during this period and therefore have been omitted.

The most numerous species in the seine collections was the red shiner (Notropis lutrensis). This species provided 1499 of the 1897 fish taken or 79 percent. Bluegill sunfish and mosquitofish made up 6 percent and 5 percent, respectively (Table 3).

Only three species were taken at the majority of the seine stations. Bluegills were collected at eleven of the twelve stations while mosquitofish and red shiner were taken at eight stations. The large catch of red shiner at Station No. 9 accounted for 888 or 59 percent of the total number of this species taken.

The results of netting on the Trinity River Watershed are given in Tables 4 and 5. The catch from the two small lakes netted showed a tendency toward gizzard shad since 59.8 percent of the Red Lake catch and 63.3 percent of the Stanmire Lake catch were of this species. No shad were netted in the River at Moss Bluff. Gizzard shad dominated the total weights of the net catches from Red Lake and Stanmire Lake with 54.8 and 50.9 percent respectively. The gar made up a small percentage of the total, both in number and weight, of the fish taken in Red Lake and Stanmire Lake but they compose 64.7 percent of the number and 95.8 percent of the weight of the catch from the river at Moss Bluff. Longnose gar provided 47.6 percent of the total number taken at Moss Bluff while only 7.6 percent were alligator gar but the alligator gar provided 50.8 percent of the total weight as compared to the longnose gar total of 40.4 percent. A comparison of the gmae and rough species shows that the 573 fish taken in gill nets weighed 1958.61 pounds for an average weight of 3.42 pounds. The rough fish made up 77.3 percent of the total number and 95.66 percent of the total weight. They averaged 4.23 pounds while the game fish averaged .65 pounds.

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Date April 18, 1957

Table 1. Key to Fish Collection Stations on Trinity River Watershed, below the Bridgeport, Grapevine, Lavon, and Garza-Little Elm Dams.

Station No.	Collection No.	Location
1	B17S-1	Rock Creek imediately above Benbrook Lake, Tarrant County.
2	B17S-2	Mustang Creek immediately above Benbrook Lake, Tarrant County.
3	B17S-3	Clear Fork of Trinity River at Durke's Ford near Aledo, Parker County.
4	B17S-4	Village Creek, U. S. Highway 287 near Everman, Tarrant County.
5	B17S-5	Village Creek 3 miles above U. S. Highway 80 near Handley, Tarrant County.
6	B17S-6	Catfish Creek on Engling Wildlife Area, Tennessee Colony, Anderson County.
7	B17S-7	Small lake on Engling Area near Catfish Creek, Tennessee Colony, Anderson County.
8	B17S-8	Lake Creek at Highway 287 crossing, Anderson County.
9	B17S-9	Trinity River at Highway 45 crossing near Trinity, Trinity County.
10	B17S-10	Kellison Creek near Weldon, Houston County.
11	B17S-11	Trinity River at Highway 7 - Leon County-Houston County line.
12	B17S-12	Trinity River at Highway 59 crossing near Livingston, Polk County.
13	B17G-1	Red Lake, on tributary to Keechi Creek near Fairfield, Freestone County.
14	B17G-2	Stanmire Lake, Oxbow cutoff from Trinity River near Oakwood, Leon Coutny.
15	B17G-3	Trintiy River near Moss Bluff, Liberty County.

Note: B17S - Denotes Seine Station.
B17G - Denotes Net Station.

Table 2. Checklist of Species from the Trinity River Watershed.

Common Name	Scientific Name
Alligator gar	Lepisosteus spatula
Shortnose gar	Lepisosteus platostomus
Spotted gar	Lepisosteus productus
Longnose gar	Lepisosteus osseus
Bowfin	Amia calva
Menhaden	Brevoortia gunteri
Gizzard shad	Dorosoma cepedianum
Smallmouth buffalo	Ictiobus bubalus
River carpsucker	Carpiodes carpio
Chubsucker	Erimyzon sucetta
Golden shiner	Notemigonus crysoleucas
Redfin shiner	Notropis umbratalis
Blacktail shiner	Notropis venustus
Red shiner	Notropis lutrensis
Blackspot shiner	Notropis atrocaudalis
Silvery minnow	Hybognathus nuchalis
Parrot minnow	Pimephales vigilax
Fathead minnow	Pimephales promelus
Channel catfish	Ictalurus punctatus
Blue catfish	Ictalurus furcatus
Black bullhead	Ictalurus melas
Yellow bullhead	Ictalurus natalis
Blackspot topminnow	Fundulus olivaceus
Mosquitofish	Gambusia affinis
Striped mullet	Mugil cephalus
White bass	Roccus chrysops
Yellow bass	Roccus mississippiensis
Spotted bass	Micropterus punctulatus
Largemouth bass	Micropterus salmoides
Warmouth	Chaenobryttus gulosus
Green sunfish	Lepomis cyanellus
Spotted sunfish	Lepomis punctatus
Redear sunfish	Lepomis microlophus
Yellowbelly sunfish	Lepomis auritus
Bluegill sunfish	Lepomis macrochirus
Longear sunfish	Lepomis megalotis
Flier sunfish	Centrarchus macropterus
Bluntnose darter	Ethoestoma chlorosomum
Freshwater drum	Aplodinotus grunniens

Table 3. Number of Each Species Collected from Seine Stations on the Trinity River Watershed, November 1, 1955 - October 31, 1956.

Station No. / Species	1	2	3	4	5	6	7	8	9	10	11	12	Total
Gizzard shad	7	2	0	0	0	0	0	0	1	0	0	0	10
Smallmouth buffalo	0	0	0	0	2	0	0	0	0	0	0	0	2
Golden shiner	0	0	0	0	0	34	0	0	0	0	0	0	34
Redfin shiner	0	0	0	0	0	0	0	0	0	12	0	0	12
Blacktail shiner	9	12	0	0	0	0	0	12	0	0	0	0	33
Red shiner	41	78	82	22	46	0	0	0	888	0	198	144	1499
Blackspot shiner	0	0	0	0	0	0	0	7	0	0	0	0	7
Silvery minnow	0	1	0	0	0	0	0	0	0	0	0	5	6
Parrot minnow	0	0	0	0	0	0	0	0	0	0	2	22	24
Fathead minnow	0	0	0	0	0	0	0	0	0	1	0	0	1
Channel catfish	0	0	0	0	0	0	0	0	2	0	0	0	2
Black bullhead	0	0	0	0	0	2	0	0	0	3	0	0	5
Blackspot topminnow	0	1	0	0	0	1	0	11	0	0	16	0	29
Mosquitofish	17	12	11	25	5	0	0	0	6	7	9	0	92
Striped mullet	0	0	0	0	0	0	0	0	0	0	0	1	1
Spotted bass	0	0	0	0	0	2	0	2	0	0	0	0	4
Black bass	1	0	11	0	0	0	2	0	0	0	0	0	14
Green sunfish	0	3	0	0	0	0	0	0	0	0	0	0	3
Spotted sunfish	2	2	0	0	0	0	0	0	0	0	0	0	4
Bluegill sunfish	1	3	30	5	9	5	1	18	0	20	11	6	109
Longear sunfish	1	0	0	0	0	0	0	1	1	0	0	0	3
Flier sunfish	0	0	0	0	0	1	0	0	0	0	0	0	1
Bluntnose darter	0	0	0	0	0	0	0	0	0	1	0	0	1
Drum	0	0	0	0	0	0	0	0	1	0	0	0	1
Total	79	114	134	52	62	45	3	51	899	44	236	178	1897

Table 4. Results of Net Collections from the Trinity River Watershed in Terms of Number and Percentage, November 1, 1955 - October 31, 1956.

Net Station / Species	Red Lake		Stanmire Lake		Moss Bluff (River)		Total	
	No.	%	No.	%	No.	%	No.	%
Alligator gar	0	0.0	0	0.0	15	7.6	15	2.6
Shortnose gar	0	0.0	0	0.0	1	0.5	1	0.2
Spotted gar	3	1.7	18	9.2	18	9.0	39	6.8
Longnose gar	0	0.0	1	0.5	94	47.6	95	16.6
Bowfin	1	0.6	0	0.0	0	0.0	1	0.2
Gizzard shad	107	59.8	124	63.3	0	0.0	231	40.3
Smallmouth buffalo	0	0.0	0	0.0	15	7.6	15	2.6
River carpsucker	0	0.0	5	2.6	0	0.0	5	0.9
Chubsucker	25	14.0	0	0.0	0	0.0	25	4.3
Channel catfish	0	0.0	12	6.1	25	12.7	37	6.5
Blue catfish	0	0.0	0	0.0	1	0.5	1	0.2
Black bullhead	8	4.4	5	2.6	0	0.0	13	2.3
Yellow bullhead	0	0.0	5	2.6	0	0.0	5	0.9
Striped mullet	0	0.0	0	0.0	16	8.0	16	2.8
White bass	0	0.0	1	0.5	0	0.0	1	0.2
Yellow bass	0	0.0	4	2.0	10	5.0	14	2.4
Largemouth bass	2	1.1	6	3.0	0	0.0	8	1.4
Warmouth	1	0.6	2	1.0	0	0.0	3	0.5
Redear sunfish	17	9.4	0	0.0	0	0.0	17	2.9
Bluegill sunfish	13	7.3	11	5.6	0	0.0	24	4.2
Yellowbelly sunfish	0	0.0	1	0.5	0	0.0	1	0.2
White crappie	2	1.1	1	0.5	0	0.0	3	0.5
Freshwater drum	0	0.0	0	0.0	3	1.5	3	0.5
Total	179	100.0	196	100.0	198	100.0	573	100.0

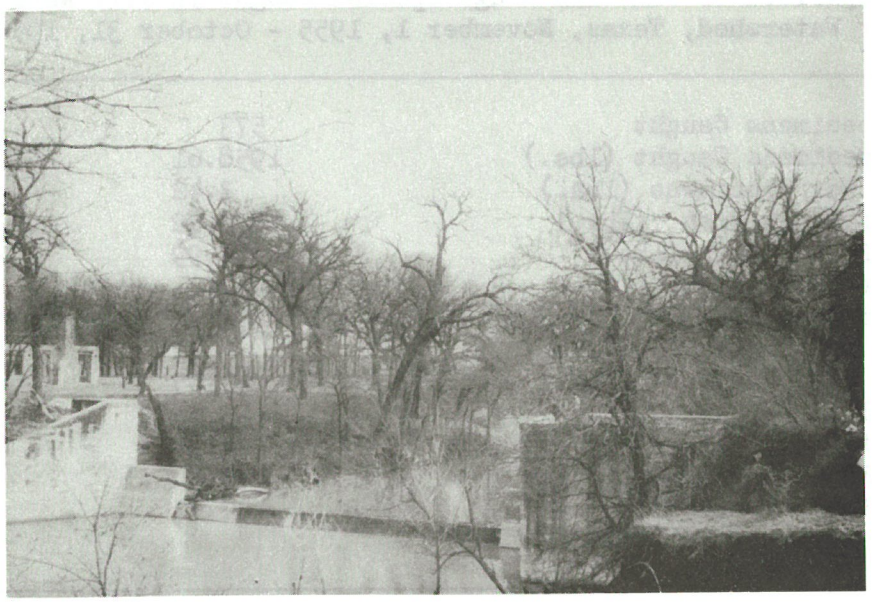
Table 5. Results of Net Collections from the Trinity River Watershed in Terms of Weight and Percentage, November 1, 1955 - October 31, 1956.

Net Stations / Species	Red Lake		Stanmire Lake		Moss Bluff (River)		Total	
	Wt.	%	Wt.	%	Wt.	%	Wt.	%
Alligator gar	0.00	0.00	0.00	0.0	686.00	40.4	686.00	35.0
Shortnose gar	0.00	0.0	0.00	0.0	50.31	3.0	50.31	2.6
Spotted gar	6.87	7.2	27.56	17.3	26.75	1.6	61.18	3.1
Longnose gar	0.00	0.0	5.25	3.3	862.19	50.8	867.44	44.3
Bowfin	3.19	3.4	0.00	0.0	0.00	0.0	3.19	0.2
Gizzard shad	52.25	54.8	81.25	50.9	0.00	0.0	133.50	6.8
Smallmouth buffalo	0.00	0.0	0.00	0.0	35.75	2.1	35.75	1.8
River carpsucker	0.00	0.0	7.19	4.5	0.00	0.0	7.19	0.4
Chubsucker	17.00	17.8	0.00	0.0	0.00	0.0	17.00	0.8
Channel catfish	0.00	0.0	12.50	7.8	17.31	1.0	29.81	1.5
Blue catfish	0.00	0.0	0.00	0.0	0.81	0.1	0.81	0.1
Black bullhead	5.75	6.0	5.19	3.2	0.00	0.0	10.94	0.5
Yellow bullhead	0.00	0.0	4.63	2.9	0.00	0.0	4.63	0.2
Striped mullet	0.00	0.0	0.00	0.0	12.06	0.7	12.06	0.6
White bass	0.00	0.0	0.69	0.4	0.00	0.0	0.69	0.1
Yellow bass	0.00	0.0	3.63	2.3	5.25	0.3	8.88	0.4
Largemouth bass	1.25	1.3	6.31	4.0	0.00	0.0	7.56	0.4
Warmouth	0.31	0.3	0.75	0.5	0.00	0.0	1.06	0.1
Redear sunfish	4.94	5.2	0.00	0.0	0.00	0.0	4.94	0.2
Bluegill sunfish	3.12	3.3	2.56	1.6	0.00	0.0	5.68	0.3
Yellowbelly sunfish	0.69	0.7	0.50	0.3	0.00	0.0	0.50	0.1
White crappie	0.00	0.0	1.56	1.0	0.00	0.0	7.93	0.4
Freshwater drum	0.00	0.0	0.00	0.0	1.56	0.1	1.56	0.1
Total	95.37	100.0	159.57	100.0	1697.99	100.0	1958.61	100.0

Table 6. A Comparison of Game and Rough Species Caught in Gill Nets from the Trinity River Watershed, Texas, November 1, 1955 - October 31, 1956.

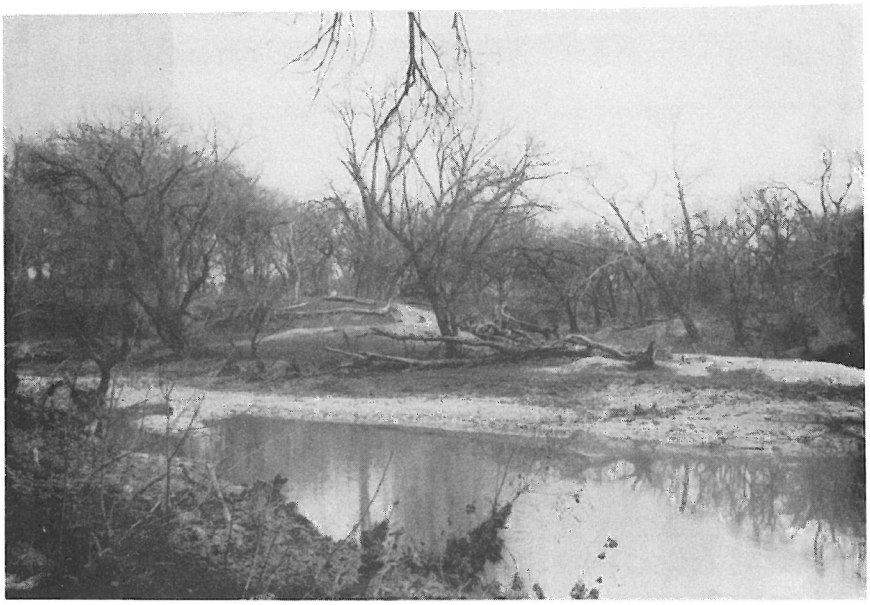
Total Number Specimens Caught	573
Total Weight Specimens Caught (lbs.)	1958.61
Average Weight per Specimens (lbs.)	3.42
Total Weight of Rough Fish (lbs.)	1873.62
Total Weight of Game Fish (lbs.)	84.99
Total Number of Rough Fish	443
Total Number of Game Fish	130
Average Weight per Rough Fish (lbs.)	4.23
Average Weight per Game Fish (lbs.)	0.65
Percent Rough Fish (by weight)	95.66
Percent Game Fish (by weight)	4.34
Percent Rough Fish (by number)	77.3
Percent Game Fish (by number)	22.7

Catfish, bullheads, and drum included in game fishes.



Low Water Dam on Clear Fork of Trinity Near Upper End of Benbrook Lake.

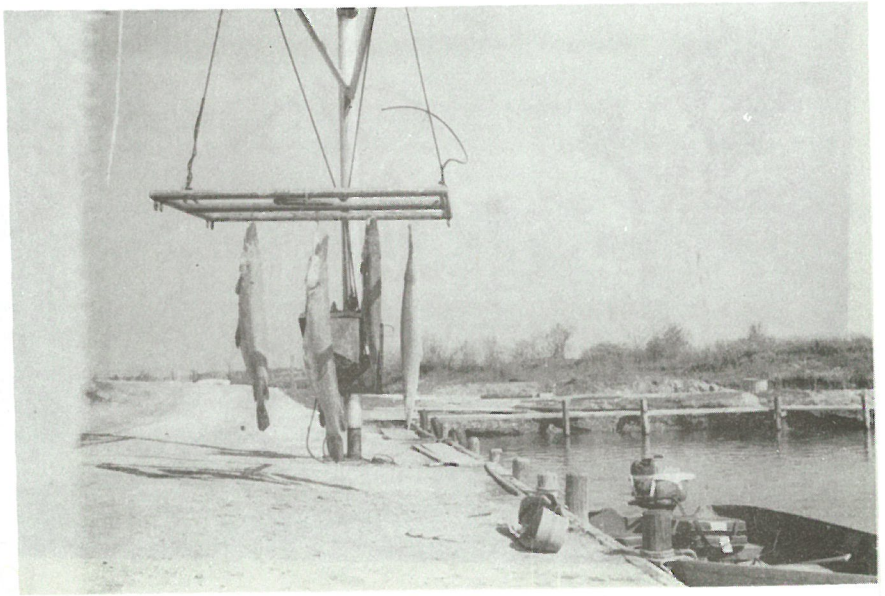
Clear Fork of Trinity Below Benbrook Dam.



Clear Fork of Trinity at Juncture with Bear Creek Above Benbrook Dam.

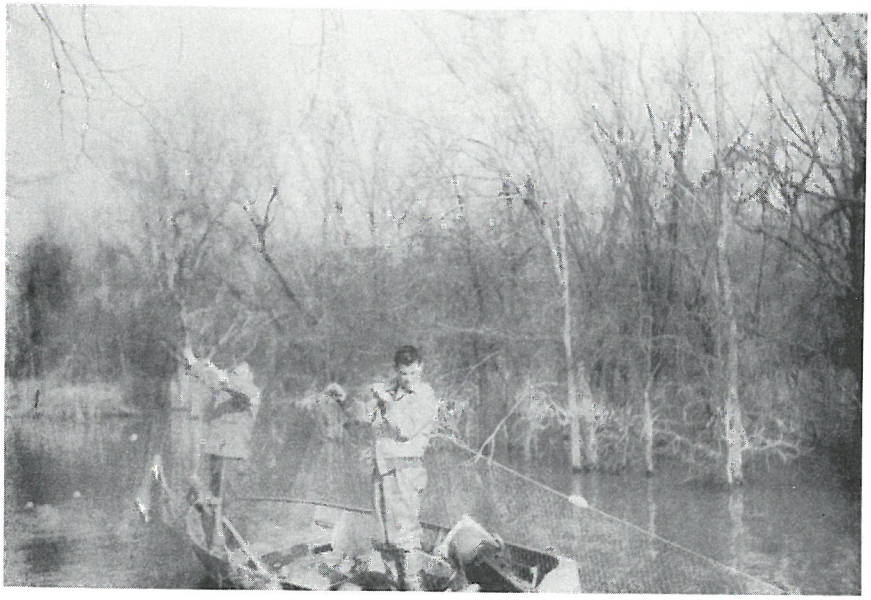
Bear Creek Showing Gravel Deposits in Dry Stream Bed About 100 Yards Above Clear Fork Juncture.

Fish Taken By Gill Nets From Benbrook Lake Near Upper End of Trinity Watershed.



Gar Taken From Old River Lake Near Mouth of Trinity. Largest is Alligator Gar Weighing 52 Pounds.

Net Station on Benbrook Lake. This Lake Formed by A Dam on Clear Fork Near Fort Worth.



Net Pictured Above is Lifted to Show Fish.